

Geotechnical Engineering

1. Water content is given by:

- a) Weight of water/mass of soil
- b) Mass of water/mass of solid
- c) Mass of water/mass of soil
- d) Mass of water/weight of solid

[View Answer](#)

Answer: b

Explanation: In Geotechnical Engineering, water content is an important parameter for analysing the soil. It is expressed as mass of water divided by mass of solids. It is denoted by w and expressed in %.

2. Who is the father of Geotechnical Engineering?

- a) Christian Otto Mohr

- b) Clausius Cleyperon
- c) John Smith
- d) Karl Von Terzaghi

[View Answer](#)

Answer: d

Explanation: He was an Austrian civil engineer and geologist. Most of the findings in geotechnical engineering and soil properties are done by him.

3. According to Darcy's Law:

- a) $q=iA$
- b) $q=kA$
- c) $q\propto iA$
- d) $q\propto kA$

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Answer: c

Explanation: Darcy's Law states that the rate of flow per unit time is proportional to a hydraulic gradient. $q\propto iA$ is the mathematical representation of the law.

4. Triaxial compression test is used to find _____ of soil.

- a) Compressive strength
- b) Permeability
- c) Specific gravity
- d) Shear strength

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Answer: d

Explanation: There are 4 methods available to measure shear strength of soil – direct shear, triaxial compression, unconfined compression and vane shear test. Triaxial compression test is the most accurate one.

5. _____ index is used to find settlement of soil.

- a) Compression
- b) Expansion
- c) Recompression
- d) Reloading

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Answer: a

Explanation: A plot is made between void ratio (e) and \log effective stress ($\log\sigma$). It shows different curves corresponding to loading, unloading and reloading of soil. Compression index $C_c = -\frac{\Delta e}{\Delta \log\sigma}$

6. Which of the following does not happen when compaction is done?

- a) Permeability decreases
- b) Water content increases
- c) Shear strength decreases

d) Compressibility decreases

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Answer: c

Explanation: On compaction of a soil mass, the shear strength is increased. It is tightly and firmly compacted and offers resistance to deformation and flow.

7. _____ is the measure of loss of strength with remoulding, with water content unchanged.

a) Compressibility

b) Sensitivity

c) Stability

d) Thixotropy

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Answer: b

Explanation: Sensitivity values range from 1-16. For an insensitive soil, it is 1. A soil with sensitivity above 16, is termed as quick.

8. In Geotechnical Engineering, soil is considered as a _____ phase material.

a) 3

b) 2

c) 1

d) 4

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Answer: a

Explanation: Soil is a 3 phase material. It consists of solids, water and air voids. It is represented in a 3 phase diagram with volume on left side and mass on the right side.

9. Fine particles are those particles with size less than _____ mm diameter.

a) 0.023

b) 0.090

c) 0.075

d) 4.75

[View Answer](#)

Answer: c

Explanation: Fine particles should pass through 75 μ IS sieve. Fine particles include clay, silt and organic content in a soil mass.

10. The mass density of water at 4°C is:

a) 1000g/ml

b) 1kg/m³

c) 1000Mg/m³

d) 1000kg/m³

[View Answer](#)

Answer: d

Explanation: Mass density is the ratio of mass of water to volume of water. At 4°C, it is 1g/ml or 1000kg/m³ or 1Mg/m³.

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11. Percentage air voids is denoted as:

- a) v
- b) n_a
- c) s
- d) a_v

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Answer: b

Explanation: Percentage air voids is the ratio of volume of air in voids to total volume of soil. It is denoted by n_a and expressed as a %.

12. Porosity and void ratio are related by:

- a) $e = \frac{n}{(1-n)}$
- b) $n = \frac{e}{(1+e)}$
- c) $1+e = n$
- d) $(1+n)/n = e-1$

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Answer: a

Explanation: Void ratio is e and porosity is n. Another relationship between the two is

$$n = \frac{e}{(1+e)}$$

[Soil Properties](#)

1. Most soils have a particle density of about:

- a) 2.6 g/cc
- b) 2.9 g/cc
- c) 2.5 g/cc
- d) 2.7 g/cc

[View Answer](#)

Answer: a

Explanation: Particle density is mass per unit volume of soil particles. It is expressed in g/cc and most soils have 2.6 g/cc as particle density.

2. Soil exists in how many states?

- a) 1
- b) 2
- c) 3
- d) 4

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Answer: d

Explanation: Soil can exist in four states based on the amount of water content. They are liquid, plastic, semi solid and solid state. Water content decreases with each state.

3. In oven drying method for determination of water content, temperature maintained is:

- a) 100-105°C
- b) 150-160°C
- c) 105-110°C
- d) 110-120°C

[View Answer](#)

Answer: c

Explanation: An optimum and constant temperature of 105-110°C is to be maintained in the oven. The specimen is kept for about 24 hours to ensure proper drying.

4. A soil generally consists of combination of _____ separates.

- a) 2
- b) 3
- c) 4
- d) 5

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Answer: b

Explanation: The mineral components of soil are termed as separates. These are three of them – clay, silt and sand. Various soils are designated based on the proportion of separates.

5. Loose soil has a relative density within a range of:

- a) 60-85
- b) 85-100
- c) 10-35
- d) 35-60

[View Answer](#)

Answer: c

Explanation: Relative density is used to express relative compactness of cohesionless soil. It ranges from <10 to 100 (very loose to very dense). Loose soil has a relative density between 10 and 35.

6. _____ apparatus is used to test liquid limit of a soil.

- a) Mohr
- b) Casagrande
- c) Otto
- d) Terzaghi

[View Answer](#)

Answer: b

Explanation: The water content at which soil changes from liquid to plastic state is liquid limit. Casagrande apparatus consists of a rubber base and brass cup. Sample is filled in a cup, subjected to blows by rotating handle at 2 revolutions per second. Water content corresponding to 25 blows is the liquid limit.

7. How many tests in the lab can be performed to get permeability of soil?

- a) 5
- b) 4
- c) 3
- d) 2

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Answer: d

Explanation: The two tests are constant head permeability test and variable head permeability test. The constant head permeability test is done for highly permeable soil and the other one for fine grained soil.

8. Soil with higher I_c (consistency index) is a better foundation material.

- a) True
- b) False

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Answer: a

Explanation: If two soils are to be compared, based on I_c , then higher value one is better foundation material. If $I_c < 0$, natural water content $<$ liquid limit and soil would behave like liquid. This is not a desired property for foundation material.

9. How many types of pores are present in a soil mass?

- a) 6
- b) 3
- c) 5
- d) 4

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Answer: c

Explanation: The five types are macropore (too large, $>75\mu\text{m}$), mesopore ($30-75\mu\text{m}$), micropore ($5-30\mu\text{m}$), ultramicropore ($0.1-30\mu\text{m}$) and cryptopore (smallest, $< 0.1 \mu\text{m}$).

10. How many grades of soil are there?

- a) 5
- b) 4
- c) 7
- d) 6

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Answer: b

Explanation: Based on the degree of distinctness of peds (natural aggregates of soil particles), there are 4 grades of soil. They are structureless, weak, moderate and strong.

[Geotechnical Investigation and Geosynthetics](#)

1. _____ gives general guidance for geotechnical investigation.

- a) IS

b) GIS

c) BIS

d) IGS

[View Answer](#)

Answer: d

Explanation: IGS is Indian Geotechnical Society. This body gives the general guidelines to be followed while conducting a geotechnical investigation. The head office is in Delhi.

2. Geosynthetics includes _____ main product categories.

a) 6

b) 8

c) 9

d) 10

[View Answer](#)

Answer: b

Explanation: Geosynthetics are synthetic products (polymeric). The eight categories are geotextiles, geogrids, geonets, geomembranes, geosynthetic clay liners, geofoam, geocells and geocomposites.

3. _____ is useful in determining gradient of water underground.

a) Pressure meter

b) Penetrometer

c) Piezometer

d) Hydrometer

[View Answer](#)

Answer: c

Explanation: Piezometer is used for long term investigation of ground water tables in cut and fill areas. They are also used to determine if there is upward or downward gradient of water.

4. How many types of primary functions of geosynthetics are there?

a) 5

b) 4

c) 6

d) 3

[View Answer](#)

Answer: a

Explanation: The main functions are separation, reinforcement, filtration, drainage and containment.

5. CPT is a more popular method compared to SPT as a method of geotechnical soil investigation.

a) True

b) False

[View Answer](#)

Answer: a

Explanation: CPT is cone penetration test and SPT is standard penetration test. CPT is more popular than SPT because of higher accuracy, speed, more continuous soil profile and less cost.

6. How many steps are involved in a soil investigation?

- a) 3
- b) 6
- c) 5
- d) 2

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Answer: a

Explanation: The first step is reconnaissance (visual inspection, maps, photos, etc.). The next step is exploration (geophysical, electrical, pits, etc.). The last step is field tests (vane shear, pumping, penetration, etc.).

7. The structure of a geocell is:

- a) 2D honeycombed
- b) 2D floccular
- c) 3D floccular
- d) 3D honeycombed

[View Answer](#)

Answer: d

Explanation: Geocell is also called a cellular confinement system. It has a 3D honeycombed structure, which is filled with compacted soil to make it a confinement system.

8. NDT is not employed in geotechnical investigations.

- a) True
- b) False

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Answer: b

Explanation: NDT is non-destructive technique and is a modern tool for geotechnical investigation. A ground penetrating radar which utilizes radar pulses for subsurface imaging is used.

9. _____ is the largest group of geosynthetics.

- a) Geonets
- b) Geomembranes
- c) Geotextiles
- d) Geogrids

[View Answer](#)

Answer: b

Explanation: Geomembranes are thin sheets of polymeric material and are impermeable. They are widely used for linings and coverings of liquid or solid storage facilities.

10. Which of the below is not a test on geosynthetics?

- a) Grab test

- b) Dry sieve test
- c) Pumping in test
- d) Tear test

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Answer: c

Explanation: Pumping in the test is a field test to determine permeability of soil. All the others are used to test geosynthetics.
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11. Indirect method of geotechnical investigation is also termed as _____

- a) Geo-chemical methods
- b) Geo-physical methods
- c) Borehole method
- d) Soil mechanics

View Answer

Answer: b

Explanation: Geo-physical methods use the principle that physical properties of soil vary for different types of soils. It is an indirect method of geotechnical investigation.

[Highway Engineering](#)

1. The administration of highway projects depends on _____ factors.

- a) 2
- b) 5
- c) 3
- d) 6

View Answer

Answer: c

Explanation: For each country, the administration of highway projects is different. But there are three factors common to all countries – social, political and economic.

2. In car – centred approach, _____ has been considered.

- a) Importance of transport
- b) Managing existing roads for future traffic
- c) Controlling demand for transportation
- d) Future increase in traffic demand

View Answer

Answer: d

Explanation: There are four strategies for highway planning. In car-centred approach, the considerations for future increase in traffic demand are taken care of. They are used in most large cities.

3. Travel patterns are determined by compiling a profile of _____ and _____ of all journeys made within the area.

- a) Origin, destination
- b) Mode, destination
- c) Origin, speed
- d) Mode, speed

[View Answer](#)

Answer: a

Explanation: The origin and destination points are considered for travel patterns. It gives details about the place and exact pattern in which people move from place to place.

4. Which of the below is a commercial element in highway construction?

- a) Traffic
- b) Installation technique
- c) Environmental aspects
- d) Material

[View Answer](#)

Answer: c

Explanation: There are two elements in highway construction – technical and commercial. Technical elements include materials, their quality, traffic, installation techniques whereas commercial elements include environmental aspects, public concerns, legal aspects, political aspects, etc.

5. In India roads are classified into _____ based on location.

- a) 6
- b) 3
- c) 4
- d) 5

[View Answer](#)

Answer: d

Explanation: They are national highways (NH), state highways (SH), major district road (MDRs), other district road (ODRs) and village road (VRs).

6. The longest international highway is:

- a) Pan-American highway
- b) Trans-Canada highway
- c) Karakoram highway
- d) Australia highway 1

[View Answer](#)

Answer: a

Explanation: Pan-American highway is nearly 25,000 kms long. It connects many countries in America. Trans-Canada is longest national highway. Karakoram is the highest international highway. Longest national highway circuit is Australia's highway 1.

7. _____ can provide a 3-5 dB reduction in tyre-pavement noise emissions.

- a) Asphalt

- b) Bituminous
- c) Rubberised asphalt
- d) Concrete

[View Answer](#)

Answer: c

Explanation: Compared to other options, rubberised asphalt give a 3-5 dB reduction in the noise produced by tyre-pavement interaction.

8. How many types of pavement surfaces are there?

- a) 4
- b) 5
- c) 6
- d) 2

[View Answer](#)

Answer: d

Explanation: The 2 types are Portland cement concrete (PCC) and hot-mix asphalt (HMA). Weathering courses, base course is laid below these.

9. The design consideration of highways doesn't include:

- a) Settlement
- b) Cross section
- c) Level of service
- d) Sight distance

[View Answer](#)

Answer: a

Explanation: To design foundation, settlement is an important parameter. For designing highways: the number of lanes, cross section, level of service, sight distance, alignment, lane width and so on are important considerations.

10. A prime coat is low viscosity asphalt emulsion used to create bond between existing pavement and new asphalt overlay.

- a) True
- b) False

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Answer: b

Explanation: A tack coat is used to bond existing pavement surface to the new asphalt overlay. A prime coat is applied to base course prior to laying HMA course.
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11. _____ is used in shaping the surface of sand-clay roads.

- a) Hoes and rakes
- b) Mattocks and bush hooks
- c) Drag scraper

d) Plow

[View Answer](#)

Answer: a

Explanation: Mattocks and bush hooks are used for trimming surface. Drag scraper is used for scraping the road surface. Plow is used to expose the surface by overturning it.

[Railway Engineering](#)

1. The first passenger train was introduced in India in:

a) 1851

b) 1853

c) 1835

d) 1815

[View Answer](#)

Answer: b

Explanation: The first passenger train in India started in 1853 with around 400 passengers, 3 coaches between Boribundar and Thane.

2. Name the organization which is the research and development wing of Indian Railways.

a) CRIS

b) RDSO

c) RSDO

d) IRCTC

[View Answer](#)

Answer: b

Explanation: The RDSO (Research, Designs and Standards Organization) acts as the technical advisor and consultant to the Ministry of Railways and their production units.

3. The Railways has a _____ degree of freedom for its movement.

a) Single

b) Two

c) Three

d) Four

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Answer: a

Explanation: Degree of freedom refers to the number of directions in which a vehicle can move. Since trains have to run on the provided tracks, their movement is restricted to one direction only, compared to road transport which can move in x, y and z directions.

4. Track modulus is defined as:

a) Load/unit length of sleeper

b) Load/unit length of sleeper to produce depression in rail

c) Load/unit length of rail to produce depression in sleeper

d) Load/unit length of rail to produce unit depression/deflection in track

[View Answer](#)

Answer: d

Explanation: The track modulus defines the stiffness of track or its load bearing capacity. It is based on the elastic theory. When a load causes a deflection on the top of the rail, the deformation comes on the sleeper, below the rail.

5. The track modulus is not affected by gauges.

a) True

b) False

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Answer: b

Explanation: As the three gauges (narrow-NG, metre –MG and broad-BG) increases, the components of the permanent part (like ballast and sleeper) also increases in size. As a result track modulus also increases. The recommended track modulus is: BG = 70 to 90kg/cm², MG=42-54kg/cm² and NG=30kg/cm².

6. Which of the following causes stresses in Sleepers?

a) Eccentric vertical loads

b) Contact shear stress of wheel and rail

c) Lateral deflection of sleepers

d) Track components

[View Answer](#)

Answer: d

Explanation: The track components like the track modulus, the stiffness of rail, design of the sleeper, sleeper density (number of sleepers provided) and their load bearing capacity are factors which cause stresses in sleepers. The other 3 options are responsible for stresses in rails.

7. There are _____ types of rail sections.

a) 2

b) 3

c) 4

d) 5

[View Answer](#)

Answer: b

Explanation: The three types of rail sections are Double Headed Rail (Shaped like a dumbbell), Bull Headed Rail (Head thicker/stronger than lower part) and Flat Footed Rail.

8. How does the depth of ballast cushion affect rail section?

a) Higher the depth bigger the rail section

b) Depth is less, bigger the rail section

c) Depth is less, smaller the rail section

d) Depth and Rail section same

[View Answer](#)

Answer: b

Explanation: The selection of the rail section depends on many factors like heaviest axle loads, maximum permissible speed, type of sleepers and depth of ballast cushion. If the depth of the ballast cushion is less, then a bigger rail section has to be provided.

9. The mountain alignment can be classified into _____ types.

- a) 4
- b) 3
- c) 2
- d) 1

[View Answer](#)

Answer: c

Explanation: They are the zig-zag development and the switch back development. In the zig-zag developments, the alignments try to follow the contours of the region to an extent. In the switch back, certain contours like steep slopes have to be negotiated and may use buffer stops.

10. What must be done to wooden sleepers before use?

- a) Seasoning
- b) Washing
- c) Painting
- d) Hydrating

[View Answer](#)

Answer: a

Explanation: The wood for the sleepers is taken directly from the trees and they contain moisture. In order to reduce the moisture content, seasoning is adopted. In India, air seasoning is the most commonly used method.

[Port and Harbour Engineering](#)

1. Every port is a harbour.

- a) True
- b) False

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Answer: a

Explanation: Harbour is an enclosed area where there is storage, refuelling, loading and unloading of cargo facilities. A port is a harbour which provides all facilities for the transfer of cargo as well as passengers. So, all the ports are harbours.

2. How many components does a harbour comprise of?

- a) 5
- b) 10
- c) 15
- d) 20

[View Answer](#)

Answer: b

Explanation: The various components of a harbour are entrance channel, break water, turning basin, shelter basin, pier, wharf, quay, dry dock, wet dock and jetty.

3. The entrance channel ranges from:

- a) 100-160m
- b) 100-500m
- c) 0-400m
- d) 100-260m

[View Answer](#)

Answer: d

Explanation: The ships enter the harbour from a wide water area, which is called an entrance channel. The width is 100m for a small harbour, 100-160m for medium and 160-260 for large harbour.

4. The solid parallel platform in a harbour with berthing facility on one side only is:

- a) Pier
- b) Quay
- c) Wharf
- d) Jetty

[View Answer](#)

Answer: c

Explanation: A pier is the platform parallel to the shore with berthing possible on both sides, a quay provides berthing on one side and retains earth on other side. A jetty is a platform that is perpendicular to shoreline.

5. _____ is a type of utility based harbour.

- a) River harbour
- b) Artificial harbour
- c) Commercial harbour
- d) Canal harbour

[View Answer](#)

Answer: c

Explanation: The commercial harbour provides facilities for loading/unloading of cargo. An artificial harbour is based on the protection needed. (Manmade to protect from storms/waves). River and canal harbours are based on the location of these.

6. The open type of wharves are made of:

- a) Timber
- b) R.C.C.
- c) Timber, R.C.C. or both
- d) Earth or rock fill

[View Answer](#)

Answer: c

Explanation: These have high level decks which are supported by piles and are made of timber, R.C.C or both

together. Sometimes stressed slab or beam is also used. The solid type wharves are made of earth or rock fill with the bottom made of structures like steel pile cells.

7. The marine structure located alongside or at the entrance of a pier or a wharf is:

- a) Pier heads
- b) Dolphins
- c) Breakwater
- d) Fenders

[View Answer](#)

Answer: b

Explanation: These structures provide mooring facilities for ships, absorb impact force and shorten the length of a pier or a wharf.
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8. The ferry designs are dependent on:

- a) Aesthetics
- b) Length of route
- c) Country where it is used
- d) Weather conditions

[View Answer](#)

Answer: b

Explanation: The ferry designs depend on factors like passenger capacity, speed, water conditions and length of route; ex- a double ended ferry used in States Island, Washington, which has interchangeable sterns & bows to shuttle the route without turning around.

9. The alignment of breakwater should be:

- a) Horizontal
- b) Straight
- c) Perpendicular
- d) Diagonal

[View Answer](#)

Answer: b

Explanation: Breakwater is a protection barrier constructed to protect the harbour from the effect of sea waves. Its alignment should be straight with an intersection angle within 60° & sometimes curved in the open sea to reduce the effect of waves.

[Airport Engineering](#)

1. Airports can be classified on how many basis?

- a) 5
- b) 4
- c) 3
- d) 2

[View Answer](#)

Answer: b

Explanation: The airports can be classified into 4 on the basis of take-off and landing, geometric design, based on aircraft approach speed (FAA) and function.

2. ICAO classification system considers how many things?

- a) 2
- b) 4
- c) 5
- d) 6

[View Answer](#)

Answer: a

Explanation: The ICAO classification system is based on geometric designs broadly. It mainly considers 2 things for its classification – length of the runway and on basis of wing span and outer main gear wheel span.

3. The FAA classification of the airport is based on:

- a) Function
- b) Geometric design
- c) Airport approach speed
- d) Length of Runway

[View Answer](#)

Answer: c

Explanation: The FAA or Federal Aviation Administration classifies on the basis of the aircraft approach speed, given in knots. They are ranging from category A<91 knots to category E>186 knots.

4. Which of the following is not a characteristic of centralized system of the terminal Area?

- a) Passengers, cargo routed centrally
- b) Passenger facilities in small units
- c) Walking distance to aircraft < 200m
- d) Common facilities for different gate positions

[View Answer](#)

Answer: b

Explanation: The passenger facilities are arranged in smaller units or provided separately at different locations in a decentralised system. Each unit will have aircraft gate positions.

5. Which of the below does not affect the site-selection of an airport site?

- a) Adequate access
- b) Air traffic potential
- c) Sufficient airspace
- d) Number of ground staff

[View Answer](#)

Answer: d

Explanation: The other 3 options are the specific aspects on which the site-selection is dependent. The site should be accessible by people easily from different locations, there should be potential for air traffic – flight or passenger and sufficient airspace for airports without obstruction. The ground staff is considered depending on the size of airport.

6. Runways are oriented in a direction against the prevailing wind.

- a) True
- b) False

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Answer: b

Explanation: The runways are oriented in the direction of the wind so that it can utilize the force provided by the wind for take-off and landing of the aircraft.

7. The wind intensity during a calm period in runways should be:

- a) Below 4.6km/hr
- b) Above 5km/hr
- c) Between 5-10 km/hr
- d) Below 6.4km/hr

[View Answer](#)

Answer: d

Explanation: The wind intensity should remain below 6.4km/hr during a calm period and it is the same for all wind direction. It is equal to 100 minus the total wind coverage.

8. The application of _____ diagram is used to find the orientation of the runway to get the desired wind coverage.

- a) Wind Butterfly
- b) Wind Cycle
- c) Wind Star
- d) Wind Rose

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Answer: d

Explanation: An average date of around 5-10 years of the various components of wind (intensity, duration and direction) of the area is compiled to make a Wind Rose diagram. The entire area of the airport is divided into 16 equal parts at angles of 22.5°. The wind coverage in each of the small quadrants is then studied for the orientation of the runway.

9. Elevation of airport site above MSL is a factor that controls airport size.

- a) True
- b) False

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Answer: a

Explanation: It is one of the factors. As the elevation increases, the meteorological conditions like air pressure and density reduces. As a result, bigger size of facilities has to be provided.

10. How many types of Fly Rules are there?

- a) 2
- b) 5
- c) 4

d) 3

[View Answer](#)

Answer: a

Explanation: There are 2 fly rules; the VFR (Visual Flight Rules) and IFR (Instrumental Fly Rules). The VFR allows the aircraft to be operated within reasonable conditions by oneself. In IFR, the operations are entirely controlled by instruments. A flight plan is required in both cases.

[Urban Engineering](#)

1. How many types of land use patterns are there?

a) 10

b) 20

c) 15

d) 5

[View Answer](#)

Answer: a

Explanation: The land use pattern shows how the land is used for various purposes in the development of housing/commercial/industrial areas. There are widely 10 land use patterns; radio centric (a large circle with development starting from centre), rectilinear (2 areas crossing centre), star (open spaces in star shape), ring (areas in circle with open space in centre), linear (along topography contours), branch (with connecting areas), sheet (spread out), articulated sheet (central and sub clusters), constellation (equal size areas nearby) and satellite (constellation around main area).

2. General land use planning deals with:

a) Residential

b) Institutional

c) Forests

d) Commercial

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Answer: c

Explanation: The general land use planning deals with the non-urban large scale areas like forests, croplands, swamplands, etc. and they are used primarily for agriculture, forest or special uses. The other 3 options come under urban land use planning.

3. The land supply for urban expansion can be determined by:

a) $TLA - (PCA + BU)$

b) $PCA - (TLA + BU)$

c) $BU - (PCA + TLA)$

d) $BU - (TLA - PCA)$

[View Answer](#)

Answer: a

Explanation: The total land area of a city (TLA) which is available for expansion is found out by deducting the total area of protected/conservation areas (PCA) and the existing built-up areas (BU). All these are taken in hectares.

4. Urbanisation and occupation of river banks and flood plains lead to:

- a) Periodic exposure to inundation
- b) Greater flow velocity
- c) High run off
- d) Increased soil erosion

[View Answer](#)

Answer: a

Explanation: The population of town on river banks are periodically exposed to inundation from the rivers. Then slowly these extensions increase as there is less space for water to flow. Removal of natural vegetation leads to the other 3 options.

5. A non-structural measure in flood control management is:

- a) Canalisation
- b) Polders and dikes
- c) Flood proofing construction
- d) Retention ponds

[View Answer](#)

Answer: c

Explanation: The aim of a non-structural flood control management is to reduce the population and properties exposure to the floods. Use of flood proofing in construction is one of the ways.

6. Which of the following is not a flood proofing measures for houses?

- a) Elevation
- b) Floodwalls
- c) Dry flood proofing
- d) Detention basin

[View Answer](#)

Answer: d

Explanation: The buildings which are in flood prone areas can be flood proofed by elevation (raise a building), floodwalls (a wall built to keep water away) and dry flood proofing (making walls of building watertight).

7. Noise map is an excellent tool for urban planning.

- a) True
- b) False

[View Answer](#)

Answer: a

Explanation: These maps help to quantify the noise of a region and evaluate the population exposed to it. They help to create a database for the planning of zones accordingly (noisy activities/sensible, etc) and to predict the impact of noise in the predicted urban infrastructure.
advertisement

8. How many number of source types of noise are there?

- a) 4

- b) 3
- c) 2
- d) 1

View Answer

Answer: b

Explanation: There are 3 sources type noise propagation. They are point source (loudspeakers, vehicles, industrial equipment, etc.), line source (road, railways, etc) and area source (parking lot, functions, opening of tunnels, etc).

9. Optimization of urban mobility can be intervened at the infrastructure level by use of:

- a) SUV lanes
- b) HOV lanes
- c) Toll free lanes
- d) Slow lanes

View Answer

Answer: b

Explanation: The HOV (High Occupancy Vehicles) lane optimizes the existing roads by allowing vehicles with 2,3 or more occupants to use these lanes exclusively. So, it promotes people to use car pools to reach the destination faster, reducing the number of vehicles on road.

[Types of Irrigation](#)

1. _____ is a form of overhead irrigation.

- a) Centre Pivot irrigation
- b) Sprinkler irrigation
- c) Terraced irrigation
- d) Drip irrigation

View Answer

Answer: a

Explanation: In centre pivot irrigation, steel/Al pipes are joined together, supported by trusses and mounted on wheeled towers.

2. Inundation irrigation system is functional all through the year.

- a) True
- b) False

View Answer

Answer: b

Explanation: Inundation canal gets water which flows from a flooded river only. These are then discharged into the fields. Only if rivers are flooded (rainy season), these are functional.

3. Surface irrigation is again subdivided into:

- a) 2
- b) 4
- c) 3

d) 5

[View Answer](#)

Answer: c

Explanation: The three types are furrow, border strip and basin irrigation. It is also called flood irrigation when the field is immersed in water completely.

4. Tank water irrigation system is common in:

- a) Madhya Pradesh
- b) Uttar Pradesh
- c) Himachal Pradesh
- d) Andhra Pradesh

[View Answer](#)

Answer: d

Explanation: In Southern states of Andhra Pradesh, Karnataka, Tamil Nadu; rain water harvesting and storage of water is done using tanks. The water is then fed to fields via a canal.

5. The field water efficiency of trickle irrigation is:

- a) 50-55%
- b) 55-85%
- c) 80-90%
- d) 60-70%

[View Answer](#)

Answer: c

Explanation: Drip irrigation is also called trickle irrigation. If this system is managed correctly, the field water efficiency can be as high as 80-90%.

6. Sub-irrigation is used in areas with:

- a) Low water table
- b) High water table
- c) Sloping terrain
- d) Flat terrain

[View Answer](#)

Answer: b

Explanation: Sub-irrigation is a method of artificially raising water table to allow the soil to be moistened from below plant's root zone. It is also used in commercial greenhouse production.

7. Water for irrigation can come from _____ sources.

- a) 3
- b) 2
- c) 4
- d) 5

[View Answer](#)

Answer: a

Explanation: The sources of water for irrigation can be ground water, surface water and non-conventional sources. The non-conventional sources are treated wastewater, drainage water, fog collection, etc.

8. Fertigation is a process in _____ irrigation.

- a) Sprinkler
- b) Surface
- c) Drip
- d) Centre pivot

[View Answer](#)

Answer: c

Explanation: In drip irrigation nowadays, a plastic mulch is incorporated which reduces evaporation and is a means of delivering fertilizers. Hence, the process fertigation.

9. The field water efficiency is determined by:

- a) Water transpired by crop – water applied to a field
- b) $(\text{Water absorbed by crop} \div \text{water applied to a field}) \times 100\%$
- c) Water absorbed by crop – water applied to a field
- d) $(\text{Water transpired by crop} \div \text{water applied to a field}) \times 100\%$

[View Answer](#)

Answer: d

Explanation: The field water efficiency is the way to determine if the method of irrigation is efficient. It is determined by using the formula $(\text{water transpired by crop} \div \text{water applied to a field}) \times 100\%$. It is expressed in %.

10. Spate irrigation is a special form of irrigation using surface water.

- a) True
- b) False

[View Answer](#)

Answer: a

Explanation: It is also called flood water harvesting. In this case, water is diverted to normally dry river beds using a network of dams, gates and channels and are spread over large areas.
advertisement

11. Micro-irrigation is also called:

- a) Nano-irrigation
- b) Petite irrigation
- c) Localized irrigation
- d) Flood irrigation

[View Answer](#)

Answer: c

Explanation: It is a system where water is distributed under low pressure through the piped network in a pre-determined pattern and applied to each plant. Hence, it is called localized irrigation.

12. Tube wells are not used in:

- a) UP
- b) Haryana
- c) Gujarat
- d) Rajasthan

[View Answer](#)

Answer: d

Explanation: In Rajasthan and Maharashtra artesian wells are used. Tube well can be installed near agricultural land. A deep tube well, worked by electricity can irrigate a large area.

[Dams](#)

1. Which of the below is the earliest known dam?

- a) Sadd-el-Kafara dam
- b) Dam of Marib
- c) Jawa Dam
- d) Ha-ilar Dam

[View Answer](#)

Answer: c

Explanation: Jawa Dam is in Jordan. It is 100 kms northeast of capital Amman. It is a gravity dam with stone wall. It is dated to 3000 BC.

2. Portion of dam in contact with ground at downstream side is _____

- a) Crest
- b) Toe
- c) Foot
- d) Heel

[View Answer](#)

Answer: d

Explanation: Toe is the position of a dam in contact with the ground at the upstream side. Crest is top of dam. There is no part called a foot.

3. Based on function of dam, it can be classified into: –

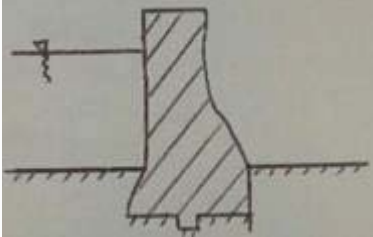
- a) 5
- b) 8
- c) 10
- d) 6

[View Answer](#)

Answer: a

Explanation: The five types are storage, diversion, detention, debris and coffer dams.

4. The cross section below shows a



- a) Earth
- b) Buttress
- c) Gravity
- d) Arch

[View Answer](#)

Answer: c

Explanation: The figure shows a gravity dam. It is a massive sized dam built using concrete or stone masonry. They can hold back large volume of water.

5. Which of the below is an example for earth dam?

- a) Bhakra Nangal Dam
- b) Banasura Sagar Dam
- c) Idukki Dam
- d) Bisalpur Dam

[View Answer](#)

Answer: b

Explanation: Bhakra Nangal Dam is an example of gravity dam. Idukki dam is an arch dam. Bisalpur Dam is also a type of gravity dam.

6. _____ is the arrangement made near top of dam for passage of excess water from the reservoir.

- a) Sluice way
- b) Spillway
- c) Gallery
- d) Abutments

[View Answer](#)

Answer: b

Explanation: Spillway is kind of a passage to allow water from upstream side to downstream side of a dam. They have floodgates to control the flow.

7. Hydroelectric power plants at dam supplies about _____ of world's electricity.

- a) 19%
- b) 25%
- c) 42%

d) 50%

[View Answer](#)

Answer: a

Explanation: It also contributes to over 63% of renewable energy. Most of this is generated by China (large dams) and contributes about 50% of world use of the power generated.

8. Natural dam is not created usually by:

- a) Glacial activity
- b) Volcanic activity
- c) River meandering
- d) Moraine deposit

[View Answer](#)

Answer: c

Explanation: River meandering refers to the formation of a member by a river by altering its straight course and following a sinuous winding path. It can't form a dam naturally. Volcanic dams form when lava flows and intercepts a river or lake, resulting in a natural impoundment. Glacial activity and moraine deposits can also form dams.

9. Arch-gravity dams are thinner dams and save resources.

- a) True
- b) False

[View Answer](#)

Answer: a

Explanation: It is a combination of arch and gravity dam. It is inward compression by water reduces lateral force acting on dam. Gravitational force required is less. Hence, it saves resources and doesn't need to be massive.

10. Buttress dams are of _____ types.

- a) 6
- b) 4
- c) 8
- d) 3

[View Answer](#)

Answer: d

Explanation: The three types of buttress dam are deck type, multiple-arch type and massive-head type. Deck type consists of a sloping deck supported by buttresses. In massive-arch type, deck is replaced by horizontal arches. There is no deck slab in massive-head type.

11. _____ is a temporary dam constructed to exclude water from a specific area.

- a) Debris dam
- b) Diversion dam
- c) Cofferdam
- d) Storage dam

[View Answer](#)

Answer: c

Explanation: Cofferdam is constructed on the upstream side of the site where a dam is to be constructed, so that site is dry.

12. Based on material of construction, _____ types are there.

- a) 2
- b) 4
- c) 6
- d) 8

[View Answer](#)

Answer: a

Explanation: There are two types – rigid and non-rigid. Rigid material includes steel, concrete, masonry, stone, etc. and non-rigid materials are earth (earth dam), tailings (waste from mine), rock fill (rock).
advertisement

13. Earth dams are _____ in shape.

- a) Triangular
- b) Rectangular
- c) Trapezoidal
- d) Circular

[View Answer](#)

Answer: c

Explanation: Earth dams are generally built using gravel, sand and clay. They are trapezoidal in shape so as to hold the non-rigid materials properly.

14. Hydraulic head for a small dam is:

- a) 5-7.5m
- b) 7.5-12m
- c) 12-13m
- d) 5-10m

[View Answer](#)

Answer: b

Explanation: Based on size, there are three types of dam. Small with hydraulic head 12-15m, intermediate with 12-30m and large with greater than 30m.

Weirs

1. How many types of weirs are there based on the shape of the crest?

- a) 6
- b) 4
- c) 5
- d) 3

[View Answer](#)

Answer: b

Explanation: The four types are sharp-crested, broad-crested, narrow-crested and ogee-shaped weir.

2. _____ weir comprises several designs into one structure.

- a) All-in-one
- b) Open
- c) Mixed
- d) Compound

[View Answer](#)

Answer: d

Explanation: Compound weirs are commonly seen in locations where a river has multiple users who may need to bypass the structure. Common design includes a broad-crested weir.

3. Triangular weir is also called:

- a) Trigonometric
- b) Ogee
- c) V-notch
- d) Isolated

[View Answer](#)

Answer: c

Explanation: Triangular weir is shaped like a reverse triangle that is the shape of V. Hence, it is also called V-notch weir. These can be used to measure discharge over small flows with greater accuracy.

4. Head loss will be small in case of:

- a) Ogee shaped
- b) Broad crested
- c) Sharp crested
- d) Narrow crested

[View Answer](#)

Answer: b

Explanation: Broad crested weirs are constructed in rectangular shape only and are suitable for larger flows. Hence, head loss is less.

5. In trapezoidal weir, sides are inclined outward with a slope of:

- a) 1:4
- b) 1:5
- c) 1:6
- d) 1:3

[View Answer](#)

Answer: a

Explanation: In trapezoidal weir, the sides are sloping outward at a specific inclination of 1:4 (horizontal: vertical). It is a modification of rectangular weir with slightly higher capacity.

6. Weirs are normally used to calculate:

- a) Volume
- b) Head loss
- c) Discharge
- d) Velocity

[View Answer](#)

Answer: c

Explanation: Discharge or flow rate is measured and calculated by analysing a weir. It is given by $Q=CLH^n$, where C is flow coefficient, L is width of crest, H is height of head, n is different for different structures.

7. _____ is the standard shape of a weir.

- a) Rectangular
- b) Triangular
- c) Square
- d) Trapezoidal

[View Answer](#)

Answer: a

Explanation: Rectangular is the standard shape of a weir. Triangular and trapezoidal weirs are modifications of it. They are generally suitable for larger flowing channels.

8. Cippoletti weir has _____ slope:

- a) Different
- b) Proportionate
- c) Disproportionate
- d) Equal

[View Answer](#)

Answer: d

Explanation: Cippoletti weir is a special case of a trapezoidal weir. In this, the side slope on either sides are equal. So, trapezoid can be divided into rectangular and triangular portion and hence analysed easily.

9. The overflowing sheet of water is called:

- a) Head
- b) Nappe
- c) Upstream
- d) Crest

[View Answer](#)

Answer: b

Explanation: Nappe represents the overflowing sheet of water. If it discharges into air, it is free discharge. If discharge is partly under water, it is submerged/drowned discharge.

10. For a discharge of triangular weirs with notch angle _____ the formula is $0.685 h^{2.45}$.

- a) 90°

b) 60°

c) 30°

d) 45°

[View Answer](#)

Answer: c

Explanation: For 30° angle, the formula is $0.685 h^{2.45}$. For 60° angle, it is $1.45 h^{2.47}$ and for 90° angle, it is $2.49 h^{2.48}$.
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11. Which of the below is suitable for soft sandy foundation?

a) Dry stone slope weir

b) Vertical drop weir

c) Parabolic weir

d) Masonry slope weir

[View Answer](#)

Answer: d

Explanation: Masonry or concrete slope weir is the one suitable for soft sandy foundation. It is used where difference in weir crest and downstream river is limited to 3m.

12. Weirs can be used to power water wheels and power sawmills.

a) True

b) False

[View Answer](#)

Answer: a

Explanation: Mill ponds are created by a weir. It impounds water and then it flows over the structure. The energy created by this change in height of the water is used to power watermills and sawmills.

[Impact Assessment](#)

1. How many types of impact assessments are there?

a) 5

b) 4

c) 3

d) 6

[View Answer](#)

Answer: b

Explanation: The four key types are global assessments, policy impact assessment, strategic environmental assessment and environmental impact assessment.

2. Environmental impacts can of _____ types

a) 3

b) 5

c) 4

d) 2

[View Answer](#)

Answer: d

Explanation: They may be primary or direct and secondary or indirect. The primary impacts are the first round impacts like pollution, displacement of people, etc. The ones that extend from these are secondary impacts.

3. A short-term environmental impact assessment (EIA) has a time period of:

- a) 2-5 years
- b) 10-15 years
- c) 5-10 years
- d) 5-7 years

[View Answer](#)

Answer: c

Explanation: EIA can be classified as short term and long term. 5-10 years time period denotes short term and above 50 years is long term.

4. EIAs commenced in the year:

- a) 1960s
- b) 1890s
- c) 1880s
- d) 1950s

[View Answer](#)

Answer: a

Explanation: In 1960s, when environmental depletion was on a hike, to create awareness and check the environmental deterioration, EIAs were formulated.

5. How many stages are there in EIA?

- a) 5
- b) 3
- c) 2
- d) 4

[View Answer](#)

Answer: d

Explanation: There are four stages or levels in EIA. They are local level, regional level, national level and global level.

6. Domestic demand for water can be assessed using:

- a) X.Y.Z
- b) H.I.J
- c) A.B.C
- d) P.Q.R

[View Answer](#)

Answer: a

Explanation: Water quality is an important part to be checked in EIA. It can be a domestic and commercial use of water. X stands for litres of water per capita, Y for number of people per household and Z for number of dwelling units.

7. _____ divided methodologies for EIA into _____ categories.

- a) Warner, 4
- b) Bisset, 4
- c) Warner, 5
- d) Bisset, 5

[View Answer](#)

Answer: c

Explanation: Any methodology can be used to perform EIA. Warner in 1973, divided available methodologies into 5 categories. They are ad hoc, overlay techniques, checklists, matrices and networks.
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8. Water Act is a main law in action used for EIA formulated in _____

- a) 1981
- b) 1974
- c) 1975
- d) 1986

[View Answer](#)

Answer: b

Explanation: The Ministry of Environment, Forest and Climate Change (MoEFCC) of India has some main laws in action for EIA. They are Water Act, Air Act, Wildlife Act, Environmental Act and Biological Diversity Act.

[Computer-Aided Design](#)

1. The computer-aided design (CAD) hardware doesn't include.

- a) Graphic display terminals
- b) Computer
- c) Computer programmes
- d) Keyboard

[View Answer](#)

Answer: c

Explanation: CAD has both hardware and software components. The hardware components are Graphic display terminals, Computer and Keyboard. The software components include all computer programmes that implement computer graphics.

2. How many types of CAD are there?

- a) 6
- b) 4
- c) 2

d) 5

[View Answer](#)

Answer: d

Explanation: The five types are 2D CAD (flat drawings of product), 2.5D CAD (Prismatic models), 3D CAD (3D objects), 3D wireframe and surface modelling (skeleton like inner structure) and solid modelling (solid geometry).

3. Modern CAD systems are based on:

a) ICG

b) GCI

c) GIF

d) IFG

[View Answer](#)

Answer: a

Explanation: ICG is interactive computer graphics. It denotes a user-oriented system in which computer is used to create, transform and display data in pictorial or symbolic forms.

4. The computer communicates with the user via:

a) CPU

b) CRT

c) Graphics

d) Display button

[View Answer](#)

Answer: b

Explanation: Cathode Ray Tube (CRT) screen gives the user the design created as an image. It is done by entering commands to get specific functions performed.

5. The process of designing consists of _____ identifiable steps.

a) 8

b) 5

c) 4

d) 6

[View Answer](#)

Answer: d

Explanation: The six steps are recognition of need, the definition of a problem, synthesis, analysis & optimization, evaluation and presentation.

6. Implementing CAD improves communications.

a) True

b) False

[View Answer](#)

Answer: a

Explanation: The use of CAD system provides the better understanding of engineering drawings by standardising them. It has fewer errors, proper documentation and greater legibility.

7. The functionality areas of CAD application can be grouped into _____ categories.

- a) 2
- b) 3
- c) 4
- d) 5

[View Answer](#)

Answer: c

Explanation: The four categories are geometric modelling, engineering analysis, design review and evaluation and automated drafting.

8. The colour on CRT screen is obtained by the combination of:

- a) Red, yellow, blue
- b) Red, green, blue
- c) Green, black, yellow
- d) Red, black, yellow

[View Answer](#)

Answer: b

Explanation: The three primary colour red, green and blue are combined to produce variety of colours. Colour CRT uses electron beams of these triad colours on phosphor screen to display objects.

9. Who formulated the six ground rules to be considered in designing graphics software?

- a) Newman and Sproull
- b) Schaffer G
- c) Fitzgerald W
- d) Krouse and Lerro

[View Answer](#)

Answer: a

Explanation: They gave six ground rules which were simplicity, consistency, completeness, robustness, performance and economy.

10. The input devices in CAD can be divided into:

- a) 2
- b) 5
- c) 3
- d) 4

[View Answer](#)

Answer: c

Explanation: The input devices can be divided into three general categories. These are cursor control devices (direct keys on keyboard, joysticks, tracker ball, etc.), digitizers (large smooth board with an electronic tracking device) and alphanumeric and other keyboard terminals.

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11. The typical ICG system consists of software component.

- a) True
- b) False

[View Answer](#)

Answer: b

Explanation: It consists of both hardware and software. Hardware includes CPU, workstations and peripheral devices. Software consists of computer programmes required to implement graphics.

[AutoCAD](#)

1. Which is the latest version of AutoCAD software?

- a) 2016
- b) 2017
- c) 2018
- d) 2019

[View Answer](#)

Answer: c

Explanation: AutoCAD 2018 is the latest version. It has improved save performance, improved 2D Graphics, 3D navigation performance, AutoCAD mobile app and updated DWG file format.

2. Which key is used to obtain properties palette in AutoCAD?

- a) Control+1
- b) Control+2
- c) Control+3
- d) Control+4

[View Answer](#)

Answer: a

Explanation: Control+2 gives design centre palette, control+3 gives tools palette. Control+4 is not an option.

3. AutoCAD was first released in the year:

- a) 1858
- b) 1966
- c) 1898
- d) 1982

[View Answer](#)

Answer: d

Explanation: It was released in December 1982. It was a desktop app running on micro-computer with internal graphics controllers.

4. How many units are available in AutoCAD?

- a) 4
- b) 5
- c) 7

d) 6

[View Answer](#)

Answer: b

Explanation: The units are architectural (feet & inches), decimals, engineering (inches), Fractional and scientific (10^e form).

5. Which mode allows the user to draw 90° straight lines :

- a) Osnap
- b) Ortho
- c) Linear
- d) Polar tracking

[View Answer](#)

Answer: b

Explanation: Ortho mode can be activated using F8 Key. It enables user to draw straight lines (90°) by restricting the cursor to 90° only.

6. To obtain parallel lines, concentric circles and parallel curves; _____ is used.

- a) Array
- b) Fillet
- c) Copy
- d) Offset

[View Answer](#)

Answer: d

Explanation: It can be activated by typing letter O. The offset distance and side is to be specified by the user.

7. The default grid spacing in both X and Y directions is:

- a) 10
- b) 20
- c) 5
- d) 15

[View Answer](#)

Answer: a

Explanation: The spacing in each grid is 10 in both direction. It can be altered by right clicking on the grid button at the bottom of the screen. A grid settings dialogue box will appear and changes can be made.

8. How many workspaces are available in AutoCAD?

- a) 2
- b) 4
- c) 3
- d) 5

[View Answer](#)

Answer: c

Explanation: There are three workspaces available to switch between in AutoCAD. These are drafting and annotation, 3D basics and 3D modelling.

9. Scale command can be accessed easily by typing:

- a) SL
- b) S
- c) SC
- d) C

[View Answer](#)

Answer: c

Explanation: Scale command is used to increase/decrease the size of an object. It can be accessed by typing SC. To increase scale, value greater than 1 is given. Values between 0 and 1 can be used to decrease scale.

10. Which command is used to divide the object into segments having predefined length?

- a) Divide
- b) Chamfer
- c) Trim
- d) Measure

[View Answer](#)

Answer: d

Explanation: Measure command divides the object into segments of predefined length. Divide option divides object into n number of equal segments.

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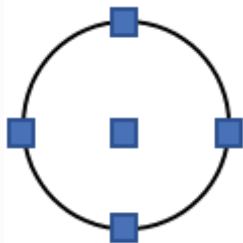
11. How many grip points does a circle have?

- a) 5
- b) 4
- c) 3
- d) 2

[View Answer](#)

Answer: a

Explanation: A grip point appears as blue colour when an object is selected. Using these, an object can be modified. A circle has 5 grip points. One in centre, 4 at each quadrant.



[Disaster Management and Planning](#)

1. Disasters can be broadly termed as _____ types.

- a) 2
- b) 4
- c) 5
- d) 3

[View Answer](#)

Answer: a

Explanation: Disasters can be accidental or intentional. Accidental disasters include natural disasters like tsunamis, hurricanes, floods, etc. Intentional are man-made disasters like, terrorism, bombing, etc.

2. The annual flood peaks in India are recorded in months of:

- a) June, July
- b) July, August
- c) July, September
- d) August, September

[View Answer](#)

Answer: d

Explanation: Floods can occur during any part of the monsoon season. But, typically during months of August and September, flood peaks are recorded. On large rivers, it ranges between 60,000 and 80,000 m³/s.

3. Uttarakhand lies in zone _____ of Earthquake prone areas.

- a) 5
- b) 3
- c) 4
- d) 2

[View Answer](#)

Answer: c

Explanation: There are five zones of earthquake. Zone 5 covers areas with the highest risk (intensity of MSK 1x or greater). Zone 4 covers areas liable to MSK VIII, Zone 3 to MSK VII, Zone 2 to MSK VI or less. Zone 1 area is not there in India.

4. To measure flood variability, _____ is used widely.

- a) FFMI
- b) FI
- c) FMI
- d) FFI

[View Answer](#)

Answer: a

Explanation: FFMI stands for Flash Flood Magnitude Index. It is the standard deviation of logarithms to the base of 10 of annual maximum series.

5. Disaster management deals with situation that occurs after the disaster.

- a) True

b) False

[View Answer](#)

Answer: b

Explanation: Disaster management is a broad term and it deals with a situation prior to, during and after the occurrence of a disaster.

6. How many elements of disaster management are there?

a) 8

b) 7

c) 4

d) 6

[View Answer](#)

Answer: d

Explanation: There are six distinct sets of activities. These include risk management, loss management, control of events, equity of assistance, resource management and impact reduction.

7. Which of the below is an example of slow-onset disaster?

a) Earthquake

b) Tsunami

c) Cyclone

d) Draught

[View Answer](#)

Answer: d

Explanation: Disasters can also be classified as rapid-onset and slow-onset. It is based on how long they last. Rapid-onset disasters are Earthquake, Tsunami and Cyclone.

8. How many phases of disaster response are there?

a) 5

b) 4

c) 3

d) 2

[View Answer](#)

Answer: a

Explanation: These are the preparatory phase, warning phase, emergency phase, rehabilitation phase and reconstruction phase.

9. The first step in preparedness planning is:

a) Analysis of data collected

b) Determination of objectives

c) Development of implementing device

d) Determination of strategy

[View Answer](#)

Answer: b

Explanation: There are six steps in preparedness planning for emergency response. The first step is to determine the objectives to be met within each affected sector.

10. Tsunami detectors are placed in sea at _____ kms from shore.

- a) 25
- b) 100
- c) 50
- d) 85

[View Answer](#)

Answer: c

Explanation: Coastal tidal gauges can detect tsunami closer to shore. It is placed at 50kms in the sea from shore. They are linked to land by submarine cables and give warning in time.

Geotechnical Engineering

[Sedimentation Analysis](#)

1. In sedimentation analysis, the soil fraction should be of what micron size, so as to be kept in a liquid medium (water).

- a) 75
- b) 83
- c) 57
- d) 70

[View Answer](#)

Answer: a

Explanation: According to Indian standards the soil fraction is set as 75 microns to be used in a liquid medium.

2. The sedimentation analysis is done with the help of _____

- a) Hydrometer and Pipette
- b) Sieve
- c) All of the mentioned
- d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: Both the hydrometer and pipette method can be used for taking sedimentation analysis.

3. The time for a particle to settle, of diameter 0.06 through a height of 10 cm is _____

- a) 25.8 s
- b) 42 m 59 s
- c) 3 m 52 s

d) 42.8 s

[View Answer](#)

Answer: a

Explanation: Based on the time of settlement of particles of various diameters it is found that minimum time of 25.8 s is needed for a particle to settle of diameter 0.006 mm.

4. Which of the following assumptions is wrong, with respect to sedimentation analysis?

- a) The soil particles are spherical
- b) Particle settle independent of other particles do not have any effect on its velocity of settlements
- c) Soil particles has different specific gravity
- d) The walls of jar, in which the suspension is kept do not affect the settlement

[View Answer](#)

Answer: c

Explanation: In sedimentation analysis, soil particle has average specific gravity.

5. The sedimentation analysis is based on _____ law.

- a) Stoke
- b) Cullman's
- c) Rankine's
- d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: The sedimentation analysis is based on stokes law according to which the velocity at which the grains settles down depend on shape, size, weight of grain.

6. In the formula, $f=105\sqrt{(300 \eta/(g-1)Vw)}$, the factor η depends on _____

- a) Pressure
- b) Velocity
- c) Temperature
- d) Specific gravity

[View Answer](#)

Answer: c

Explanation: Since η =viscosity of water/liquid, it can be affected by temperature.

7. The lower limit of particle size allowed in sedimentation analysis is _____

- a) 0.0002 mm
- b) 0.04 mm
- c) 0.074 mm
- d) 0.0004 mm

[View Answer](#)

Answer: a

Explanation: The particle smaller than 0.0002 mm is affected by Brownian movement and Stokes law remains no longer valid.

8. 1 poise is equivalent to _____

- a) 0.5 NS/m²
- b) 0.1 NS/ m²
- c) 10⁻⁴ K NS/ m²
- d) 0.8 NS/ m²

[View Answer](#)

Answer: b

Explanation: As, 1 poise = 1/10 NS/ m²
1 poise = 0.1 NS/ m².

9. The unit weight of water in $v = \frac{2}{g} r^2 (V_s - V_w / \eta)$ is taken as _____

- a) 9.81 kn/m²
- b) 98.1 n/m²
- c) 0.981 kn/m²
- d) 9.81 n/m³

[View Answer](#)

Answer: a

Explanation: The constant value of unit weight of water/liquid is taken as $\gamma_w = 9.81 \text{ kn/m}^2$.

10. Viscosity of water/liquid (η) is expressed in _____

- a) KN-s/m³
- b) Ns/m²
- c) KN-s/m²
- d) Ns/m

[View Answer](#)

Answer: c

Explanation: The viscosity of distilled water in sedimentation analysis is taken as 0.00855 KN-s/m².

[Pipette Method](#)

1. Which of the following, cannot be used as a dispersing agent?

- a) Sodium oxalate
- b) Sodium polyphosphate
- c) Sodium silicate
- d) Sodium oxide

[View Answer](#)

Answer: d

Explanation: Sodium oxide cannot be used as a dispersing agent in preparing soil suspension.

2. The process of removal of organic matter and calcium compounds in the dispersion method is _____

- a) Pretreatment
- b) Sedimentation
- c) Evaporation
- d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: Pretreatment is the process of removal of organic matter and calcium compounds in the dispersion method.

3. Which of the following are used as a standard sedimentation method in a laboratory?

- a) Sedimentation analysis method
- b) Hydrometer method
- c) Pipette method
- d) Sand replacement method

[View Answer](#)

Answer: c

Explanation: Pipette method is used as a standard sedimentation method than hydrometer in a laboratory.

4. The dispersing agent which are added to soil in the pipette method may also be referred to as _____

- a) Deflocculating agent
- b) Calgon
- c) Mechanical agent
- d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: To have a proper dispersion of the soil, Deflocculating agent is used as a dispersing agent.

5. In the pipette method of sedimentation analysis, the soil is treated with _____ to remove organic matter in it.

- a) Hydrochloric acid
- b) Sodium oxalate
- c) Hydrogen peroxide
- d) Sodium silicate

[View Answer](#)

Answer: c

Explanation: The soil is treated with hydrogen peroxide to remove organic matter.

6. In pipette analysis apparatus, the water outlet is present at _____

- a) Top
- b) Bottom

- c) Middle
- d) Slightly above bottom

View Answer

Answer: c

Explanation: The water outlet is present in the middle of the pipette analysis apparatus.

7. The recommended time interval for the drainage in pipette analysis is _____

- a) 1/2, 1, 2, 4, 8, 15, and 30 min
- b) 2, 4, 6, 12, 20 and 30 min
- c) 1, 8, 16, 24 min
- d) 24, 30, 34, 40, 46 min

View Answer

Answer: a

Explanation: The time interval for drainage of water in pipette analysis is 1/2, 1, 2, 4, 8, 15 and 30 min.

8. Which of the following is not a disadvantage, in using the pipette method for sedimentation analysis?

- a) The apparatus is very simple
- b) Requires very accurate weight
- c) It requires more time
- d) The method of process is simple

View Answer

Answer: d

Explanation: In pipette method, the method of process is simple.

9. The volume (or) capacity of boiling tube taken in pipette method is about _____

- a) 750 ml
- b) 1000 ml
- c) 500 ml
- d) 800 ml

View Answer

Answer: c

Explanation: The boiling tube of 500 ml capacity is used in pipette analysis apparatus.

10. The dispersing agents in soil particle, may act as _____

- a) Cementing agent
- b) Separating agent
- c) Soluble agent
- d) Deflocculating agent

View Answer

Answer: a

Explanation: The dispersing agents that are mixed with soil particle act as a cementing soluble to withhold the particles present.
advertisement

11. The Sodium hexametaphosphate used in soil suspension may be also called _____

- a) Deflocculating agent
- b) Calgon
- c) Aggregate
- d) None of the mentioned

[View Answer](#)

Answer: b

Explanation: Sodium hexametaphosphate, which is used in preparing soil suspension is also called as calgon.

[Hydrometer Method](#)

1. In hydrometer method, the sampling depth h is kept at a constant of _____

- a) 14 cm
- b) 9 cm
- c) 8 cm
- d) 10 cm

[View Answer](#)

Answer: d

Explanation: The sampling depth (h) in hydrometer method is taken as 10 cm.

2. In calibration of hydrometer reading, the reduced reading are designated as _____

- a) RS
- b) RH
- c) RR
- d) RL

[View Answer](#)

Answer: b

Explanation: The reducing reading is designated as RH, which is used for calibration of hydrometer.

3. The dispersing agent correction in hydrometer reading is always _____

- a) Positive
- b) Both negative and positive
- c) Negative
- d) Equal

[View Answer](#)

Answer: c

Explanation: The addition of dispersing agent in water increases its water level, therefore the dispersing correction is always negative.

4. The hydrometer method differs from pipette method on the basis of which of the following?

- a) Principle of test
- b) Taking the observation
- c) Method of procedure
- d) None of the mentioned

[View Answer](#)

Answer: b

Explanation: In sedimentation analysis the hydrometer method differs from the pipette method in the method of taking the observation.

5. The corrections which are applied to the hydrometer reading, in hydrometer method is _____

- a) Meniscus correction and Dispersing agent correction
- b) Magnitude correction
- c) All of the mentioned
- d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: Both meniscus and dispersing agent correction are applied to a hydrometer reading.

6. The meniscus correction in hydrometer reading is _____

- a) Always positive
- b) Always negative
- c) Negative sometime
- d) Positive sometime

[View Answer](#)

Answer: a

Explanation: The actual reading to be taken at water level will be more; hence the meniscus correction will be always positive.

7. Which of the following is the correct hydrometer reading equation?

- a) $R = Rh' + Cm \pm CL - Cd$
- b) $R = Rh' + cm + CL - Cd$
- c) $R = Cm \pm Rm - Cd + CL$
- d) $R = Rh + Cm \pm Cd + CL$

[View Answer](#)

Answer: a

Explanation: According to the derived equation of hydrometer the equation is $R = Rh' + Cm \pm CL - Cd$.

8. The corrected hydrometer reading for meniscus is _____

- a) $R = Rh' + Cm$
- b) $R = Rh' + C$

c) $R = Rh' + C_m \pm CL - Cd$

d) None of the mentioned

[View Answer](#)

Answer: b

Explanation: The three corrections C_m , CL , Cd can be combined into one corrections C_m and the equation can be written as $R = Rh' + C_m$.

9. The visibility of the soil suspension in hydrometer method is _____

a) Transparent

b) Translucent

c) Opaque

d) None of the mentioned

[View Answer](#)

Answer: c

Explanation: Since the density of the soil suspension is high, the visibility will be opaque.

10. The volume of suspension taken in the hydrometer test is _____

a) 500

b) 120

c) 100

d) 1000

[View Answer](#)

Answer: d

Explanation: The quantity of dry soil and dispersing agent is taken as double of pipette which is 500 ml. advertisement

11. Initially, the volume of hydrometer is taken in terms of _____

a) Grams

b) Millimeters

c) Liters

d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: since the soil is weighed in terms of mass, the volume is taken in terms of grams.

12. The hydrometer are generally calibrated at _____

a) 35°C

b) 27°C

c) -35°C

d) -27°C

[View Answer](#)

Answer: b

Explanation: The hydrometer are generally calibrated at 27°C if the temperature is more than 27°C, temperature correction will be taken negative. If less than 27°C then the temperature correction will be positive.

[Particle Size Distribution Curve](#)

1. A soil sample may be well graded if _____

- a) If it has most number of particles of same size
- b) Excess of certain particles
- c) Good representation of particles of all size
- d) None of the mentioned

[View Answer](#)

Answer: c

Explanation: A soil is said to be well graded when it has a good representation of particle of all size.

2. For coarse grained soil, the particle size D₁₀ is sometimes called as _____

- a) Effective size and effective diameter
- b) Uniform diameter
- c) All of the mentioned
- d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: The size D₁₀ is sometimes called as the effective size or effective diameter.

3. The shape of particle size curve, which is represented by the coefficient of curvature (C_c) is given by _____

- a) $C_c = (D_{30})^2 / D_{10} \times D_{40}$
- b) $C_c = (D_{40})^2 / D_{10} \times D_{30}$
- c) $C_c = (D_{30})^2 / D_{10} \times D_{60}$
- d) $C_c = D_{60} / D_{10}$

[View Answer](#)

Answer: b

Explanation: The coefficient of curvature (C_c) is given by the equation

$$C_c = (D_{40})^2 / D_{10} \times D_{30}.$$

4. The coefficient of uniformity (C_v) is the ratio of _____

- a) D₆₀ and D₁₀
- b) D₃₀ and D₁₀
- c) D₁₀ and D₃₀
- d) D₁₀ and D₃₀

[View Answer](#)

Answer: a

Explanation: The coefficient of uniformity C_v, is defined as the ratio of D₆₀ and D₁₀

i.e. $C_v = D_{60} / D_{10}$.

5. The curve situated at the right side of the particle size distribution curve is _____

- a) Coarse-grained soil
- b) Fine-grained soil
- c) coarse-grained soil
- d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: The right side the particle size distribution curve shows the coarse-grained while the left shows the relatively fine-grained soil.

6. What is the time of settlement of coarse particle of a soil sample, of diameter 0.5?

Take $\gamma=0.905D^2$ and height of water tank as 5 m.

- a) 11.6 seconds
- b) 72.8 seconds
- c) 14 seconds
- d) 22.1 seconds

[View Answer](#)

Answer: d

Explanation: $\gamma=0.905(0.5)^2=0.2263$ m/sec

Time of settlement, $T=h/v =5/0.2263=22.1$ seconds.

7. A curve with a flat portion, in particle size distribution curve represent _____

- a) Intermediate size particle are missing
- b) Intermediate size particles are present
- c) Smaller size particle are present
- d) Large size particles are present

[View Answer](#)

Answer: a

Explanation: A curve with a flat portion represents soil in which intermediate size particle are missing.

8. The D10 represents a size, such that _____ of the particles are finer than this size.

- a) 20%
- b) 60%
- c) 10%
- d) 100%

[View Answer](#)

Answer: c

Explanation: The D10 represents a size, in mm such that 10% of the particle is finer than D10 size.

9. The time of settlement of the finest particle of soil sample is 15hr20min49sec. calculate the height of the water tank. Take $D=0.01$ mm, $\gamma=0.905D^2$.

- a) 5 m
- b) 7 m
- c) 12 m
- d) 4 m

[View Answer](#)

Answer: a

Explanation: $\gamma=0.905(0.01)$

$$\gamma=9.05 \times 10^{-5}$$

$$t = 15\text{hr } 20\text{min } 49\text{sec} = 55429 \text{ sec}$$

$$t=h/v$$

$$55429=h/9.05 \times 10^{-5}$$

$$h=55429 \times 9.05 \times 10^{-5}$$

$$h = 5.000034 \text{ m.}$$

10. The shape of the particle size curve is represented by _____

- a) Effective size
- b) Effective diameter
- c) Uniform coefficient
- d) Co-efficient of curvature

[View Answer](#)

Answer: d

Explanation: Coefficient of the curvature C_c represent the shape of the particle size curve given by $CC = \frac{(D_{40})^2}{D_{10} \times D_{30}}$.

11. A particle-size distribution curve gives us an idea about _____

- a) Type of soil
- b) Properties of soil
- c) All of the mentioned
- d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: A particle-size curve shows both type and gradation of the soil.

[Consistency of Soils](#)

1. The property of a soil which allows it to be deformed rapidly, without rupture is _____

- a) Elasticity
- b) Plasticity
- c) Tenacity
- d) None of the mentioned

[View Answer](#)

Answer: b

Explanation: Plasticity is the property of a soil which allows it to be deformed rapidly, without rupture, without elastic rebound and without volume change.

2. The ratio of liquid limit, minus the natural water content to the plasticity index of the soil is _____

- a) Consistency index
- b) Plasticity index
- c) All of the mentioned
- d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: consistency index or relative consistency is defined as the ratio of liquid limit, minus the natural water content to the plasticity index of the soil.

3. The consistency (or) relative consistency (Ice) is given by the formula _____

- a) $IC = WL - W/IP$
- b) $IC = W - WL/IP$
- c) $IC = W - WL/IP$
- d) $IC = W - WP/IP$

[View Answer](#)

Answer: a

Explanation: The consistency or relative density is defined as ratio of liquid limit, minus the natural water content to the plasticity index of the soil $IC = WL - W/IP$.

4. The shrinkage limit is represented by the term _____

- a) IP
- b) WS
- c) IC
- d) WP

[View Answer](#)

Answer: b

Explanation: Shrinkage limit is represented as WS.

5. The Swedish agriculturist who divided the entire range of consistency from liquid to solid states is _____

- a) Dupuit's
- b) Laplace
- c) Boussinesq
- d) Atterberg

[View Answer](#)

Answer: d

Explanation: In 1911, Atterberg who was a Swedish Agriculturist divided the entire range of liquid to solid state in to four stages.

6. Which of the following is not useful for engineer purpose, as proposed by Atterberg?

- a) Plastic limit
- b) Liquid limit
- c) Solid limit
- d) Shrinkage limit

[View Answer](#)

Answer: c

Explanation: Liquid limit, plastic limit, shrinkage limit are useful for engineering purpose.

7. According to Goldschmidt theory, the plasticity in soil is due to _____

- a) Electro-magnetic charges
- b) Smooth surface
- c) All of the mentioned
- d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: The plasticity in soil is due to the presence of thin scale like particles which carry on to their surfaces, electro-magnetic charges.

8. Clay does not become plastic, when mixed with _____

- a) Soap solution
- b) Kerosene
- c) Oil
- d) None of the mentioned

[View Answer](#)

Answer: b

Explanation: According to Goldschmidt theory, the clay does not become plastic when mixed with liquids of non-polarizing agents like kerosene.

9. In consistency of soil, the limits are expressed in terms of _____

- a) Per cent water content
- b) Area
- c) Volume
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: According to Atterberg, the consistency limits are expressed as percent water content.

10. Which of the following is not considered as one of the state, as divided by Atterberg?

- a) Solid state
- b) Gaseous state

- c) Semi-solid state
- d) Liquid state

View Answer

Answer: b

Explanation: The four stages as divided by Atterberg are solid state, liquid state, plastic state, semi-solid state.

[Determination of Liquid and Plastic Limits](#)

1. The grooving tool which is used for finding liquid limit is _____

- a) ASTM tools
- b) Grooving tools
- c) All of the mentioned
- d) None of the mentioned

View Answer

Answer: a

Explanation: ASTM tool and casagrande tools are two types of grooving tools are used in determining liquid and plastic limit.

2. The depth of the groove cut by casagrande tool for determining the liquid limit is _____

- a) 10 mm
- b) 11.0 mm
- c) 2 mm
- d) 8 mm

View Answer

Answer: b

Explanation: The casagrande tools cut a groove of size 11.0 mm wide at the bottom.

3. The type of tools which is preferred for sandy soil for the purpose of grooving is _____

- a) ASTM tool
- b) Casagrande tool
- c) All of the mentioned
- d) None of the mentioned

View Answer

Answer: a

Explanation: ASTM tool is used only for more sandy soil, where the Casagrande tool tends to tears the side of the groove.

4. What is the diameter of the sieve that is used for finding the liquid limit?

- a) 275 microns
- b) 700 microns
- c) 425 microns

d) 200 microns

[View Answer](#)

Answer: c

Explanation: 425 micron sieve is used as a standard, for filtering the given specimen.

5. The soviet liquid limit device is based on the principle of _____

- a) Station penetration
- b) Soil moisture
- c) Soil water content
- d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: Static cone penetration method is used in operation of soviet liquid limit device.

6. The toughness index (I_t) is defined by the ratio of _____

- a) $I_t = WP/IP$
- b) $I_t = IP/If$
- c) $I_t = IF/IP$
- d) $I_t = WL/If$

[View Answer](#)

Answer: b

Explanation: Toughness index (I_t) is determined by the ratio of plasticity index to the flow index: $I_t = IP/If$.

7. The number of revolutions per second, at which the handle is rotated in process of finding the liquid limit is _____

- a) 2
- b) 7
- c) 4
- d) 9

[View Answer](#)

Answer: a

Explanation: In liquid limit apparatus, the handle is rotated at a rate of about 2 revolutions per second.

8. The cone which is used to penetrate the soil pat has a central angle of _____

- a) 26 degree
- b) 30 degree
- c) 31 degree
- d) 40 degree

[View Answer](#)

Answer: c

Explanation: The cone has a central angle of 31° since the total sliding mass is 80 g.

9. The plastic index is calculated from the relation _____

- a) $IP = WP - WL$
- b) $IP = WL - WP$
- c) $IP = IL - IS$
- d) $IP = IW - IS$

[View Answer](#)

Answer: b

Explanation: The plasticity index is given by the formula, $IP = WL - WP$.

10. One-point method, used for determining the liquid limit is majorly applicable for finding _____

- a) Accurate value
- b) Precise value
- c) Rough value
- d) None of the mentioned

[View Answer](#)

Answer: c

Explanation: Since the liquid limit is found out by only one reading of water content and its corresponding number of blows. One point method is applicable for finding rough value.
advertisement

11. The shear strength of the soil, at the liquid limit is _____

- a) 1.75 kN/m^2
- b) 1.89 kN/m^2
- c) 17.9 kN/m^2
- d) 17.6 g/cm^2

[View Answer](#)

Answer: d

Explanation: The shear strength of the soil is about 17.6 g/cm^2 which the penetrometer gives for a depth of 25 mm under a total sliding mass of 148 g.

12. The apparatus used for finding, WL value by static cone penetrometer method is _____

- a) Liquid limit apparatus
- b) Pycnometer
- c) Cone penetration
- d) Rubber balloon cylinder

[View Answer](#)

Answer: c

Explanation: Cone penetration apparatus is used for finding WL value, according to IS: 2720 (part 5) -1965.

[Shrinkage Limit](#)

1. Which of the following apparatus does not include, in a determination of shrinkage limit?

- a) Porcelain evaporating dish
- b) Two glass plates
- c) Brass cup
- d) Stainless steel shrinking dish

[View Answer](#)

Answer: c

Explanation: The equipment for determination of shrinkage limit consist of Porcelain evaporating dish, two glass plates, stainless steel shrinking dish.

2. The density of the mercury, used in shrinkage limit apparatus is _____

- a) 13.6 g/cm³
- b) 13.2 kg/cm²
- c) 13.0 g/cm³
- d) 13.6 g/cm³

[View Answer](#)

Answer: a

Explanation: The density of mercury =13.6 g/cm³.

3. The inside of the shrinkage dish is coated with a thin layer of _____

- a) Oil
- b) Vaseline
- c) Acid
- d) None of the mentioned

[View Answer](#)

Answer: b

Explanation: Vaseline prevents the formation of air-bubbles. Hence it is used as for inner coating in a shrinking dish.

4. The volume of the wet soil, present in shrinkage dish _____ of volume of dish.

- a) One –fourth
- b) Two-third
- c) One-third
- d) Same

[View Answer](#)

Answer: c

Explanation: One –third of shrinkage dish is filled with wet soil to prevent overflow.

5. What are the ways of preventing of inclusion of air bubbles in shrinkage dish?

- a) Mixing the soil with sufficient distilled water and Making the soil pasty enough
- b) Coating the surface with a thin layer of oil
- c) All of the mentioned

d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: Mixing the soil with sufficient distilled water and making it pasty enough prevents forming air bubbles in shrinking dish.

6. The Density of water, used in shrinkage limit test is _____

- a) 1 g/cm³
- b) 1000 g/cm³
- c) 2 g/cm³
- d) 1/1000 g/cm³

[View Answer](#)

Answer: a

Explanation: The density of water = 1g/ cm³.

7. The volume shrinkage (VS) is defined by the formula _____

- a) $VS = (VL - VD / VD) \times 100$
- b) $VS = (VD - VL / VD) \times 100$
- c) $VS = (WL - WS) SR$
- d) None of the mentioned

[View Answer](#)

Answer: c

Explanation: Since $VS = (VL - Vd) \times 100 / Vd$

But, $(VL - Vd) \times 100 / Vd = (WL - WS) SR$

Therefore, $VS = (WL - WS) SR$.

advertisement

8. The shrinkage ratio of soil is equal _____ the soil in its dry state.

- a) Mass specific gravity
- b) Mass density
- c) Water content
- d) Specific gravity

[View Answer](#)

Answer: a

Explanation: The shrinkage ratio is equal to mass specific gravity in a dry state.

9. Shrinking limit can be found out using alternate method, if _____

- a) The specific gravity of soil is known
- b) Dry volume of soil is known
- c) Water content in the soil is known
- d) Dry density of soil is known

[View Answer](#)

Answer: a

Explanation: Alternatively, shrinking limit can be found out if the specific gravity G of the soil grains is known.

[Activity of Clays](#)

1. The plasticity of clay depends on which of the following?

- a) The nature of clay minerals present
- b) Volume of clay present
- c) All of the mentioned
- d) None of the mentioned

View Answer

Answer: a

Explanation: The plasticity depends on i) The nature of clay minerals present ii) amounts of clay minerals present.

2. The typical activity value of illite, present in clay is _____

- a) 0.4-0.5
- b) 0.5-1.0
- c) 1.0-7.0
- d) 2.7-5.3

View Answer

Answer: b

Explanation: Typical active values are kaolinite: 0.4-0.5

Illite: 0.5-1.0

Montmorillonite: 1.0-7.0.

3. Based on activity number, clays can be classified in to _____ categories.

- a) Five
- b) Two
- c) Three
- d) More than five

View Answer

Answer: c

Explanation: Clays are classified into 3 types as kaolinite, illite, and montmorillonite.

4. A clay is said to be inactive, if the activity is _____

- a) <0.75
- b) 0.75-1.40
- c) >1.40
- d) None of the mentioned

View Answer

Answer: a

Explanation: Clay is classified as inactive if the activity is less than 0.75.

5. Clay containing kaolinite, will relatively have a _____ activity.

- a) High
- b) Intermediate
- c) Low
- d) Moderate

[View Answer](#)

Answer: c

Explanation: Clay containing will have relatively low activity, while montorillonite have high activity.

6. Activity of a clay can be determined by laboratory test like _____

- a) Wet analysis
- b) Liquid limit
- c) Plastic limit
- d) All of the mentioned

[View Answer](#)

Answer: d

Explanation: Activity can be determined by from the result of usual laboratory tests such as wet analysis, liquid limit, and plastic limit.

7. Based on the observation made by Skempton, for a given soil _____

- a) Plastic index is proportional to percent of clay-size fraction
- b) Plastic index is inversely proportional to percent of clay-size fraction
- c) Plastic index is equal to percent of clay-size fraction
- d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: In 1953 skempton, observed that for a given soil the plasticity index is proportional to the percent of clay-size fraction.

8. For a clay to be active, the activity of it should be _____

- a) 0.75-1.40
- b) >1.40
- c) <0.75
- d) <0.75

[View Answer](#)

Answer: b

Explanation: Based on activity number, the activity should be greater than 1.4 for clay to be active.

9. The sensitivity of most clays usually falls in a range of _____

- a) 2 to 8
- b) 1 to 6

c) 1 to 8

d) 1 to 5

[View Answer](#)

Answer: c

Explanation: From referring sensitivity classification table, it can be seen that clays have a common sensitivity between 1 to 8.

10. Highly over consolidating clays tends to be _____

a) sensitive

b) normal sensitive

c) less sensitive

d) extra sensitive

[View Answer](#)

Answer: c

Explanation: This type of clay tends to have sensitive of 1(unity). Hence it is classified as in sensitive.

[Collapsible Soils](#)

1. Which of the following is exhibited by collapsible soil?

a) Silts where cementing agent is soluble

b) Loose bulky grains hold together by capillary stresses

c) All of the mentioned

d) None of the mentioned

[View Answer](#)

Answer: b

Explanation: A common feature of collapsible soil is the loose bulky grain held together by capillary stresses.

2. The researchers who have provided guidance for identifying the potential, foot clayey sand and sand clay found in western US is _____

a) Macverren

b) Holtz and Gibbs

c) All of the mentioned

d) None of the mentioned

[View Answer](#)

Answer: b

Explanation: In 1967, Holtz and Gibbs provide guidance for identifying the potential collapsible soil in arid and semi-arid regions.

3. If the collapsible potential values of the soil are 0-1 %.what will be the severity of the problem?

a) Severe problem

b) Moderate problem

c) No problem

d) None of the mentioned

[View Answer](#)

Answer: c

Explanation: The severity of the problem will be zero, if the CP value lies between 0-1 percent.

4. Collapsible soils undergoes large decrease in volume due to _____

a) Decrease in moisture content

b) Increase in moisture content

c) Increase in solubility

d) None of the mentioned

[View Answer](#)

Answer: b

Explanation: Collapsible soils undergo large increase in volume due to an increase in moisture content, even without increasing in external loads.

5. collapsible soils are usually present in areas of _____

a) Semi-arid regions and Arid regions

b) Dry regions

c) All of the mentioned

d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: Since collapsible soil exhibit loose, weakly cemented sands they are usually present in arid and semi-arid regions.

6. The loose bulky grains in collapsible soil are held together by _____

a) Inter-molecular force between the soil

b) Compressive stress

c) Capillary stress

d) All of the mentioned

[View Answer](#)

Answer: c

Explanation: As the common Feature exhibited by collapsible soil is capillary stress, the loose bulky grains in the soil are held together by it.

7. The capillary potential (CP) of the collapsible soil varies with _____

a) Degree of saturation and Pressure

b) Water content present

c) All of the mentioned

d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: The bulk of structural collapse occurs upon the first saturation, at a given over-burden pressure. Hence collapsible potential varies with degree of saturation and pressure.

8. At a given overburden pressure (P_o) for a collapsible soil, its collapsible potential depends on _____

- a) Degree of saturation
- b) Temperature coefficient
- c) Moisture content
- d) Pressure

[View Answer](#)

Answer: a

Explanation: Collapsible potential varies with degree of saturation, at an overburden pressure of P_o .

9. A clay specimen has an unconfined compressive strength of 240 Kn/m^2 in a distributed state. On remolding, the unconfined compressive strength is 54 Kn/m^2 . What will be the sensitivity of clay?

- a) 3.85
- b) 7.24
- c) 2.04
- d) 4.44

[View Answer](#)

Answer: d

Explanation: Sensitivity,

$$St = \frac{QU(\text{undistributed})}{QU(\text{distributed})}$$

$$= \frac{240}{54}$$

$$= 4.44.$$

10. The structural collapse for a clay soil usually occurs at _____

- a) First saturation
- b) Last
- c) Does not occur
- d) At an intermediate

[View Answer](#)

Answer: a

Explanation: As there is a sudden compression of the soil under pressure, the structural collapse occurs upon first saturation.

[Specific Surface](#)

1. Specific surface is termed as _____

- a) Total volume of soil particles
- b) Total area of soil particles
- c) Total surface area in a unit mass
- d) Ratio of total surface to the total volume

[View Answer](#)

Answer: c

Explanation: Specific surface is usually defined as the total surface area of the soil particle in a unit mass.

2. Specific surface of the soil particle increase very rapidly, as the grain size _____

- a) Increases
- b) Decreases
- c) Bulges
- d) None of the mentioned

[View Answer](#)

Answer: b

Explanation: The subdivision of a mass yields greater surface area than the same mass itself. The specific surface of a mass increases as the grain size decreases.

3. A factor, which is important for the magnitude of specific surface of soil particles is _____

- a) Grain shape
- b) Grain size
- c) Both size and shape
- d) Grain molecular structure

[View Answer](#)

Answer: a

Explanation: Specific surface varies for different shapes of particle having the same mass. Hence grain shape is important factor for determining specific surface.

4. The specific surface of a soil particle will be _____

- a) Proportional to inter-molecular surface
- b) Inversely proportional to electric force
- c) Proportional to the compressive force
- d) Directly proportional to electric force

[View Answer](#)

Answer: d

Explanation: The electrical force responsible for inter-particle effect is proportional to the specific surface.

5. The harmonic diameter, can be found out by using _____

- a) kozney's method
- b) casagrande method
- c) Skempton's method
- d) Atterberg method

[View Answer](#)

Answer: a

Explanation: The harmonic diameter D_H can be found by using kozney's method using the formula $F = 6/\rho_s \times 1/D_n$.

6. Specific surface of a soil is related with _____

- a) Chemical properties of the soil

- b) Physical properties of the soil
- c) General characteristic of the soil
- d) All of the mentioned

[View Answer](#)

Answer: b

Explanation: As specific surface is associated with surface characteristics of a particle, therefore it is related with physical properties.

7. Microscopic soil particles have a very _____

- a) Larger specific surface
- b) A larger volume
- c) Small specific surface
- d) Larger diameter

[View Answer](#)

Answer: a

Explanation: As the specific surface increases as the size of the grain decreases. Therefore Microscopic particles have a large specific surface.

8. Specific surface(SS) can also expressed as _____

- a) Surface area of the particle per unit volume
- b) Physical properties of the soil
- c) Moisture content of the soil
- d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: From the expression, specific surface = surface area of particle/volume of the particle, it can be seen that specific surface is the surface area of a particle.

9. Permeability of the soil depends on _____

- a) Size of the soil particle
- b) Moisture present in soil
- c) Specific surface of the soil particle
- d) Density of the soil

[View Answer](#)

Answer: c

Explanation: Permeability of soil greatly depends on the specific surface of the soil because of the viscous effects associated with surface characteristics of the grains.

10. Chemical activity of a clay mineral depends on _____

- a) Electric charge
- b) Surface area
- c) Compactness

d) Unit mass

[View Answer](#)

Answer: b

Explanation: The chemical activity of the clay mineral depends upon the surface area, because of the electrical charge of clay minerals is high per unit mass.

[Particle Size Classification](#)

1. For engineering purpose, soil can be classified in terms of _____

a) Particle size

b) Textural

c) Unified soil

d) All of the mentioned

[View Answer](#)

Answer: d

Explanation: For general engineering purposes, soil can be classified in terms of particle size, textural and unified soil.

2. Systems which are used for classification of soil based on particle size are _____

a) PRA system of united states

b) Indian standard classification system

c) International soil classification

d) All of the mentioned

[View Answer](#)

Answer: d

Explanation: Based on particle size, soil can be classified as

i) U.S. Bureau of soil and public road administration system

ii) The M.I.T. classification system

iii) Indian standard classification system

iv) International soil classification system.

3. In particle size classification system, the soils are classified according to _____

a) Grain size

b) Properties

c) Shape

d) Solubility

[View Answer](#)

Answer: a

Explanation: In the particle soil classification system, soils are arranged to the grain size.

4. Which of the following terms are used to indicate grain sizes?

a) Gravel

b) Sand

c) Silt

d) All of the mentioned

[View Answer](#)

Answer: d

Explanation: Terms such as gravel, sand, silt, and clay are used to indicate grain sizes. These terms are used only as a designation of particle size.

5. The term 'silt' in particle size classification system, can be replaced by _____

- a) Silt size
- b) Clay size
- c) Silt type
- d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: As the system is classified based on size, it is preferable to use the word 'silt size' and 'clay size' in place of simply 'silt' or 'clay'.

6. Indian standard classification of soil is based on _____

- a) PRA system
- b) International soil classification
- c) M.I.T system
- d) Indian system

[View Answer](#)

Answer: c

Explanation: Indian standard classification (IS: 1948-1970) is based on the M.I.T. system.

7. Soil occurring in nature, is composed of _____

- a) Sand
- b) Decomposed substance
- c) All of the mentioned
- d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: Soil occurring in nature is composed of a different percentage of sand, silt, and clay size particles.

8. The purpose of soil classification is to _____

- a) To arrange various soils types in to groups
- b) To use it for various purpose
- c) For finding its properties
- d) For investigating the soil

[View Answer](#)

Answer: a

Explanation: The purpose of soil classification is to arrange various types of soils in to groups according to their engineering or agricultural properties.

9. Particle size classification is best suited for _____

- a) Coarse grained soil
- b) Clay soil
- c) Dry soil
- d) All of the mentioned

[View Answer](#)

Answer: b

Explanation: Since properties of clay soils is less dependent on particle size distrubution(textural classification) and more dependent on size it is best suited for clay soil.

10. Particle size classification system does not signify _____

- a) Soil types
- b) Soil Particle size
- c) All of the mentioned
- d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: Particle size classification used only as a designation of particle sizes, and do not signify the naturally occurring types which are mixtures of a particle of different sizes.

[Textural Classification](#)

1. Soil classification based on the particle size distribution is _____

- a) Unified soil classification
- b) IS classification
- c) Particle size classification
- d) Textural classification

[View Answer](#)

2. The best known classification system in textural classification is _____

- a) M.I.T. classification system
- b) Triangular classification of U.S. public road administration
- c) Indian classification system
- d) International classification

[View Answer](#)

Answer: b

Explanation: Triangular classification of U.S. public road administration is a commonly used system for textural classification.

3. Textural classification is most suitable for _____

- a) Clay soil
- b) Wet soil
- c) Coarse grained soil
- d) Soil with moist

[View Answer](#)

Answer: c

Explanation: Since the textural classification is based on the percentages of sand, silt, and clay size making up the soil. Such a classification is more suitable for describing coarse-grained soil.

4. To use textural classification chart _____ lines must be drawn.

- a) Parallel to the three sides of the triangle
- b) Parallel to the only one side of the triangle
- c) Adjacent to the three sides of the triangle
- d) Adjacent to the one sides of the triangle

[View Answer](#)

Answer: a

Explanation: To use the textural classification chart, for a given percentage of three constituents forming a soil, lines are drawn parallel to three sides of the equilateral triangle.

5. The type of triangle, used in textural classification of soil is _____

- a) Right angled triangle
- b) Equilateral triangle
- c) Perpendicular triangle
- d) None of the mentioned

[View Answer](#)

Answer: b

Explanation: A triangle, having equal length of sides (i.e. Equilateral triangle) is used in textural classification chart.

6. Public road administration (PRA) system is based on _____

- a) Particle-size composition and Plasticity characteristics
- b) Particle size distribution
- c) All of the mentioned
- d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: HRB classification system, also known as public road administration (PRA) is based on both the particle-size composition and plasticity characteristics.

7. Highway research board (HRB) classification system is also known as _____

- a) Indian classification system
- b) Public road administration (PRA) system

- c) International classification system
- d) M.I.T. classification system

View Answer

Answer: b

Explanation: Highway research board classification system is also known as public road administration (PRA) system.

8. Based on HRB classification system, the soil are divided in to _____

- a) 2 primary groups
- b) 6 primary groups
- c) 7 primary groups
- d) 6 primary groups

View Answer

Answer: c

Explanation: Based on HRB system, the soil is divided into 7 primary groups, designated as A-1, A-2...A-7.

9. The performance of the soil, when used for pavement construction is found out by using _____

- a) Quality test
- b) Group index
- c) Material test
- d) None of the mentioned

View Answer

Answer: b

Explanation: As group index is a mean of rating the value of soil as a sub-grade material. It can be used for finding the performance and quality of the soil.

10. The group index of a soil depends on _____

- a) Liquid limit
- b) Plastic limit
- c) All of the mentioned
- d) None of the mentioned

View Answer

Answer: a

Explanation: Group index of soil usually varies by

- i. Liquid limit
 - ii. Plastic limit
 - iii. Amount of material passing through the 75-micron IS sieve.
- advertisement

11. Group index is defined by which of the equation?

- a) $GI=0.2b+0.005ac+0.01bd$
- b) $GI=0.2a+0.005bd+0.001ac$

c) $GI=0.2a+0.005ac+0.001bd$

d) $GI=0.2a+0.5ac+0.001bd$

[View Answer](#)

Answer: c

Explanation: Group index (GI) is given by the following equation

$GI = 0.2a+0.005ac+0.01bd$.

[Unified Soil Classification](#)

1. Unified soil classification system (USCS) was developed by _____

a) Kozney

b) Atterberg

c) Casagrande

d) Rankine

[View Answer](#)

Answer: c

Explanation: In 1940, casagrande originally developed the unified soil classification system (USCS).

2. The USCS system was used for which of the following purpose during World War 2?

a) Air field construction

b) Dam construction

c) Foundation

d) Earth slopes

[View Answer](#)

Answer: a

Explanation: In the earlier stages of World War 2, the USCS system was used for air field construction.

3. According to USCS, the fined grained soil are classified on the basis of _____

a) Plasticity

b) Grain size distribution

c) Group index

d) Particle size composition

[View Answer](#)

Answer: a

Explanation: According to USCS the fine grained soils, whose behavior is controlled by plasticity, are classified on the basis of their plasticity.

4. By USCS system, soil are classified in to _____ Major groups.

a) 2

b) 5

c) 6

d) 4

[View Answer](#)

Answer: d

Explanation: Various soil are classified into four major groups

- i. Coarse grained
- ii. Fine grained
- iii. Organic soils
- iv. Peat.

5. A soil is considered as coarse grained, if it retains more than _____ in a sieve.

- a) 90% of the soil
- b) 70% of the soil
- c) 50% of the soil
- d) 20% of the soil

[View Answer](#)

Answer: c

Explanation: If more than 50 % of the soil is retained on a NO.200 US sieve (0.075), it is designated as coarse grained soil.

6. Coarse grained soils, containing fines between 5-12%, are designated by _____ Symbol.

- a) GW-GM and SP-SM
- b) CL-ML
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: If the percentage of fines lies between 5 to 12 %, coarse grained soils are designated by dual symbols GW-GM or SP-SM.

7. Fine grained soil are sub divided in to _____

- a) Silt and clay
- b) Sand and clay
- c) Organic and silt
- d) Gravel and peat

[View Answer](#)

Answer: a

Explanation: Based on their liquid limit and plasticity index, fine grained soils are subdivided in to silt and clay.

8. Fine grained soil are subdivided based on _____

- a) Liquid limit and Plasticity index
- b) Group Index
- c) None of the mentioned

d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: Based on the liquid limit and plasticity index, fine grained soil is subdivided.

9. Coarse grained soil is sub-divided in to _____

a) Gravel and clay

b) Gravel and sand

c) Sand and silt

d) Silt and clay

[View Answer](#)

Answer: b

Explanation: Based on the soil size, coarse grained soil is divided in to gravel and sand.

10. In Casagrande's plasticity chart, the numbers in the chart denotes _____

a) Relative suitability

b) Grade of the soil

c) Division of the group

d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: In Casagrande's plasticity chart, the numbers denote relative suitability with No.1 as the best and No.10 as the worst.

[Indian Standard Classification](#)

1. The Indian standard soil classification system, (ISCS) was first developed in _____

a) 1947

b) 1950

c) 1959

d) 1960

[View Answer](#)

Answer: c

Explanation: The Indian standard classification system (ISCS) was first developed in 1959 and revised in 1970.

2. According to ISCS, fine grained soils are subdivided in to _____

a) 2

b) 4

c) 5

d) 3

[View Answer](#)

Answer: d

Explanation: Fine grained soil are subdivided into 3 types

- i. Inorganic silts and very fine sands
- ii. Inorganic clays
- iii. Organic silts and clay and organic matter.

3. The ISCS classifies the soil in to _____

- a) 12 groups
- b) 15 groups
- c) 18 groups
- d) 16 groups

[View Answer](#)

Answer: c

Explanation: The ISCS classifies the soil into 18 groups as against 15 groups of USCS.

4. Laboratory classification of fined grained soil is done with the help of _____

- a) Plasticity chart
- b) Textural classification chart
- c) Kozney's graphical method
- d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: Laboratory classification criteria of fine grained soil is done by plasticity chart.

5. The A-line, in unified classification system table has the equation of _____

- a) $IP = WL - 20$
- b) $IP = 0.73(WL - 20)$
- c) $IP = 0.73(20 - WL)$
- d) $IP = 20 - WL$

[View Answer](#)

Answer: b

Explanation: The A-line, dividing the inorganic clay from silt and organic soil has the equation: $IP = 0.73(WL - 20)$.

6. According to IS classification, the symbol GC means _____

- a) Clayey gravel
- b) Silt gravel
- c) Sand gravel
- d) Well graded gravel

[View Answer](#)

Answer: a

Explanation: As per Indian standards of group symbols and typical names, G-refers to gravel and C-refers to clay.

7. The symbol 'L' represents which of the following soil types?

- a) Silt and Clay

- b) Gravel
- c) All of the mentioned
- d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: By IS classification, silts and clays of low compressibility having a liquid less than 35, are represented by the 'L'.

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8. What are the features required, for classifying a soil component as boulder?

- a) Bulky hard
- b) Diameter more than 30cm
- c) Round to angular shape
- d) All of the mentioned

[View Answer](#)

Answer: d

Explanation: For a soil component to be a boulder, size range must be of average diameter more than 30cm and shape of round to angular and bulky hard.

[Soil Structure](#)

1. What are the Soil properties, which are influenced by soil structure?

- a) Permeability
- b) Compressibility
- c) Shear strength
- d) All of the mentioned

[View Answer](#)

Answer: d

Explanation: Soil structure is an important factor which influences many soil properties such as permeability, compressibility, and shear strength.

2. The single grained structure is a characteristic of _____

- a) Coarse-grained soil
- b) Fine-grained soil
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: Single grained structure is usually found in coarse-grained soil.

3. Soil structure usually defines _____

- a) Arrangement of soil particles and Stage of aggregation of soil particle in soil
- b) Composition of the soil mass

- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: Soil structure is defined as the arrangement and state of aggregation of soil particle in a soil mass.

4. An arrangement composed of 'flocs' of soil particle is known as _____

- a) Dispersed structure
- b) Cohesive matrix structure
- c) Honey comb structure
- d) Flocculent structure

[View Answer](#)

Answer: d

Explanation: An arrangement composed of 'flocs' of soil particle is known as flocculent structure. As the particles are oriented 'edge-to-edge' (or) 'edge-to-face' with respect to one another.

5. An arrangement composed of soil particle having a parallel orientation is _____

- a) Dispersed
- b) Coarse grained skeleton
- c) Honey comb
- d) Single grained

[View Answer](#)

Answer: a

Explanation: In dispersed structure of particle are oriented face to face with one another in a dispersed state.

6. The skeleton and matrix structure represent _____

- a) Coarse-grained soil
- b) Fine-grained soil
- c) Composite soil
- d) Loose-grained soil

[View Answer](#)

Answer: c

Explanation: An arrangement of coarse grains forming a skeleton and matrix represent composite soils.

7. The soil structure, having comparative loose stable structure is _____

- a) Honey comb
- b) Cohesive matrix
- c) Flocculent
- d) Single grained

[View Answer](#)

Answer: a

Explanation: Honey comb structure is composed of loosely arranged bundle of particle. Hence they have comparatively less stable structure than others.

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8. The honey comb, flocculent and dispersed structure are found in _____

- a) Fine-grained soil
- b) Coarse grained soil
- c) Composite soil
- d) All of the mentioned

[View Answer](#)

Answer: b

Explanation: Fine grained soil usually contains a combined structure of honeycomb, flocculent and dispersed.

9. Coarse-grain skeleton structure, consist of arrangement of _____

- a) Soil forming honey comb structure
- b) Coarse grain forming a skeleton
- c) Soil oriented 'edge-to-edge' with one another
- d) None of the mentioned

[View Answer](#)

Answer: b

Explanation: An arrangement of coarse grains forming a skeleton with its interstices partly filled by relatively loose aggregation of the finest soil grains is shown in coarse-grained skeleton structure.

[Solid Particles in Soil](#)

1. The particle of coarse-grained are composed of _____

- a) Primary minerals
- b) Non-clay minerals
- c) Clay minerals
- d) Crystalline minerals

[View Answer](#)

Answer: a

Explanation: Coarse-grained particle is usually made of primary minerals.

2. The fine-grained soil are composed of _____

- a) Crystalline minerals and Amorphous materials
- b) Primary minerals
- c) All of the mentioned
- d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: Many investigations by Girm (1959) show that the fine-grained soil is composed predominantly of crystalline minerals and amorphous materials.

3. The behavior of bulky particles in coarse grained soil is governed by _____

- a) Gravitational force and Mass energy
- b) Colloidal force
- c) All of the mentioned
- d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: The bulky particle does not possess the property of plasticity and cohesion.

4. The crystalline minerals whose surface activity is such that, they develop cohesion and plasticity are called _____

- a) Non-clay minerals
- b) Clay minerals
- c) Bulky particles
- d) Primary minerals

[View Answer](#)

Answer: b

Explanation: As the surface activity of clay minerals is high they develop a property of cohesion and plasticity.

5. Clay particles behave like _____

- a) Colloids
- b) Amorphous solids
- c) Crystalline particles
- d) Non-colloids

[View Answer](#)

Answer: a

Explanation: Clay minerals have high surface like colloids and are controlled by surface energy, they behave like colloids.

6. A montmorillonite platelet has a specific surface/volume equal to _____

- a) $120/\mu$
- b) $100/\mu$
- c) $500/\mu$
- d) $1000/\mu$

[View Answer](#)

Answer: d

Explanation: Since the platelet of montmorillonite has a volume, 5 times greater than equivalent cube ($200/\mu$) its volume will be equal to $1000/\mu$.

7. Which of the following clay minerals are considered as colloidal?

- a) Kaolinite
- b) Dichite
- c) Attapulgit
- d) All of the mentioned

[View Answer](#)

Answer: d

Explanation: As entire clay particle has a greater dimension than 1μ , all of the clay minerals are considered as colloidal.

8. Clay minerals are classified in to _____

- a) 3
- b) 4
- c) 7
- d) 6

[View Answer](#)

Answer: b

Explanation: Kaolinite, montmorillonite, illite, playgorskite are the types of clay minerals.

9. Chemically, the clay minerals are silicates of _____

- a) Aluminum
- b) Iron
- c) Magnesium
- d) All of the mentioned

[View Answer](#)

Answer: d

Explanation: Since minerals contain alkaline and/or alkaline earth as essential component they contain alkaline mineral such as aluminium, iron, magnesium.

10. Clay is essentially made of extremely _____

- a) Large particles
- b) Small particles
- c) Intermediate particles
- d) None of the mentioned

[View Answer](#)

Answer: b

Explanation: Clay is generally made of small particles of either a book of sheets like units (or) bundle of tubes or fibers.

[Atomic and Molecule Bonds](#)

1. The nature of surface bonding force in soil is classified in to _____ types.

- a) 3

b) 4

c) 2

d) 5

[View Answer](#)

Answer: a

Explanation: The nature of surface bonding is classified into three types as primary valence bond, hydrogen bond, secondary valence bond.

2. Atoms in one molecule bonding to atom in another molecule are called _____

a) Primary valence bond

b) Secondary valence bond

c) Hydrogen bond

d) Electrostatic bond

[View Answer](#)

Answer: b

Explanation: The bonding takes between two different molecules rather than the same hence it is called a secondary valence bond.

3. There are _____ types of primary valence bond.

a) 5

b) 4

c) 6

d) 2

[View Answer](#)

Answer: a

Explanation: Covalent bond, heterpolar pond, ionic pond and co-ordinate bond are the five types of primary valence bond.

4. Which of the following bond is considered to be strongest?

a) Covalent bond

b) Heterpolar bond

c) Ionic bond

d) Co-ordinate bond

[View Answer](#)

Answer: c

Explanation: The ionic bond occurs by exchange of electron in the union of ions which make it stronger.

5. The ionic bond, sometimes may be also called as _____

a) Electrovalent bond

b) Covalent bond

c) Metallic bond

d) Heteropolar bond

[View Answer](#)

Answer: a

Explanation: As there is an exchange of electrons between soil particles in an ionic bond, it is also called an ionic bond.

6. The hydrogen bond occurs when _____

- a) Atoms of hydrogen strongly attracted by two other atoms
- b) Molecules of one atom bonding to atom of another
- c) Atom of hydrogen is attracted by one atom
- d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: When the atoms of hydrogen are strongly attracted by two other atoms, a hydrogen bond tends to occur.

7. The strength of a hydrogen bond lies between the value of _____

- a) 20-200
- b) 5-100
- c) 0.5-5
- d) 10-100

[View Answer](#)

Answer: b

Explanation: The strength of a hydrogen bond is between 5-10 Kcal per g-mole.

8. Intermolecular distance of a bond in a secondary valence bond is _____

- a) 1-2
- b) 2-3
- c) 0.5-5
- d) >5

[View Answer](#)

Answer: d

Explanation: Interatomic or intermolecular distance of a secondary valence bond is $>5 \text{ \AA}$.

9. The secondary valence force caused by an orientation effect is commonly known as _____

- a) Vander Waal's force
- b) Dispersion energy
- c) Induced effect
- d) Polarisability

[View Answer](#)

Answer: a

Explanation: Vander Waal's force is the common attractive force acting between all atoms and molecules of matter.

10. Flocculation is caused by increasing _____

- a) Electrolytic concentration
- b) Ion valence
- c) Temperature
- d) All of the mentioned

View Answer

Answer: d

Explanation: The factor in a soil-water system affecting flocculation is electrolyte concentration, temperature and dielectric constant or ion valence.

[Interparticle Force in a Soil Mass](#)

1. Unified soil classification system (USCS) was developed by _____

- a) Kozney
- b) Atterberg
- c) Casagrande
- d) Rankine

View Answer

Answer: c

Explanation: In 1940, casagrande originally developed the unified soil classification system (USCS).

2. The USCS system was used for which of the following purpose during World War 2?

- a) Air field construction
- b) Dam construction
- c) Foundation
- d) Earth slopes

View Answer

Answer: a

Explanation: In earlier stages of World War 2, the USCS system was used for air field construction.

3. According to USCS, the fined grained soil are classified on the basis of _____

- a) Plasticity
- b) Grain size distribution
- c) Group index
- d) Particle size composition

View Answer

Answer: a

Explanation: According to USCS the fine grained soils, whose behavior is controlled by plasticity, are classified on the basis of their plasticity.

4. By USCS system, soil are classified in to _____ Major groups.

- a) 2

b) 5

c) 6

d) 4

[View Answer](#)

Answer: d

Explanation: Various soil are classified in to four major groups

i. Coarse grained

ii. Fine grained

iii. Organic soils

iv. Peat.

5. A soil is considered as coarse grained, if it retains more than _____ in a sieve.

a) 90% of the soil

b) 70% of the soil

c) 50% of the soil

d) 20% of the soil

[View Answer](#)

Answer: c

Explanation: If more than 50 % of the soil is retained on a NO.200 US sieve (0.075), it is designated as coarse grained soil.

6. Coarse grained soils, containing fines between 5-12%, are designated by _____ Symbol.

a) GW-GM and SP-SM

b) CL-ML

c) None of the mentioned

d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: If the percentage of fines lies between 5 to 12 %, coarse grained soils are designated by dual symbols GW-GM or SP-SM.

7. Fine grained soil are sub divided in to _____

a) Silt and clay

b) Sand and clay

c) Organic and silt

d) Gravel and peat

[View Answer](#)

Answer: a

Explanation: Based on their liquid limit and plasticity index, fine grained soil are subdivided in to silt and clay.

8. Fine grained soil are subdivided based on _____

a) Liquid limit and Plasticity index

b) Group Index

- c) None of the mentioned
- d) All of the mentioned

View Answer

Answer: a

Explanation: Based on the liquid limit and plasticity index, fine grained soil is subdivided.

9. Coarse grained soil is sub-divided in to _____

- a) Gravel and clay
- b) Gravel and sand
- c) Sand and silt
- d) Silt and clay

View Answer

Answer: b

Explanation: Based on the soil size, coarse grained soil is divided in to gravel and sand.

10. In Casagrande's plasticity chart, the numbers in the chart denotes _____

- a) Relative suitability
- b) Grade of the soil
- c) Division of the group
- d) None of the mentioned

View Answer

Answer: a

Explanation: In Casagrande's plasticity chart, the numbers denote relative suitability with No.1 as the best and No. 10 as the worst.

[Single Grained and Honey Comb Structure](#)

1. The force causing coarse-grained soil, deposition is _____

- a) Gravitational force
- b) Surface force
- c) Secondary valence force
- d) All of the mentioned

View Answer

Answer: a

Explanation: The major force causing deposition is gravitational since the surface forces are too small to be of practical importance.

2. Coarse- grained soil may be deposited in a _____

- a) Loose state
- b) Dense state
- c) Solid state

d) Liquid state

[View Answer](#)

Answer: a

Explanation: Coarse-grained soil may be deposited in a loose state having a high void ratio or in a dense state having a low void ratio.

3. Honey comb structure exist commonly in _____

a) Grains of silts and Rock flour

b) Coarse-grained soil

c) All of the mentioned

d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: Honey comb structure exists in grain of silts or rock flour smaller than 0.02 m diameter and larger than 0.0002 mm.

4. The cells in the honey comb structure is made of _____

a) Multi mineral grains

b) Single mineral grains

c) Multi layered structure

d) Platelets

[View Answer](#)

Answer: b

Explanation: Each cell in the honeycomb structure is made of numerous single mineral grain.

5. The structure of honey comb might be broken down due to _____

a) Decrease in volume

b) Increase in volume

c) Excessive volume change

d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: Honey comb structure might be broken down with a resulting volume increase, by driving piles in to deposit of silt of honey comb structure.

6. Which of the following is correct, with respect to honey comb structure?

a) The structure has high void ratio and It can carry out heavy load

b) It has high compact structure

c) All of the mentioned

d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: The honey comb structure so formed has high void ratio and is capable of carrying a relatively heavy load without excessive volume change.

7. The diameter of coarse-grained soils having single grained structure is _____

- a) <0.002 mm
- b) >0.002 mm
- c) $=0.002$ mm
- d) ≥ 0.002 mm

[View Answer](#)

Answer: b

Explanation: Coarse-grained soil of diameter >0.002 mm settle out of suspension in water as individual grains independently of the grain.
advertisement

8. The Coarse-grained soil settle in suspension due to _____

- a) Gravitational force
- b) Surface force
- c) Weight of the grain
- d) All of the mentioned

[View Answer](#)

Answer: c

Explanation: The weight of the grains in coarse-grained soil causes them to settle and get to particle-to-particle contact on deposition.

9. Which of the following force play an important role in honey comb structure?

- a) Adhesion force
- b) Gravitational force
- c) Surface force
- d) All of the mentioned

[View Answer](#)

Answer: c

Explanation: The surface forces at the contact areas of the honey comb structure, prevent the grains from rolling down immediately in to positions of equilibrium among the grains already deposited.

[Clay Minerals](#)

1. There are _____ fundamental building blocks for the clay mineral structures.

- a) 3
- b) 5
- c) 4
- d) 2

[View Answer](#)

Answer: d

Explanation: Silica tetrahedral unit and octahedral unit are the 2 building blocks of clay mineral.

2. In silica tetrahedral unit, the silicon structure is enclosed by _____

- a) Oxygen
- b) Hydroxyls
- c) Aluminum
- d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: In silica tetrahedral unit, four oxygen or hydroxyls have the configuration of tetrahedron.

3. Octahedral unit, consist atoms of _____ element.

- a) Aluminum atom
- b) Oxygen atom
- c) Magnesium atom
- d) All of the mentioned

[View Answer](#)

Answer: d

Explanation: In octahedral unit, aluminum, iron or magnesium atom are enclosed in six hydroxyls having the configuration of an octahedron.

4. The silicon sheet is represented by _____ symbol.

- a) trapezoidal
- b) rectangle
- c) triangle
- d) none of the mentioned

[View Answer](#)

Answer: a

Explanation: The silicon sheet is represented by trapezoidal symbol, representing the oxygen basal layer and hydroxyl apex layer.

5. The 15 clay minerals are mainly divided in to _____ groups.

- a) 3 groups
- b) 2 groups
- c) 9 groups
- d) 4 groups

[View Answer](#)

Answer: d

Explanation: Clay minerals are classified into 3 groups of kaolin, montmorillonite, illite and palygorskite.

6. The kaolinite structural unit is made up of _____ layer or sheet.

- a) Gibbsite sheet

- b) Silica sheet
- c) Oxygen layer
- d) Aluminum sheet

[View Answer](#)

Answer: a

Explanation: The kaolinite structural unit is made up of gibbsite sheet with aluminum atoms at their centers.

7. In kaolinite crystal, the layers are held by _____ bond.

- a) Ionic bond
- b) Cationic linkage
- c) Hydrogen bond
- d) Electro static bond

[View Answer](#)

Answer: c

Explanation: Since kaolinite is stable and water is unable to penetrate between the layers, they are held by a fairly strong bond of hydrogen.

8. Kaolinite exhibit the characteristic of _____

- a) Shrinkage limit
- b) Plasticity
- c) All of the mentioned
- d) None of the mentioned

[View Answer](#)

Answer: b

Explanation: The platelets in kaolinite carry negative charges which attract thick layers of adsorbed water thereby producing plasticity.

9. An Example of kaolinite crystal or mineral is _____

- a) China clay
- b) Crystal
- c) Clay mineral
- d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: China clay show the property of plasticity, when mixed with water therefore it can be taken as an example for kaolinite crystal.

10. The illite crystal has a great tendency of _____ properties.

- a) Swelling
- b) To split in to ultimate platelets
- c) High shrinkage

d) None of the mentioned

[View Answer](#)

Answer: b

Explanation: The cationic bond of illite is weaker than the hydrogen bond of kaolinite, but is stronger in water bond. Due to this, illite crystal has a great tendency to split in to ultimate platelets.

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11. The structure of illite is similar to that of _____ crystal.

- a) Kaolinite
- b) Dickite
- c) Montmorillonite
- d) Attapulgit

[View Answer](#)

Answer: c

Explanation: Both illite and montmorillonite are made up of sheet like unit.

12. The thickness of each sheet in montmorillonite is _____

- a) 5 Å
- b) 7 Å
- c) 10 Å
- d) 15 Å

[View Answer](#)

Answer: d

Explanation: Thickness of montmorillonite, $T = 7 \times 10^{-10} \text{mm}$

$T = 7 \text{ Å}$.

Modes of Occurences of Water in Soil

1. Ground water may be also called as _____

- a) Capillary water
- b) Gravitational water and Free water
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: Since the ground water is subjected to no forces other than gravity. Hence the water is also known as gravitational water or free water.

2. Water present in the voids of soil mass is called _____

- a) Soil water
- b) Free water
- c) Ground water

d) Pore water

[View Answer](#)

Answer: a

Explanation: Soil water is the water present in the voids of the soil mass.

3. Hygroscopic water is affected by which of the following factor?

a) Gravity

b) Capillary forces

c) All of the mentioned

d) None of the mentioned

[View Answer](#)

Answer: d

Explanation: Since hygroscopic water has greater density and viscosity than ordinary water. It is neither affected by gravity or capillary forces or by any other force.

4. What are the forces involved in hygroscopic water or contact moisture?

a) Adhesion force

b) Capillary force

c) All of the mentioned

d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: In hygroscopic water, soil particle freely adsorbs water from the atmosphere by the physical force of attraction, and is held by adhesion force.

5. The average hygroscopicity of clay is _____

a) 6 %

b) 16 %

c) 1 %

d) 4 %

[View Answer](#)

Answer: b

Explanation: The average hygroscopicity of sands, silts and clay is 1 %, 6 % and 16 %.

6. The water which soaks in to ground by moving downward, subjected to capillary force is _____

a) Ground water

b) Pore water

c) Infiltrated water

d) Capillary water

[View Answer](#)

Answer: c

Explanation: Infiltrated water is the portion of surface precipitation which soaks into ground moving downward through air-containing zones.

7. Based on inter-particle forces, soil water can be classified in to _____

- a) Adsorbed water
- b) Pore water
- c) All of the mentioned
- d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: Adsorbed water which is attracted by forces within the soil and pore water are the two types of soil water divided based on inter-particle forces.

8. Solvate water is subjected to _____ forces.

- a) Polar
- b) Electrostatic
- c) Binding
- d) All of the mentioned

[View Answer](#)

Answer: d

Explanation: Since the solvate water forms a hydration shell around soil grain. It is influenced by ionic and polar forces.

9. The soil water which is impossible to remove from the soil is _____

- a) Structural water
- b) Capillary water
- c) Solvate water
- d) Pore water

[View Answer](#)

Answer: a

Explanation: Under loading encountered in soil engineering, it is found out that structural water cannot be separated or removed and therefore it is considered as a part and parcel of the soil particle.

10. Ground water is influenced by _____ force.

- a) Vander Waals force
- b) Surface force
- c) Hydrodynamic force
- d) Electro static force

[View Answer](#)

Answer: c

Explanation: As the ground water obeys laws of hydraulic force, it is capable of moving under hydrodynamic forces.
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11. Water can be classified in to _____ types based on structural aspect.

- a) 3
- b) 5
- c) 2
- d) 4

[View Answer](#)

Answer: d

Explanation: Structural classifications of water in a soil are 4 types, which are: pore water, solvate water, adsorbed water, structural water.

[Capillary Water](#)

1. Capillary water is located in part of _____ soil mass.

- a) Within the voids in soil
- b) Above the ground water surface
- c) Pores in the soil mass
- d) Surface of soil particles

[View Answer](#)

Answer: a

Explanation: Capillary water is the soil moisture located within the interstices and voids of capillary forces.

2. The capillary force of water depends on _____

- a) Surface tension of water
- b) Pressure in water
- c) Conformation of soil pores
- d) All of the mentioned

[View Answer](#)

Answer: d

Explanation: The capillary force of soil moisture depends upon various factors such as surface tension of water, pressure in water relation to atmospheric pressure, and the size and conformation of soil pores.

3. The surface tension of water (TS) is _____

- a) 29 dynes per cm
- b) 72.8 dynes per cm
- c) 0.29 dynes per cm
- d) 2.45 dynes per cm

[View Answer](#)

Answer: b

Explanation: The surface tension = 0.728×10^{-6} KN/cm at 20°C
= 72.8 dynes per cm.

4. The coefficient of surface tension depends on which of the following?

- a) Chemical nature of liquids

- b) Surface area of the liquid
- c) Forces acting
- d) Atmospheric pressure

[View Answer](#)

Answer: a

Explanation: Since surface tension is the property of the molecules on the surface of the liquid body, the coefficient depends on the chemical nature.

5. The meniscus formation in capillary tubes always be _____

- a) Convex
- b) Concave
- c) Equilibrium
- d) None of the mentioned

[View Answer](#)

Answer: b

Explanation: Since the soil pores always carry adsorbed water, the meniscus formation in capillary tube will always be concave.

6. When a capillary tube of uniform-section is lifted from the water surface, water in the tube will be _____

- a) Retained
- b) Not retained
- c) Retained partially
- d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: Since the upward force due to surface tension are balanced by downward force at the lower end there will be no water retained in the tube.

7. The height of capillary rise in capillary tube, depends on _____

- a) Diameter of the tube
- b) Surface tension
- c) Direction of flow of water
- d) All of the mentioned

[View Answer](#)

Answer: c

Explanation: If a capillary tube is of non-uniform diameter height of capillary rise will be depending upon the direction of flow of water in the tube.

8. The formation of concave meniscus in capillary tubes takes place, only if _____

- a) Inner tubes is dry
- b) Tube has non-uniform diameter
- c) Inner tube is wet

d) Diameter of the tube is larger

[View Answer](#)

Answer: c

Explanation: Concave meniscus will only take place if the inner walls of the tubes are initially wet. If the walls are dry, a depressed convex meniscus will be formed.

9. The water in the sandy soil is _____

- a) Pore water
- b) Ground water
- c) Free water
- d) Infiltrated water

[View Answer](#)

Answer: a

Explanation: In the sandy soil there is no significant force of attraction between the soil particles, hence it contains pore water.

10. Coarse grained soil relatively has _____ hygroscopic capacity.

- a) High
- b) Low
- c) Very low
- d) Very high

[View Answer](#)

Answer: b

Explanation: Coarse-grained soils have relatively low hygroscopic moisture due to their limited specific surface.
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11. The maximum hygroscopic capacity of clay is _____

- a) 1 %
- b) 3 %
- c) 7 %
- d) 17 %

[View Answer](#)

Answer: d

Explanation: The ratio of water adsorbed by dry soil in a saturated atmosphere at a given temperature to the weight of oven-dried soil, has the following average values Sands 1% silts 7%, clays 17 %.

[Capillary Tension, Capillary Potential and Soil Suction](#)

1. The capillary tension or capillary potential can also be called as _____

- a) Pressure deficiency
- b) Pressure reduction
- c) Negative pressure

d) All of the mentioned

[View Answer](#)

Answer: d

Explanation: The capillary potential is the pressure deficiency, pressure reduction or negative pressure in the pore water.

2. The maximum tensile stress of water in capillary tube is _____

- a) Proportional to the diameter of tube
- b) Inversely proportional to height of capillary rise
- c) Inversely proportional to the radius of meniscus
- d) All of the mentioned

[View Answer](#)

Answer: c

Explanation: From the formula, $(UC)_{max} = 2Ts / R$

Where, $(UC)_{max}$ = maximum tensile stress

R = radius of meniscus

TS = surface tension.

3. The pF value of 2 in soil mass represent _____

- a) Soil suction of 200 cm of water
- b) Suction pressure of 100 g/cm²
- c) Soil suction of 100 cm of water
- d) Capillarity of 100 g/cm²

[View Answer](#)

Answer: c

Explanation: From the relationship,

$pF = \log_{10}(hc)$

$2 = \log_{10}(hc)$

$hc = 2 / \log_{10}$

$hc = 100$ cm.

4. The pressure deficiency of held water in a capillary tube is termed as _____

- a) Soil suction and suction pressure
- b) Negative pressure
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: As the water is decreased linearly in the tube due to the suction of soil mass. The pressure deficiency is also called as soil suction or suction pressure.

5. Which one of the following factor does not affect soil suction?

- a) Water content
- b) Temperature

- c) Plasticity index of a soil
- d) Atmospheric pressure

[View Answer](#)

Answer: d

Explanation: As the atmospheric pressure, does not have any effect on water in the soil mass. It does not contribute to the affecting factor.

6. The soil suction is maximum, when angle of contact(α) is _____

- a) $\alpha=0$
- b) $\alpha=90$
- c) $\alpha=60$
- d) $\alpha=1$

[View Answer](#)

Answer: a

Explanation: As soil suction depend on capillary height (h_c)

Using the formula $h_c = \frac{4T \cos \alpha}{\gamma_w d}$

When $\alpha=0$

$h_c = \frac{4T_s}{\gamma_w d}$, which is maximum.

7. Rise in temperature _____ soil suction.

- a) Decreases
- b) Increases
- c) Removed
- d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: Rise in temperature results in a decrease of surface tension (TC) and hence decrease in soil suction.

8. Capillary tension is developed in saturated soil, when _____

- a) Soil is dry
- b) Water content is reduced
- c) Water content is increased
- d) Soil particle is large

[View Answer](#)

Answer: b

Explanation: On decreasing of water content, the menisci recede, resulting in a reduction of curvature and corresponding increase in capillary tension.

9. When do the soil suction is reduced to zero value?

- a) Water content is reduced
- b) Soil is oven dry
- c) Dry soil is submerged

d) All of the mentioned

[View Answer](#)

Answer: c

Explanation: When a dry soil is submerged under water, meniscus is destroyed resulting in a reduction of soil suction to zero value.

10. The size of interstices in a soil depends on _____

- a) Particle size
- b) Plasticity index
- c) Soil structure
- d) Angle of contact

[View Answer](#)

Answer: c

Explanation: Change in structure of the soil, changes the size of interstices in soil, resulting in soil suction variation. advertisement

11. The capillary pressure, transferred from grain to grain in soil may be also called as _____

- a) Inter granular pressure
- b) Contact pressure
- c) Effective pressure
- d) All of the mentioned

[View Answer](#)

Answer: d

Explanation: Inter granular or contact or effective pressure is the capillary pressure, transferred from grain to grain in soil.

[Shrinkage and Swelling of Soil](#)

1. Volume change in soil is due to which of the following factor?

- a) Water content is changed
- b) Increase in soil density
- c) Change in pressure
- d) Change in particle size

[View Answer](#)

Answer: a

Explanation: Decrease in the water content of the soil causes shrinkage while an increase of water content causes swelling.

2. Large volume changes in clayey soils results in _____

- a) Increase in capillary pressure
- b) Structural damage
- c) Decrease in surface area

d) Breaking of bonds

[View Answer](#)

Answer: b

Explanation: Clayey soil has very little shrinking and swelling capacity, therefore a large change in volume results in extensive structural damages.

3. Free swell of a soil can be defined as _____

- a) Swelling of soil without shrinkage
- b) Increase in volume without any constrains
- c) Limited swelling on rewetting
- d) Swelling on submergence in water

[View Answer](#)

Answer: b

Explanation: As per IS: 2720-part 40, free swell of a soil is defined as increase in volume of a soil without any constrains, on submergence in water.

4. What are the minerals, responsible for large volume decrease in soil on drying in clayey soils?

- a) Illite and Kaolinite
- b) Montmorillonite
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: When illite and kaolinite minerals are present in clay soil, the soil exhibit large initial volume decrease on drying.

5. Formation of meniscus in a saturated soil causes _____

- a) Compression in the soil structure and Reduction in the volume
- b) Decrease in the water content
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: Formation of meniscus in dry saturated soil, causes tension in the soil water leading to a compression in the soil structure and consequent reduction in the volume.

6. When does surface Tension in the water become zero?

- a) When the soil is completely dried
- b) When the soil is fully saturated
- c) When the water evaporates
- d) None of the mentioned

[View Answer](#)

Answer: b

Explanation: Initially when the soil is fully saturated, the capillary space between the particles are completely filled with water, therefore the tension in the water becomes zero at this stage.

7. Shrinkage is prominent in _____ soil.

- a) Clay
- b) Coarse-grained
- c) Fine-grained
- d) Silt

[View Answer](#)

Answer: a

Explanation: As the degree of shrinkage increase with an increase in clay content. Shrinkage is more in clay soil.

8. When will meniscus in saturated soil attain a minimum value?

- a) Compressive force is maximum and Shrinkage is maximum
- b) Soil is fully saturated
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: Compressive and shrinkage forces are maximum when meniscus has its minimum value.

9. Presence of sand and silt-size particles in a clay deposit reduces _____

- a) Swelling of soil
- b) Volume
- c) Water content
- d) Total shrinkage

[View Answer](#)

Answer: d

Explanation: Since the degree of shrinkage depends on geological deposition, presence of sand and silt reduces the total shrinkage.

[Frost Action](#)

1. Frost heave is defined as _____

- a) Rise of ground water surface
- b) Freezing of water in soil
- c) Increase in volume due to freezing
- d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: Rise of ground water surface in a soil mass due to frost action is termed as frost heave.

2. If the void ratio is 40% in saturated soil, then the expansion of the soil will be _____

- a) 5 %
- b) 2.3 %
- c) 3.6 %
- d) 4 %

[View Answer](#)

Answer: c

Explanation: There is an increase of about 9% in the volume, when water is converted in to ice. Therefore
Expansion of the soil = 0.009×40
= 3.6 %.

3. What are the types of soils, that are prone to frost action?

- a) Sand and Silt
- b) Clay
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: Only silts and fine sands are prone to frost action because these soils have large capillary rise due to relatively fine particles.

4. What is the maximum capillary tension for a tube of 0.05 mm diameter at 4°C?

- a) 6.05 KN/m³
- b) 0.617 KN/m³
- c) 5.45 KN/m³
- d) 3.00 KN/m³

[View Answer](#)

Answer: a

Explanation: Maximum capillary height at 4°C is
(h_C)_{max} = $0.3084/d = 0.617$ m
Capillary tension = (h_C)_{max} × γ_{max}
= 6.05 KN/m³.

5. A well graded soil is said to be frost susceptible if more than _____

- a) 10 % particle are smaller than 0.002 mm
- b) 3 % particle are smaller than 0.002 mm
- c) 3 % particle are smaller than 0.005 mm
- d) 10 % particle are smaller than 0.005 mm

[View Answer](#)

Answer: b

Explanation: A well graded soil is reckoned to be frost susceptible if 3 % particle are smaller than 0.002 mm and for poor graded soil 10 % particle are smaller than 0.002 mm.

6. The ground surface up to which water freeze is called _____

- a) Frost heave
- b) Frost boil
- c) Frost line
- d) Ice lenses

[View Answer](#)

Answer: c

Explanation: Frost line is the depth or boundary below the ground surface up to which water may freeze.

7. The temperature at which the soil freezes in the pores of the soil depend on _____

- a) Pore size
- b) Frost action
- c) Saturation
- d) Capillary tension

[View Answer](#)

Answer: a

Explanation: As the water freezes in larger pores, and remain unfrozen in the smaller pore the temperature falls downs.

8. Silt soils are more susceptible to frost action than _____

- a) Sand soil and Clayey soil
- b) Gravel soil
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: Silt soils have more plasticity index than sand and clays and hence the softening effect due to excess water will be more severe in silts.

9. Soil should possess _____ for the formation of ice lens.

- a) Low moisture content
- b) High porosity
- c) High capillarity
- d) All of the mentioned

[View Answer](#)

Answer: c

Explanation: For the formation of ice lens and frost heave, soil should possess high capillarity so that the soil possesses a high capacity to pull water.

10. Which of the following is an effect of frost boils?

- a) Formation of pot holes
- b) Increased frost depth

- c) Formation of capillary saturation
- d) All of the mentioned

View Answer

Answer: a

Explanation: Due to frost boils, there is a formation of pot holes by extrusion of soft soil and water under the dynamic action of wheel loads.

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11. Which of the following action can be used to prevent deep frost penetration in the ground surface in building?

- a) Removing the frost susceptible soil
- b) Placing insulating blankets of sand and gravel
- c) Providing proper drainage
- d) Interposing a pervious gravel blanket

View Answer

Answer: b

Explanation: Placing insulating blankets of 15 to 30 cm thick layer of sand and gravel on the ground surface above the frost susceptible to prevent deep penetration method.

[Stress Condition in Soil :Effective and Actual Pressure](#)

1. Total stress or unit pressure on a soil mass is _____

- a) Total load
- b) Total surface area
- c) Total volume
- d) Total weight

View Answer

Answer: a

Explanation: At any plane in a soil mass, the total stress or unit pressure is the total load per unit area.

2. At any plane, pore pressure is equal to _____

- a) Ratio of Piezometric head to weight of water
- b) Equal to piezometric head times the unit weight of water
- c) Ratio of weight of water to the piezometric head
- d) None of the mentioned

View Answer

Answer: b

Explanation: $u = h_w \times \gamma_w$

Pore pressure=piezometric head \times weight of water.

3. Pressure transmitted from particles to the soil mass is called _____

- a) Neutral pressure
- b) Effective pressure
- c) Pore pressure

d) Capillary pressure

[View Answer](#)

Answer: b

Explanation: Effective pressure ' σ ' or intergranular pressure is the pressure transmitted from particle through their point of contact through the soil mass above the plane.

4. The neutral pressure does not have any effect on _____

- a) Shearing resistance
- b) Shearing strength
- c) Shearing stress
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The neutral pressure does not have measurable influence on the mechanical property of the soils, such as shearing resistance.

5. The total pressure in a soil mass consists of _____ distinct components.

- a) 3
- b) 4
- c) 2
- d) 5

[View Answer](#)

Answer: c

Explanation: i. Effective pressure or intergranular pressure.
ii. Neutral pressure or pore pressure, are the two components of total pressure.

6. The neutral pressure is transmitted through _____

- a) Soil particle
- b) Pore fluid
- c) Air particle
- d) Atmosphere

[View Answer](#)

Answer: b

Explanation: As the neutral pressure should not have any effect on void ratio or property of soil, it is transmitted through pore fluid.

7. Total vertical pressure at any plane is equal to _____

- a) $\sigma = \sigma' + u$
- b) $\sigma' = \sigma + u$
- c) $\sigma = \sigma' + v$
- d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: Total vertical pressure at any plane is equal to the sum of effective pressure and the total pressure i.e. $\sigma = \sigma' + u$.

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8. Factor of unit cross-section χ , depends on _____

- a) degree of saturation
- b) soil structure
- c) stress change
- d) all of the mentioned

[View Answer](#)

Answer: d

Explanation: Factor of unit cross-section varies with the degree of saturation, soil structure, process by which the soil present degree of saturation and stress change.

9. For degree of saturation, it is recommended to take χ as _____

- a) 0
- b) 1
- c) 2
- d) ∞

[View Answer](#)

Answer: b

Explanation: For degree of saturation of $S \geq 90\%$, it is recommended to take χ as unity (i.e., 1).

[Darcys Law](#)

1. What are the types of water flow in the soil?

- a) Turbulent flow and Laminar flow
- b) Linear flow
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The flow of water through soils may be either a laminar flow or turbulent flow.

2. In what way, do the fluid particles travel in a turbulent flow?

- a) Twisting
- b) Crossing
- c) Re-crossing
- d) Definite path

[View Answer](#)

Answer: d

Explanation: In laminar flow, each fluid particles travels along a definite path which never crosses the path of any other particles.

3. Gravels are _____ permeable.

- a) Highly
- b) Least
- c) Partially
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The pore size in gravel is larger, hence the gravels are highly permeable than sand which is least permeable.

4. The law of flow of water through the soil was first studied by _____

- a) Taylor
- b) Darcy
- c) Lambe
- d) Khosla

[View Answer](#)

Answer: b

Explanation: In 1856, Darcy studied the law of flow of water through soil and demonstrated experimentally the laminar flow conditions.

5. Which of the following equation defines Darcy's law?

- a) $q=KA$
- b) $q=K/A$
- c) $q=K i A$
- d) $q=K i/A$

[View Answer](#)

Answer: c

Explanation: According to Darcy's law, the rate of flow or discharge per unit area is proportional to the hydraulic gradient.

$q \propto i$

$q = K i A$, where K =Darcy's coefficient of permeability

A = total cross-sectional area.

6. Coefficient of permeability or simple permeability is expressed in terms of _____

- a) cm/sec
- b) m/day
- c) feet/day
- d) all of the mentioned

[View Answer](#)

Answer: d

Explanation: As the dimension of the coefficient of permeability k are same as those of velocity. It is expressed in terms of cm/sec or m/day or feet/day.

7. The co-efficient of permeability of fine sand is _____

- a) 1.0 and greater
- b) 1×10^{-6} and smaller
- c) 1×10^{-2} to 5×10^{-3}
- d) 5×10^{-2} to 1×10^{-3}

[View Answer](#)

Answer: d

Explanation: For fine sand, the coefficient of permeability is 0.05 to 0.001 cm /sec or 5×10^{-2} to 1×10^{-3} .

8. Darcy's law is valid for only _____

- a) Laminar flow
- b) Turbulent flow
- c) Hydraulic flow
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: Darcy's law of linear dependency between the velocity of flow and hydraulic agent is valid for only laminar flow conditions in the soil.

9. Darcy's law is valid as long as it is equal to or less than _____

- a) 1
- b) 0
- c) 0.1
- d) 2

[View Answer](#)

Answer: a

Explanation: In 1933, Lewis and Barnes demonstrated experimentally that Darcy's law is valid if it is ≤ 1 .

10. Stiff clays are _____ permeable.

- a) Highly
- b) Least
- c) Partially
- d) None of the mentioned

[View Answer](#)

Answer: b

Explanation: As stiff clay does not contain any porous materials, it may be termed as least permeable or impermeable.

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11. The study of seepage of water through soil is important for, which of the following purpose?

- a) Drainage of soils
- b) Stability of slopes
- c) Ground water flow towards well
- d) All of the mentioned

View Answer

Answer: d

Explanation: The study of seepage of water through soil is important for the following engineering problem

- i. Ground water towards soil and drainage of soil
- ii. Calculation of seepage through the body of earth dams, and stability of slopes.

[Factors Affecting Permeability](#)

1. Based on Allen Hazen experiments, permeability can be expressed as _____

- a) $K=CD^{102}$
- b) $K=CD^{210}$
- c) $K=DC^{210}$
- d) $K=DC^{102}$

View Answer

Answer: a

Explanation: In 1892, Allen Hazen based on his experiment on filter of sand particles between 0.1 and 3 mm, found that the permeability can be expressed as $K=CD^{102}$.

2. Which of the following factors affects the permeability of soil?

- a) Grain size
- b) Properties of pore fluid
- c) Void ratio of soils
- d) All of the mentioned

View Answer

Answer: d

Explanation: Grain size, properties of pore fluid, structural soil arrangement of soil particles, entrapped air and foreign matter and adsorbed water.

3. Physical permeability of a soil K_P is related to the coefficient of permeability by the equation _____

- a) $K_P=k\eta$
- b) $K_P=k\eta/\gamma W$
- c) $K_P=k/\eta$
- d) $K_P=k \gamma W$

View Answer

Answer: b

Explanation: In 1937, Muskat pointed out a relationship between physical permeability and Darcy's coefficient of permeability as $K_P=k\eta/\gamma W$.

4. Loudon's experiments demonstrated the relationship between _____

- a) Permeability and specific surface
- b) Permeability and grain size
- c) Permeability and adsorbed water
- d) Permeability and volume

[View Answer](#)

Answer: a

Explanation: Loudon's experiment demonstrated that the permeability of coarse grained soils is inversely proportional to the specific surface at a given porosity.

5. What is the constant value of a and b in Loudon's empirical formula " $\log_{10}(KS_s^2) = a + bn$ "?

- a) 1 and 0
- b) 1.515 and 1.365
- c) 1.365 and 1.515
- d) 0 and 1

[View Answer](#)

Answer: c

Explanation: Based on his experiments, Loudon found out the value of a and b s 1.365 and 1.515 for permeability of 10°C.

6. What is the relationship between permeability and viscosity of water?

- a) Directly proportional
- b) Inversely proportional
- c) Both are equal
- d) None of the mentioned

[View Answer](#)

Answer: b

Explanation: From Poiseuille's law, $K = D_s^2 \gamma_w / \eta$

It is found that permeability is directly proportional to the unit weight of water and inversely proportional to its viscosity.

7. What is the effect of adsorbed water on the permeability of soil?

- a) Structural arrangement is varied
- b) Reduced degree of saturation
- c) Size of the particles is diminished
- d) Reduces the pore size

[View Answer](#)

Answer: d

Explanation: The adsorbed water surrounding the fine soil particles is not free to move, and reduces the effective pore space available for the passage of water.

8. What is the approximate value, which can be taken as void ratio occupied by adsorbed water?

- a) 1

- b) 0
- c) 0.1
- d) 10

View Answer

Answer: c

Explanation: According to approximation value after casagrande, 0.1 may be taken as the void ratio occupied by adsorbed water.

9. The effect of structural disturbance is on permeability is more in _____

- a) Fine-grained soil
- b) Coarse grained soil
- c) Clay soil
- d) All of the mentioned

View Answer

Answer: a

Explanation: The effect of structural disturbance on permeability is much pronounced in fine-grained soil than any other.

10. The structural arrangement of soil Particle vary depending upon _____

- a) Method of deposition and Compacting the soil mass
- b) Degree of saturation
- c) None of the mentioned
- d) All of the mentioned

View Answer

Answer: a

Explanation: The structural arrangement of the particle may vary, at the same void ratio, depending upon the method of deposition or compacting the soil mass.
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11. How do degree of saturation effect permeability of soil?

- a) By reducing the pore size
- b) By entrapping air in the voids
- c) Not allowing soil particles to move freely
- d) By changing the void ratio

View Answer

Answer: b

Explanation: By entrapping the air in the voids present in the soil, the permeability is greatly reduced, thus reducing the degree of saturation.

[Determination of Coefficient of Permeability](#)

1. Permeability can be determined by direct measurement with the help of _____

- a) Permeameter

- b) Consolidation test
- c) Horizontal capillary test
- d) Pumping-out test

[View Answer](#)

Answer: a

Explanation: Permeability of soil can be determined by permeameters, by allowing the water to flow through soil sample under either constant head or under variable head.

2. Which of the following formula, cannot be used for determining the permeability of soil?

- a) Jacky's formula
- b) Allen Hazen's formula
- c) Kozney's formula
- d) Darcy's formula

[View Answer](#)

Answer: d

Explanation: In Darcy's equation or Darcy's law, there is no permeability constant.

$$q = k i A$$

Hence it cannot be used for finding permeability of soil.

3. Coefficient of permeability of soil can be determined by which of the following method?

- a) Laboratory methods
- b) Field methods
- c) Indirect methods
- d) All of the mentioned

[View Answer](#)

Answer: d

Explanation: The coefficient of permeability can be determined by the following methods:

- i. Laboratory method – constant head permeability and falling head permeability test
- ii. Field method –pumping-out and pumping-in test
- iii. Indirect methods- horizontal capillary test and consolidation test data.

4. Allen Hazen's formula is given by which of the following equations?

- a) $K = 100m^2$
- b) $K = C D^{102}$
- c) $K = 200De^{2e2}$
- d) None of the mentioned

[View Answer](#)

Answer: b

Explanation: Allen Hazen's formula is $K=CD^{102}$, where c is constant, which is taken as approximately equal to 100 when D_{10} is expressed in cm.

5. The unit of coefficient of absolute permeability(K) is _____

- a) Kg/cm

- b) m/s^2
- c) m^2
- d) All of the mentioned

View Answer

Answer: c

Explanation: Since K has the dimension of area (i.e. $[k] = [L^2]$), the unit of K is m^2 .

6. Coefficient of absolute permeability (K) depends on _____

- a) Permeant
- b) Properties of soil mass
- c) Degree of saturation
- d) All of the mentioned

View Answer

Answer: b

Explanation: From the equation of coefficient of absolute permeability,

$$K = C \frac{e^3}{1+e} D^3$$

We can find that coefficient of permeability is independent of the properties of permeant (i.e. water) and it depends solely on the properties of soil mass.

7. In Terzaghi's formula $K = 200D_e^2e^2$, D_e represents _____

- a) Effective grain shape
- b) Void ratio
- c) Effective grain size
- d) Permeability

View Answer

Answer: c

Explanation: D_e =effective grain size, the diameter of the sphere for which the ratio of its volume to its surface area is the same as the similar ratio for a given assemblage of soil particles.

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8. $K = 100D_m^2$, is given by which of the following formula?

- a) Terzaghi's formula
- b) Kozeny's formula
- c) Jacky's formula
- d) Allen Hazen's formula

View Answer

Answer: c

Explanation: In 1944, Jacky found out the order of magnitude of k can be obtained from all soils from the formula $K = 100D_m^2$, where D_m denotes grain size.

9. Terzaghi's formula can be applied for _____

- a) Uniform sand

- b) Clay soil
- c) Coarse-grained soil
- d) Fine-grained soil

[View Answer](#)

Answer: a

Explanation: Terzaghi's formula can be successfully applied to fairly uniform sand, which reflects the effect of grain size and void ratio.

Constant and Falling Head Permeability Test

1. Falling head permeability test can be used for _____

- a) Coarse-grained soil
- b) Less permeable soil
- c) Clayey soil
- d) All of the mentioned

[View Answer](#)

Answer: b

Explanation: Falling head test is used for relatively less permeable soils where the discharge is small.

2. Which of the following formula is used in Falling head permeability test?

- a) Jacky's formula
- b) Louden's formula
- c) Darcy's law
- d) Kozney's formula

[View Answer](#)

Answer: c

Explanation: In falling head permeability test, Darcy's law is used from which the rate of flow q , can be used $q = K i A$.

3. In falling head permeability test apparatus, the water head at any time instant is equal to _____

- a) Difference in the water level
- b) Cross-sectional area of pipe
- c) Height of permeameter
- d) None of the mentioned

[View Answer](#)

Answer: b

Explanation: The head h_1 and h_2 at any time instant t is equal to the difference in the water level in the stand pipe and the bottom tank.

4. In constant permeability test, the length of specimen is measured by _____

- a) Calculating the difference in water level
- b) Using Piezometric tube
- c) Using measuring scale

d) None of the mentioned

[View Answer](#)

Answer: b

Explanation: In a constant head test, the length of the sample is measured by inserting piezometric tubes on top and bottom.

5. The constant head permeability test is used for _____

- a) Fine-grained soil
- b) Coarse-grained soil
- c) Clay soil
- d) Saturated soil

[View Answer](#)

Answer: b

Explanation: Coarse-grained soil, for which a reasonable discharge can be collected in a given time, is used in constant test.

6. The laboratory observation falling head test consist of measurements of _____

- a) h_1 at an interval of t_1 and h_2 at an interval of t_2
- b) Only t_1 and t_2
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The laboratory measurement of falling head permeability test consists of measurement of the heads h_1 and h_2 at two chosen time intervals t_1 and t_2 .

7. Which of the following tubes are used in the constant head test?

- a) Inlet tube
- b) Overflow tube
- c) Outlet tube
- d) All of the mentioned

[View Answer](#)

Answer: d

Explanation: The constant head test apparatus consists of three tubes: the inlet tube, the overflow tube and outlet tube.

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8. In falling head permeability test, change in the head at a time interval dt is denoted as _____

- a) dh
- b) $-dh$
- c) h

d) $-h$

[View Answer](#)

Answer: b

Explanation: $-dh$ is used to denote a change in a smaller time interval dt , the minus sign has been used since h decreases as t increases.

[The Jodhpur Permeameter](#)

1. The Jodhpur permeameter, was designed by _____

- a) Louden
- b) Kozney
- c) Alam Singh
- d) Poiseuille's

[View Answer](#)

Answer: c

Explanation: The Jodhpur permeameter was designed and developed by Dr. Alam Singh in 1958, at the soil engineering laboratory of M.B.M Engineering College, Jodhpur.

2. The Jodhpur permeameter apparatus is, meant for studying _____

- a) Permeability characteristics
- b) Coefficient of permeability
- c) Capillary rise
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The apparatus is meant for studying the permeability characteristics of all types of soil samples under different conditions of laboratory as well as field.

3. Which of the following permeability test, can be done in Jodhpur permeameter?

- a) Falling head test and Constant head test
- b) Pumping-out test
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: In Jodhpur permeameter, both falling head and constant head test can be performed on remoulded as well as undisturbed specimens.

4. The Remoulded specimen in Jodhpur Permeameter, can be prepared by _____

- a) Static compaction and Dynamic compaction
- b) Tensile compaction
- c) None of the mentioned

d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The remoulded specimen can be prepared either by static compaction, or b dynamic compaction, at the desired density.

5. What is the diameter of the permeameter mould (i.e. Cylinder), used in Jodhpur permeameter?

a) 79.8 mm

b) 50 mm

c) 300 mm

d) 60 mm

[View Answer](#)

Answer: a

Explanation: The permeameter mould which is a cylinder has an internal capacity 300 ml, 50 cm² cross-sectional area, and diameter of 79.8 mm and a 6 cm height.

6. Which of the following tools is not used in static compaction?

a) Split collar

b) Perforated plate

c) DRT

d) Top cap

[View Answer](#)

Answer: c

Explanation: The DRT tool (Dynamic Ramming tool) is used for compaction in the Jodhpur mini compactor test.

7. If permeability at proctor's maximum dry density is required, which of the following method can be used?

a) Jodhpur mini compactor test

b) Proctor test

c) Compaction in permeameter

d) All of the mentioned

[View Answer](#)

Answer: d

Explanation: If permeability at proctor's maximum dry density and at a moulding water content equal to the optimum value is required, first the maximum dry density and optimum water content is required is determined which can be done using Jodhpur mini compactor test, proctor test or by compaction in permeameter mould itself.

8. The specimen in permeameter is compacted dynamically using _____

a) DRT

b) Split collar

c) Rod temper

d) Core cutter

[View Answer](#)

Answer: c

Explanation: When compacting the specimen dynamically, rod temper is used. The wet soil of pre-calculated quantity in the specimen is compacted in to mould by means of the rod temper in two or three layers.

9. The permeameter assembly is placed in _____ of the Jodhpur permeameter apparatus.

- a) Bottom tank
- b) Top of cylinder
- c) Below the top plate
- d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: The permeameter assembly is placed in the bottom tank having a water outlet which permits control of water level.

[The Capillarity-Permeability Test](#)

1. The capillarity-permeability test may be also called as _____

- a) Vertical capillarity test
- b) Horizontal capillarity test
- c) Capillary test
- d) Coefficient of permeability test

[View Answer](#)

Answer: b

Explanation: The apparatus used in capillary-permeability test is horizontal; hence it can be also called as horizontal capillarity test.

2. The capillary-permeability test, is used to determine _____

- a) Coefficient of permeability and Capillary test
- b) Degree of saturation
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The capillarity-permeability test or the horizontal capillarity test is used to determine the coefficient of permeability K as well as the capillarity test h_c of the soil sample.

3. The bedding planes of soil layers in soil mass may be _____

- a) Horizontal
- b) Vertical
- c) Inclined

d) All of the mentioned

[View Answer](#)

Answer: d

Explanation: In nature, soil may consist of several layers deposited one above the other. Their bedding planes may be horizontal, inclined or vertical.

4. Each layer of soil layer has its own value of _____

a) Degree of saturation

b) Coefficient of permeability

c) Capillary head

d) All of the mentioned

[View Answer](#)

Answer: b

Explanation: Since layer of soil is assumed to be homogeneous and isotropic, each layer has its own value of coefficient of permeability.

5. The average permeability of soil deposits depends on _____

a) Direction of flow

b) Coefficient of permeability

c) Moisture content

d) Saturation of the soil

[View Answer](#)

Answer: a

Explanation: The average permeability of the whole soil deposit will depend upon the direction of flow with relation to the direction of bedding planes.

6. The degree of saturation in capillarity-permeability test can be found out by _____

a) Known dry mass of soil

b) Taking wet mass of soil

c) Finding the porosity

d) All of the mentioned

[View Answer](#)

Answer: b

Explanation: The degree of saturation can be found out by taking the wet mass of the soil sample at the end of the test.

7. The saturation in capillary-permeability is assumed to be _____ percentage.

a) 0

b) 50

c) 75

d) 100

[View Answer](#)

Answer: d

Explanation: The saturation is assumed to be 100 % so that the formula $nvs=Ki$ is derived from Darcy's law.
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8. The possible directions of flow of the soil deposit with respect to the bedding planes are _____

- a) Parallel and Perpendicular
- b) Inclined
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: There are two possible cases of flow, one is parallel to the bedding plane and another is perpendicular to the plane.

9. The hydraulic gradient (i), used in capillary-permeability test is _____

- a) h_0+hc/x
- b) h_0/x
- c) h_0+hc
- d) hc/x

[View Answer](#)

Answer: a

Explanation: The hydraulic head lost in causing of flow = h_0+hc
Therefore, hydraulic gradient = h_0+hc/x .

[Steady Flow to a Well : Dupuits Theory](#)

1. Which of the following test is commonly adopted for determining soil permeability of soil formations?

- a) Pumping-in test and Pumping-out test
- b) Horizontal capillary test
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: Pumping-out test is the frequently used field method, as it involves discharging water from the ground.

2. The value of specific yield SY, of an aquifer depends on _____

- a) Grain size
- b) Compaction of stratum
- c) Grain shape
- d) All of the mentioned

[View Answer](#)

Answer: d

Explanation: Since specific yield is the volume of water drained, the drainage of water depend on grain size, shape and compaction of stratum in the soil.

3. Specific yield of unconfined aquifer indicates _____

- a) Water capacity
- b) Volume of water
- c) Water retained
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: Specific yield is an indication of the water yielding capacity of an unconfined aquifer.

4. Dupuit's theory was later modified by _____

- a) Thiem
- b) Darcy
- c) Alam Singh
- d) Louden

[View Answer](#)

Answer: a

Explanation: The theory proposed by Dupuit's on radial flow was modified by Thiem in 1906.

5. The parabolic depression in the aquifer is called as _____

- a) Cone of depression and Drawdown curve
- b) Parabolic curve
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The parabolic depression formed when water is pumped from the aquifer through well can be called as cone of depression or the drawdown surface.

6. In most of the confined aquifers, the value of storage coefficient ranges between _____

- a) 0.05 to 0.0005
- b) 0.5 to 0.005
- c) 0.00005 to 0.005
- d) 0 to 5

[View Answer](#)

Answer: c

Explanation: By pumping test method, the value of storage coefficient ranges was found to be in between 0.00005 to 0.005.

7. Which of the following is depicted by Dupuit's theory?

- a) The velocity of flow

- b) Co-efficient of transmissibility
- c) Radial flow of water
- d) Volume of aquifer

[View Answer](#)

Answer: c

Explanation: The analysis of the radial flow of water to a well was originally proposed by Dupuit's theory.

8. The co-efficient of transmissibility (T) of an aquifer is given by which of the following equation?

- a) $T=b k$
- b) $T=b/k$
- c) $T=(b k)^2$
- d) $T=k/b$

[View Answer](#)

Answer: a

Explanation: The coefficient of transmissibility T is equals the field of co-efficient of permeability K multiplied by the aquifer thickness b:

$T=b k$.

9. According to Dupuit's theory, the velocity of flow is proportional to _____

- a) Sine of hydraulic gradient
- b) Tangent of hydraulic gradient
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: b

Explanation: Based on the assumption proposed by Dupuit's theory, the velocity of flow is proportional to the tangent of the hydraulic gradient instead of its sine.

10. Dupuit's theory states that, the Darcy's law equation is not valid near _____

- a) Well face
- b) Top Surface of well
- c) Sides of the well
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: Since the flow of water is not horizontal near wall and the flow no longer remains laminar. Thus, Darcy's law equation is not valid near the well face.

[Recuperation Test](#)

1. The pumping-in test was devised by _____

- a) U.S. Bureau of soil and PRA
- b) U.S. Bureau of reclamation

c) Indian standard of Bureau

d) None of the mentioned

[View Answer](#)

Answer: b

Explanation: The U.S. bureau of Reclamation (Earth Manual, 1960) has devised two types of pumping-in test.

2. The type of hydraulics of flows towards open well is _____

a) Radial flow

b) Bottom flow

c) Adjacent flow

d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: If the well is open, radial flow takes place all around the well and there is no flow from the bottom of the well.

3. The discharge of an open well can be determined by, which of the following method?

a) Constant head test

b) Falling head test

c) Recuperation test

d) None of the mentioned

[View Answer](#)

Answer: c

Explanation: In the recuperation test, water level can be depressed to any level and the discharge from the well can be calculated.

4. Which of the following well, does not penetrate to the full depth of an aquifer?

a) Fully penetrating artesian gravity well

b) Partially penetrating artesian well

c) Partially penetrating artesian gravity well

d) All of the mentioned

[View Answer](#)

Answer: b

Explanation: A partially penetrating artesian well is the one in which the well screen does not penetrate to the full depth of the confined aquifer. Such wells extend only partly through the water bearing stratum.

5. In Recuperation test, the expression (K/A) is known as _____

a) Specific yield and Specific capacity

b) Coefficient of permeability

c) None of the mentioned

d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: K/A is known as the specific yield or specific capacity of an open well, in cubic meter per hour per square meter of the area through which water percolates.

6. For fine-grained soil, the value of K/A as specified by Marrio is _____

- a) 1.00
- b) 0.50
- c) 0.25
- d) 2.00

[View Answer](#)

Answer: c

Explanation: For fine-grained type of soil, the value of K/A is 0.25 cubic meter per hour, per sq. m of the area under 1m depression head.

7. When two wells, situated near each other is discharged, the total discharge will _____

- a) Increases
- b) Decreases
- c) Remains the same
- d) None of the mentioned

[View Answer](#)

Answer: b

Explanation: When two wells are discharged, their drawdown curves intersect within their radii of zero drawdown. Thus the total discharge is increased.

8. Volume of water dV entering the well, when the head recuperates by dh is _____

- a) $dV=A/dh$
- b) $dV=A.dh$
- c) $dV=Khdt$
- d) $dV=K.A$

[View Answer](#)

Answer: b

Explanation: Volume of water entering the well, when the head recuperates by dh is given by the equation: $dV=Adh$
Where, A =cross-sectional area of the well at its bottom.

9. Which of the following flow is less efficient than radial flow?

- a) Bottom flow
- b) Spherical flow
- c) Turbulent flow
- d) Linear flow

[View Answer](#)

Answer: b

Explanation: The discharge of spherical flow q_s is given by, $q_s/q = 2.3(r/b) \log_{10} 1000$

Let $r = 8\text{cm} = 0.08\text{ m}$

$R/r = 1000$; $b = 16\text{ m}$

$$q_s/q = 2.3(0.08/16) \log_{10} 1000$$

$$q_s/q = 1/30$$

This shows that the spherical flow is much less efficient than the radial flow.

10. An open well has relatively larger diameter at _____

- a) Base
- b) Middle
- c) Top
- d) Near the bottom

[View Answer](#)

Answer: b

Explanation: As the velocity of water is larger at the base, the width of base widens up and its diameter increases.

[Two Dimensional Flow : Laplace Equation](#)

1. What are the types of flow head that exist at any point in a saturated soil mass?

- a) Piezometric head or pressure head
- b) Velocity head
- c) Position head
- d) All of the mentioned

[View Answer](#)

Answer: d

Explanation: When water flows through a saturated soil mass, the total head at any point in the soil mass consist of i) piezometric head or pressure head ii) the velocity head iii) the position head.

2. The quantity of water, flowing through a saturated soil mass can be estimated by which of the following theory?

- a) Flow of fluids through porous medium
- b) Theoretical analysis of Laplace
- c) Flow of water through saturated soil mass
- d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: The quantity of water flowing through a saturated soil mass, as well as the distribution of water pressure can be estimated by the theory of fluids through porous medium.

3. According to theory of flow of fluids through porous medium, the saturated porous medium is _____

- a) Compressible
- b) Incompressible
- c) Moderately compressible
- d) Highly compressible

[View Answer](#)

Answer: b

Explanation: The size of the pore spaces in saturated soil mass does not change with time, regardless of water pressure. Therefore the saturated porous medium is incompressible.

4. The quantity of water which flows out from any element of volume is _____ than quantity which flows out.

- a) Greater
- b) smaller
- c) Equal
- d) All of the mentioned

[View Answer](#)

Answer: c

Explanation: According to the theoretical analysis of the flow of fluids, the quantity of water flowing into any element of volume is equal to the quantity which flows out in the same length of time.

5. In the zone of soil through which water seeps, there will be _____ change in the degree of saturation.

- a) More
- b) Less
- c) All of the mentioned
- d) None of the mentioned

[View Answer](#)

Answer: d

Explanation: There is no change in the degree of saturation in the zone of soil through which water seeps.

6. The path along which, the individual particles of water seep through the soil are _____

- a) Stream lines and Flow lines
- b) Equipotential lines
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The direction of seepage is always perpendicular to the equipotential line. But both equipotential line and stream line (flow line) is mutually orthogonal. So the individual particle of the water seep through stream line.

7. The solution of velocity potential ϕ can be obtained by which of the following methods?

- a) Analytical methods
- b) Graphical methods
- c) Experimental methods
- d) All of the mentioned

[View Answer](#)

Answer: d

Explanation: Solution for velocity potential equation can be obtained from analytical, graphical and experimental methods which give two sets of curves.

8. The loss of head per unit distance in soil is called _____

- a) Velocity potential
- b) Hydraulic gradient

- c) Velocity gradient
- d) Stream function

View Answer

Answer: b

Explanation: The loss of head or the dissipation of the hydraulic head per unit distance of flow through the soil is called hydraulic gradient
i.e. $i=h/L$.

9. Seepage pressure is important for which of the following purpose?

- a) Stability analysis
- b) Structural arrangement
- c) Total head
- d) All of the mentioned

View Answer

Answer: a

Explanation: The seepage structure is a vital importance in the stability analysis of earth structures subjected to the action of seepage.

10. The total head at any point on soil may be regarded as _____ per unit weight of water measured.

- a) Velocity energy
- b) Hydraulic potential
- c) Potential energy
- d) Piezometric energy

View Answer

Answer: b

Explanation: Flow occurs between two points only when there is a difference in the potential energies or simply potential.
advertisement

11. A combination of velocity potential (ϕ) and stream function (ψ) is called _____

- a) Velocity potential
- b) Seepage pressure
- c) Complex potential
- d) Hydraulic gradient

View Answer

Answer: c

Explanation: A combination of ϕ and ψ is called as complex potential (w) and is defined by the equation: $w=\phi +i \psi$.

[Application of Flow Net](#)

1. A flow net can be used for which of the following purpose?

- a) Determination of seepage
- b) Determination of seepage pressure

- c) Determination of hydrostatic pressure
- d) All of the mentioned

[View Answer](#)

Answer: d

Explanation: A flow net can be utilized for determination of seepage, seepage pressure, hydrostatic pressure, and exit gradient.

2. The portion between two successive flow lines is known as _____

- a) Field channel
- b) Flow channel
- c) Open channel
- d) All of the mentioned

[View Answer](#)

Answer: b

Explanation: The portion between any two successive flow lines is called a flow channel and the portion enclosed between two successive equipotential lines and successive flow lines are known as field.

3. Who was the first to give a graphical method of flow net construction?

- a) Casagrande
- b) Darcy
- c) Forchheimer
- d) Kozney

[View Answer](#)

Answer: c

Explanation: The graphical method of flow net construction first given by Forchheimer in 1930, based on trial sketching.

4. The Darcy's law governing the flow of water through is related to which of the following law?

- a) Ohm's law
- b) Stokes law
- c) Faraday's law
- d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: The electric models suggested by ohm, have the same geometric shape as the soil through which the water flows. And both Darcy and ohm's law have corresponding analogous quantities.

5. The flow lines and equipotential lines are _____

- a) Parallel
- b) Perpendicular
- c) Elliptical

d) All of the mentioned

[View Answer](#)

Answer: b

Explanation: The flow lines and equipotential lines always meet at right angles to one another.

6. The hydrostatic pressure in terms of piezometric head can be calculated from which of the following equation?

a) $h_w = h - Z$

b) $h_w = h + Z$

c) $h_w = u/\gamma_w$

d) $h_w = h/z$

[View Answer](#)

Answer: a

Explanation: The equation $h_w = h - Z$, can be used to plot pressure net representing lines of equal water pressure without the saturated soil mass since all the three quantities in the equation can be expressed as the percentage of total hydraulic head H.

7. The seepage medium can be replaced by _____ electric model having the same geometric shape.

a) Potential divider

b) Insulator

c) Electric conductor

d) Potentiometer

[View Answer](#)

Answer: c

Explanation: The seepage medium is replaced by an electric conductor consisting of water with some salt or diluted hydrochloric acid.

8. What will be the hydrostatic pressure if, $h_w = 30\%$ and $Z = 10\%$?

a) 30%

b) 10%

c) 40%

d) 50%

[View Answer](#)

Answer: c

Explanation: Using the formula, $h_w = h - Z$

$$30 = h - 10$$

$$h = 30 + 10 = 40$$

Hydrostatic pressure, $h = 40\%$.

9. In homogeneous soil, every transition in the shape of curves drawn in flow net must be _____

a) Smooth

b) Sharp

c) Rough

d) All of the mentioned

View Answer

Answer: a

Explanation: According to practical suggestion given by A.Casagrande, every transition in the shape of curve is smooth, being either elliptical or parabolic in shape.

10. The exit gradient can be expressed by which of the following expression?

a) $i_e = \Delta h/i$

b) $i_e = \Delta h.i$

c) $i_e = l/h$

d) $i_e = h/i$

View Answer

Answer: a

Explanation: $i_e = \Delta h / l$, represent gradient formula where Δh =potential drop and l is the average of last field in the flow net at the exit end.

Phreatic Line of an Earth Dam

1. What are the essentials, required to draw a flow net?

a) Top Flow and Phreatic line

b) Stream line

c) None of the mentioned

d) All of the mentioned

View Answer

Answer: a

Explanation: In order to draw the flow net, it is first essential to find out the location and shape of the phreatic line and top flow line separating the saturated and unsaturated zones.

2. The phreatic line can be located by which of the following method?

a) Graphical method

b) Experimental method

c) Analytical method

d) All of the mentioned

View Answer

Answer: d

Explanation: As suggested by casagrande, the phreatic line can be located by graphical, experimental and analytical methods.

3. Kozney's top flow lines is called as _____

a) Basic and Base parabola

b) Simple parabola

c) None of the mentioned

d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: Kozney's solution for flow of water consists of a family of confocal parabolas representing the flow lines. Hence Kozney's top flow line is called the basic or base parabola.

4. For the water flowing above an impervious, infinite, horizontal plane. The net flow is given by _____

a) Casagrande

b) Kozney

c) Forchheimer

d) Darcy

[View Answer](#)

Answer: a

Explanation: In 1938, Kozney analytically derived a flow net for the case of water flowing above an impervious, infinite, horizontal plane which at a certain place becomes permeable.

5. What is the line within a dam section, below which there are positive hydrostatic pressures?

a) Phreatic and Seepage line

b) Equipotential line

c) None of the mentioned

d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The phreatic line or seepage line is the line within a dam section below which there are hydrostatic pressures in the dam. The hydrostatic pressure below on the phreatic line itself is atmospheric.

6. The flow lines and equipotential proposed by Kozney is in the shape of _____

a) Hyperbola

b) Ellipse

c) Parabola

d) Circle

[View Answer](#)

Answer: c

Explanation: According to flow net derived by Kozney, the flow lines and equipotential consist of the shape of parabola.

7. The analytical solution of Schaffernak and Van Iterson gave result only for slopes, having _____

a) $\alpha > 30^\circ$

b) $\alpha < 30^\circ$

c) $\alpha > 60^\circ$

d) $\alpha < 60^\circ$

[View Answer](#)

Answer: b

Explanation: The analytical solution of schaffernak and van iterson provided result, as long as slope is gentle i.e., $\alpha < 30^\circ$. For steeper slopes, the deviation from correct values increases rapidly beyond tolerable limits.
advertisement

8. What kind of method was suggested by Casagrande, for determining the phreatic line?

- a) Experimental method
- b) Analytical method
- c) Graphical method
- d) All of the mentioned

View Answer

Answer: c

Explanation: Graphical method was used by Casagrande for the determination of the phreatic line using flow net.
[Khoslas Theory](#)

1. Khosla's theory can be used for calculating which of the following?

- a) Uplift pressure and exit gradient
- b) Seepage pressure
- c) None of the mentioned
- d) All of the mentioned

View Answer

Answer: a

Explanation: Khosla's theory has an account of flow pattern below the impermeable base of hydraulic structures, hence it can be used to calculate the uplift pressure and the gradient at the exit, called the exit gradient.

2. The failure of Naror weir in India was due to _____

- a) Excessive water pressure
- b) Undermining
- c) Hydraulic structure
- d) All of the mentioned

View Answer

Answer: a

Explanation: According to Leliavsky (1965), failure of Norora weir in India was due to excessive water pressure (uplift pressure) causing the floor to be blown upwards.

3. The hydraulic gradient theory of weir design was developed by _____

- a) Darcy and Beresford
- b) Col. Clibborn
- c) None of the mentioned
- d) All of the mentioned

View Answer

Answer: a

Explanation: In 1902, Col. Clibborn and Beresford developed the hydraulic gradient theory of weir design as a result of their experiment.

4. A hydraulic structure should not be built on pervious soil, because of _____

- a) Higher water level at the upstream of the structure
- b) Compressibility of the soil is low
- c) Excessive water pressure above the soil
- d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: If a hydraulic structure is built on pervious soil, the higher water level at the upstream of the structure will cause seepage through the permeable soil.

5. Undermining of the sub soil is due to _____

- a) Seepage
- b) Piping
- c) Excessive water pressure
- d) Uplift pressure

[View Answer](#)

Answer: d

Explanation: According to the commonly accepted ideas, the undermining is supposed to result from piping, that is, the erosion of the sub-soil by the high velocities of flow of water through it when such velocities exceed certain limit.

6. The pressure at the exit gradient at which the upward force is equal to the submerged weight of the soil is called the _____

- a) Floatation gradient
- b) Bursting gradient
- c) Critical gradient
- d) All of the mentioned

[View Answer](#)

Answer: d

Explanation: The upward force is equal to the submerged weight of the soil is called the flotation gradient (Terzaghi), or bursting gradient (Haigh) or the critical gradient (Khosla).

7. The concept of undermining by 'foundation' was put forward by _____

- a) F.F.Haigh
- b) Khosla
- c) Casagrande
- d) Pavlov sky

[View Answer](#)

Answer: a

Explanation: In 1925, professor Terzaghi put forward the conception of undermining by foundation. advertisement

8. In khosla's theory, the stream lines occurring under a horizontal is shown in the form of _____

- a) Parabola
- b) Ellipse
- c) Hyperbola
- d) Circle

[View Answer](#)

Answer: b

Explanation: For the case of two dimensional flows occurring under a straight floor, the stream lines are shown as confocal ellipse.

9. Which of the following is similar to that of khosla's theory?

- a) Darcy's theory
- b) Terzaghi's theory
- c) Bligh's theory
- d) Haigh theory

[View Answer](#)

Answer: c

Explanation: Both Bligh's theory and khosla's theory deals with a finding of uplift pressure and exit gradient.

[Well Point System](#)

1. The removal of excess of water from the saturated soil mass is called _____

- a) Drainage and Dewatering
- b) Saturation
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: Drainage or dewatering is the process of removing the water from the water table for the purpose of excavation for construction purpose.

2. Which one of the following method can be used to lower water table, using gravity flow?

- a) Well point system
- b) Dewatering
- c) Water suction method
- d) Dehydration

[View Answer](#)

Answer: a

Explanation: Well point system can be used to lower the water table. The process is based on gravity flow.

3. The diameter of the perforated pipe used in well point system is _____

- a) 0.5 to 1 m
- b) 5 to 8 cm
- c) 2 to 4 cm
- d) 1 to 3.5 m

[View Answer](#)

Answer: b

Explanation: A well point is a perforated pipe about 0.5 to 1 m long and 5 to 8 cm in diameter covered by cylindrical wire-gauge screen.

4. The ground water table may be lowered by which of the following methods?

- a) Vacuum method
- b) Well point system
- c) Electro-osmosis method
- d) All of the mentioned

[View Answer](#)

Answer: d

Explanation: The ground water table can be lowered by methods like ditches and dumps, well point system, shallow well system, deep well system, vacuum method, electro-osmosis method.

5. What is the minimum depth of water that can be brought to the surface in well point system?

- a) 5m
- b) 2m
- c) 6m
- d) 1m

[View Answer](#)

Answer: c

Explanation: The suction pump used in the well point system has a capacity of bringing water to the surface from a minimum depth of about 6m.

6. For dewatering more than 6m below the water table, which of the following method is used?

- a) Well point system
- b) Multi stage well point system
- c) Vacuum method
- d) Deep well system

[View Answer](#)

Answer: b

Explanation: Multi stage well point system at precise distances is used for dewatering more than 6m below the natural water table.

7. A advantage of using jetting of water in well point system is _____

- a) Forms a natural filter around well point

- b) Allows to penetrate soil easily
- c) Less time is consumed for drilling
- d) All of the mentioned

View Answer

Answer: a

Explanation: A advantage of using jetting is that the water under pressure washes away soil fines from around the well point leaving a relatively coarser material to settle to form a natural filter around the well point.
advertisement

8. In well point system, _____ should be made essential for proper working of the system.

- a) Suction pump
- b) Pumping schedule
- c) Man power
- d) None of the mentioned

View Answer

Answer: a

Explanation: In the well point system, a round the clock pumping schedule is essential, as the interruption in pumping can have catastrophic consequences.

9. The pump which is used for suction of water in the well point system is _____

- a) Suction pump
- b) Auxiliary pump
- c) Vacuum pump
- d) All of the mentioned

View Answer

Answer: b

Explanation: For suction of water one auxiliary pump for each two well point in the use should always be available.
[Seepage Analysis](#)

1. The seepage analysis is done on the assumption of _____

- a) Flow is laminar and Darcy's law is valid
- b) Seepage of water
- c) None of the mentioned
- d) All of the mentioned

View Answer

Answer: a

Explanation: The seepage analysis is done on the assumptions that the flow is laminar and Darcy's law is valid and further assumed that the soil to be dewatered is homogeneous and isotropic.

2. For unconfined flow, which of the following discharge slot is used?

- a) Partially penetrating slot
- b) Fully penetrating slot

- c) None of the mentioned
- d) All of the mentioned

View Answer

Answer: b

Explanation: Fully penetrating slot is used for both confined and unconfined case of flow.

3. Fine grained cohesive soil can be drained or stabilized by _____

- a) Vacuum method
- b) Electro-osmosis method
- c) Shallow well system
- d) Well point system

View Answer

Answer: b

Explanation: Dewatering of fine grained cohesive soil can be done only electro-osmosis method.

4. Discharge for a unconfined aquifer can be found from the expression developed by _____

- a) Dupuit
- b) Darcy
- c) Chapman
- d) Baron

View Answer

Answer: c

Explanation: In 1956, chapmen developed an expression for finding the discharge q_P from a partially penetrating slot in an unconfined aquifer from his model studies.

5. A complete design of dewatering system consist of _____

- a) Spacing of wells
- b) Penetration of wells
- c) Pumping capacities
- d) All of the mentioned

View Answer

Answer: d

Explanation: Complete design of dewatering system consists of the diameter and spacing of well points or wells, penetration of wells and the pumping capacities.

6. When dewatering system consist of number of well-points _____ can be considered for a simplified solution.

- a) Linear drainage limit
- b) Seepage analysis
- c) Flow of water

d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: Where the dewatering system consists of a number of closely spaced well points or wells a simplified solution can be obtained by considering the lines of wells equivalent to a linear drainage slot.

7. In discharge equation given by chapmen $q_p = kba(H-h_o)/L+EA$, EA refers to _____

- a) Coefficient of permeability
- b) Electric gradient
- c) Extra length factor
- d) Efficiency of permeability of soil

[View Answer](#)

Answer: c

Explanation: EA= extra length factor, which is a function of the ratio of slot penetration p to the thickness of pervious stratum b.

8. The application of electro-osmosis on dewatering of soil was developed by _____

- a) L. casagrande
- b) Darcy
- c) Chapmen
- d) Dupuit

[View Answer](#)

Answer: a

Explanation: The application of electro-osmosis to dewatering of soil was largely developed by L. Casagrande.

9. For fine-grained soil what type of dewatering system can be used?

- a) Electro-osmosis method
- b) Shallow well system
- c) Deep well system
- d) Vacuum method

[View Answer](#)

Answer: d

Explanation: For fine-grained soils, the well point system can be extended by the vacuum method.

10. The drawdown curve in fully penetrated slot is based on the assumptions of _____

- a) Dupuit and Forchheimer
- b) Darcy
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: Based on Dupuit-Forchheimer assumptions, the slope of the drawdown curve was assumed to be equal to hydraulic agent.

Protective Filters

1. A protective filter can also be called as _____

- a) Reverse filter and Inverted filter
- b) Horizontal filter
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: In protective filter, each subsequent layer becomes increasingly coarser than the previous one, and hence, it is also called a reverse filter or inverted filter.

2. The soil to be protected by protective filter is known as _____

- a) Pervious materials
- b) Protective materials
- c) Base material
- d) Porous materials

[View Answer](#)

Answer: c

Explanation: The soil to be protected i.e., the embankment or foundation material surrounding the filter is known as the base materials.

3. The requirements to be satisfied by a filter material were devised by which of the following organization?

- a) U.S.B.R. Earth manual
- b) Indian standard classification
- c) PRA system
- d) M.I.T system

[View Answer](#)

Answer: a

Explanation: United States Bureau of Reclamation set four main requirements to be satisfied by a filter material for it to be considered as a protective filter.

4. A protective filter is designed to provide _____

- a) Soil erosion
- b) Quick drainage
- c) Water moisture
- d) All of the mentioned

[View Answer](#)

Answer: b

Explanation: A protective filter designed in such a manner as to provide quick drainage, yet prevent the movement of soil particles.

5. What type of filter is provided at the bottom of drainage sumps and trenches?

- a) Drainage filter
- b) Reverse filter
- c) Weighting filter
- d) Horizontal filter

[View Answer](#)

Answer: c

Explanation: Weighting filters at the bottom of drainage sumps and trenches arrest the percolating water at the exit and allow its safe exit without inducing piping.

6. The phreatic line of an earth dam can be kept within the body of the dam by _____

- a) Proper drainage filter
- b) Providing protective filter
- c) Increasing soil porosity
- d) Increasing surface area

[View Answer](#)

Answer: b

Explanation: With a proper drainage filter under slope or rock fill toe, the phreatic line in an earth dam can be kept well within the body of the dam.

7. According to Terzaghi, the D15 size material must be more than the size of _____

- a) D40
- b) D85
- c) D20
- d) D10

[View Answer](#)

Answer: b

Explanation: The D15 size of filter material must not be more than 4 to 5 times D85 size of the base materials. This prevents the foundation materials from passing through the pores of the filter material.

8. The grain size curve of the filter should be parallel to that of _____

- a) Base materials
- b) Filter
- c) Seepage discharge
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: As per the criteria given by Terzaghi, the grain size curve of the material should be roughly parallel to that of the base materials.

9. The filter material should be _____ enough to prevent buildup of seepage forces within the filter.

- a) Coarse and Pervious
- b) Finer
- c) None of the mentioned
- d) All of the mentioned

View Answer

Answer: a

Explanation: The filter material should be sufficiently coarse and pervious so that the incoming force is rapidly removed without any appreciable buildup of seepage forces within the filter.

10. A protective filter consists of layers of _____

- a) Base material
- b) Pervious material
- c) Filter material
- d) Sheet-pile

View Answer

Answer: b

Explanation: A protective filter consists of a combination of layers of pervious materials to provide quick drainage.

[Standard Proctor Test](#)

1. The standard proctor test was developed by _____

- a) Darcy
- b) Terzaghi
- c) Proctor
- d) Rendulic

View Answer

Answer: c

Explanation: The standard proctor test was developed by R.R.Proctor in 1933 for the construction of earth fill dams in the state of California.

2. The compaction process can be accomplished by _____ process.

- a) Rolling
- b) Tampering
- c) Vibration
- d) All of the mentioned

View Answer

Answer: d

Explanation: Compaction can be done by rolling, tamping or vibration by a steel-tyred or rubber-tyred roller.

3. The compaction energy used for standard proctor test is _____

- a) 595 kJ/m³

- b) 300 kJ/m³
- c) 6065 kJ/m³
- d) 1000 kJ/m³

[View Answer](#)

Answer: a

Explanation: The compaction energy used in the proctor test is 6065 kg cm per 1000 ml of soil which is equal to 595kJ/m³.

4. Which of the following test are used in the laboratory, for compaction?

- a) Vibration test
- b) Standard proctor test and Jodhpur-mini compactor test
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer:b

Explanation: Some of the compaction tests used in the laboratory is: standard and modified proctor test, Harvard Miniature compaction test, Abbot Compaction test and Jodhpur-mini compactor test.

5. A line showing the water content dry density relation for the compacted soil is _____

- a) Zero air voids lines
- b) Air-voids line
- c) Density line
- d) All of the mentioned

[View Answer](#)

Answer: b

Explanation: Air-voids line is a line which shows the water content dry density relation for the compacted soil containing a constant percentage of air voids.

6. Which of the following equipment is not used in standard compactor test?

- a) Cylindrical metal mould
- b) Rammer
- c) Circular face plate
- d) Collar

[View Answer](#)

Answer: c

Explanation: The compactor test equipment consists of cylindrical metal mould, detachable base plate, collar, rammer of 2.5kg.

7. The initial percentage of water content taken for coarse-grained soil in proctor test is _____

- a) 4
- b) 10
- c) 25

d) 50

[View Answer](#)

Answer: a

Explanation: The initial water content may be taken as 4 % for coarse-grained soils and 10 % for fine-grained soils as the quantity of water to be added for the first test depends on the probable optimum water content for the soil.

8. The water content corresponding to the maximum density in compaction curve is called _____

- a) Water content of compacted soil
- b) Optimum water content
- c) Air void water content
- d) None of the mentioned

[View Answer](#)

Answer: b

Explanation: The water content goes on increasing till the maximum density is reached. The water content corresponding to the maximum density is called optimum water content W_0 .

9. The modified compactor test is also known as _____

- a) Standard compactor test
- b) AASHO test
- c) Dietert test
- d) Compaction test

[View Answer](#)

Answer: b

Explanation: The modified compactor test was standardized by the American Associates of State highway officials and is known as the modified AASHO test.

10. In standard compactor test, soil is compacted into _____ layers.

- a) 2
- b) 4
- c) 3
- d) 5

[View Answer](#)

Answer: c

Explanation: The standard compactor test consists of compacting the soil at various water contents in the mould, in three equal layers, each layer being given 25 blows from the rammer.

Factors Affecting Compaction

1. Which of the following factors affects compacted density?

- a) Water content and Type of compaction
- b) Degree of saturation
- c) None of the mentioned

d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: Water content, type of soil, addition of admixtures, amount and type of compaction are the various factors which affect the compacted density.

2. The compacted density is increased when the water content of the soil is _____

- a) Increased
- b) Decreased
- c) Constant
- d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: It has been seen from a laboratory experiment that, as the water content is increased the compact density goes on increasing, until a maximum dry density is achieved after which further addition of water decreases the density.

3. The force which is responsible for withholding of soil particles, of lower content is _____

- a) Vander Waals force
- b) Electric force
- c) Frictional force
- d) Cationic linkage

[View Answer](#)

Answer: b

Explanation: When only a relatively small amount of water is present in the soil, it is firmly held by the electrical forces at the surface of soil particles with a high concentration of the electrolyte.

4. The amount of compaction greatly affects _____

- a) Water content and Maximum dry density
- b) Saturation of soil
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The amount of compaction affects maximum dry density and optimum water content of a given soil. The effect of increasing the compactive energy results in an increase in the maximum dry density and decrease in the optimum water content.

5. Higher density and lower optimum water content is easily achieved by _____

- a) Coarse grained soil
- b) Fine grained soil
- c) Cohesion less soil

d) Saturated soil

[View Answer](#)

Answer: a

Explanation: Well graded coarse-grained soil attains a much higher density and lower water optimum water content than fine grained soil which requires more water.

6. The dry density decreases in cohesion less soil with an increase in water content due to which of the following reasons?

- a) Capillary rise
- b) Bulking of sand
- c) Degree of saturation
- d) Water content

[View Answer](#)

Answer: b

Explanation: In case of cohesion less soil the dry density decreases with an increase in water content under a low compactive effect, this is due to bulking of sands where in the capillary tension resists the tendency of soil particles to take a density state.

7. The maximum density is reached in cohesion less soil when the soil is _____

- a) Zero water content
- b) Partially saturated
- c) Fully saturated
- d) Maximum specific surface

[View Answer](#)

Answer: c

Explanation: The density reaches the maximum value when the cohesion less soil is fully saturated, on further addition of water, the dry density again increases.

8. The maximum bulking of sand occurs at a water content between _____

- a) 4 to 5 %
- b) 2 to 6 %
- c) 4 to 8 %
- d) 1 to 5 %

[View Answer](#)

Answer: a

Explanation: The maximum bulking occurs at water content between 4 to 5 %. On further additions of water, the meniscus is destroyed and the soil particles are able to shift to a closer packing.

9. The initial decrease of dry density at lower water content is exhibited in _____ type of soil.

- a) Fine grained soil
- b) Black cotton soil
- c) Alluvial soil

d) Cohesion soil

[View Answer](#)

Answer: b

Explanation: The initial decrease of dry density at lower water content is a characteristic feature of black cotton soils, high swelling clays and fat clays. The optimum water content for such soils ranges between 20 to 25%.

10. The attainment of maximum density of soil at full saturation is due to _____

- a) Lubrication action
- b) Hydrostatic pressure
- c) Bulking of sand
- d) None of the mentioned

[View Answer](#)

Answer: b

Explanation: The attainment of maximum density at full saturation is due to the reduction of effective pressure between soil particles by hydrostatic pressure.

[Effect of Compaction on Soil Properties](#)

1. Which of the following property of soil is improved by compacting the soil?

- a) Reduction of compressibility
- b) Water absorption
- c) Permeability
- d) All of the mentioned

[View Answer](#)

Answer: d

Explanation: The main aim of compacting soil is to improve some desirable properties of the soil, such as reduction of compressibility, water absorption and permeability, increase in soil strength, bearing capacity.

2. When compacted dry of optimum, the structure of clay is always _____

- a) Flocculated
- b) Dispersed
- c) Disoriented
- d) Honey comb shaped

[View Answer](#)

Answer: a

Explanation: As the structure of compacted clay is complicated and increasingly oriented, the structure of clay is always flocculated.

3. The flocculated structure of compacted dry soil is broken due to _____

- a) High strains
- b) Low water content
- c) Low strains

d) Dry density

[View Answer](#)

Answer: a

Explanation: Due to higher strains, the flocculated structure of the compacted on the dry side is broken, giving rise to ultimate strength.

4. The shear strength of compacted clays depends upon _____

- a) Dry density
- b) Water content
- c) Degree of saturation
- d) Addition of admixtures

[View Answer](#)

Answer: a

Explanation: The shear strength of compacted clays depends upon dry density, moulding water content, soil structure, method of compaction, drainage condition and type of soil.

5. The structure of composite soil after compacted will be in the form of _____

- a) Coarse grained skeleton structure and Cohesive matrix structure
- b) Single grained structure
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The structure of composite soils, after being compacted depend upon the relative proportion of coarse particles their structure can either be coarse grained skeleton structure or cohesive matrix structure.

6. What is the maximum dry density for a soil sample having sp. gr. of 2.7 and OMC=16 %?

- a) 3.0 g/cm³
- b) 1.88 g/cm³
- c) 0.562 g/cm³
- d) 1.00 g/cm³

[View Answer](#)

Answer: b

Explanation: γ_d , max occurs when S is maximum, i.e. when S=1

$$\gamma_d, \text{ max} = G \gamma W / 1 + (w.G/S)$$

$$= G \gamma W / 1 + w.G \text{ (since } S=1)$$

$$\text{Hence, } \rho_d \text{ max} = G. \rho W / 1 + w.G$$

$$= 2.7 \times 1 / 1 + (0.16 \times 2.7)$$

$$\text{Maximum dry density, } \gamma_d \text{ max} = 1.885 \text{ g/cm}^3.$$

7. Strength of soil sample compacted wet of optimum is influenced by _____

- a) Compressibility
- b) Permeability
- c) Manner of compaction

d) Amount of compaction

[View Answer](#)

Answer: c

Explanation: The manner of compaction influences the strength of soil sample compacted wet of optimum to a certain extent.

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8. A cohesive soil yields a maximum dry density of 1.8 g/cc at an OMC of 16 % during a standard proctor test. What will be its degree of saturation? Take $G=2.65$

- a) 100 %
- b) 60.45 %
- c) 43.27 %
- d) 89.79 %

[View Answer](#)

Answer: d

Explanation: Given $\rho_d = 1.8 \text{ g/cm}^3$; $w=0.1$; $G=2.65$

$e = G \rho_w / \rho_d - 1 = (2.65 \times 1 / 1.8) - 1 = 0.4722$

$S = w G / e = 0.16 \times 2.65 / 0.4722 = 0.8979 = 89.79 \%$

Degree of saturation, $S=89.79 \%$.

[Mohrs Stress Circle](#)

1. The shearing resistance of a soil is constituted by _____

- a) Structural resistance and Frictional resistance
- b) Shearing strength
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The shearing resistance of soil is constituted by

- i) The structural resistance to displacement of the soil because of the interlocking of the particles
- ii) The frictional resistance to a translocation between the individual soil particles at their contact points.

2. The shear strength in cohesion less soil is due to _____

- a) Internal friction
- b) Cohesion
- c) Inter granular friction
- d) Inter particle force

[View Answer](#)

Answer: c

Explanation: The shear strength in cohesion less soils from inter granular friction, while in other soils it results both from internal friction as well as cohesion.

3. The planes that exist in soil mass is _____

- a) Principal plane
- b) Principal stress
- c) Stress plane
- d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: In a loaded soil mass, there exist three typical planes, mutually orthogonal to each other. These planes are called the principal planes.

4. The failure condition for a soil can be expressed in terms of limiting shear stress, called _____

- a) Principal stresses and Shear strength
- b) Shearing resistances
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The failure conditions for a soil may be expressed in terms of limiting stress, called shear strength or as a function of the principal stresses.

5. The shear deformation of soil in a building can cause _____ of the following?

- a) Sinking of footing
- b) Slide in an earth embankment
- c) Movement of wedge
- d) All of the mentioned

[View Answer](#)

Answer: d

Explanation: Shearing deformation of soil may be in the form of the sinking of a footing, or movement of a wedge of soil particles or on masses upon the action of shear stress.

6. Major principal stress in a soil is represented by the symbol _____

- a) σ_1
- b) σ_2
- c) σ_3
- d) σ_4

[View Answer](#)

Answer: a

Explanation: Major, intermediate and minor principal stresses are represented by the corresponding symbols σ_1 , σ_2 , and σ_3 .

7. The circle obtained from two dimensional stress system is known as _____

- a) Principal stress circle

- b) Mohr circle
- c) Shearing stress circle
- d) None of the mentioned

View Answer

Answer: b

Explanation: The circle drawn from two dimensional stress systems is known as Mohr's circle of stress (Mohr, 1870).

8. The maximum shear stress τ_{max} , for a soil mass is equal to _____

- a) $(\sigma_1 - \sigma_3)/2$
- b) $(\sigma_1 + \sigma_3)/2$
- c) $(\sigma_1 \times \sigma_3)/2$
- d) $(\sigma_3 - \sigma_1)/2$

View Answer

Answer: a

Explanation: The maximum shear stress τ_{max} is equal to $(\sigma_1 - \sigma_3)/2$ which occurs on planes with $\alpha = 45^\circ$.

9. The normal stresses acting on planes of the soil are known as _____

- a) Major principal stresses
- b) Principal stresses
- c) Minor principal stresses
- d) Principal planes

View Answer

Answer: a

Explanation: The normal stresses acting on principal planes are called the principal stresses.

10. Stress component on planes of a loaded soil mass depends upon _____

- a) Stress acting on plane
- b) Direction of plane
- c) Shearing resistance
- d) All of the mentioned

View Answer

Answer: b

Explanation: Through a point in a loaded soil mass, innumerable planes passes and stress component on each plane depends upon the direction of the plane.

[Mohr – Coulomb Failure Theory](#)

1. The curve obtained by plotting the normal and shear stress is called as _____

- a) Mohr's envelope
- b) Coulomb envelope
- c) Strength envelope

d) Stress envelope

[View Answer](#)

Answer: c

Explanation: If the normal and shear stress corresponding to failure are plotted, then a curve is obtained. The plot or curve is called the strength envelope.

2. Which of the following is coulomb's strength equation?

a) $S = c + \tan \phi$

b) $C = s + c \tan \phi$

c) $S = c + \sigma \tan \phi$

d) $S = \tan \phi$

[View Answer](#)

Answer: c

Explanation: Coulomb defined the function $F(\sigma)$ as a linear function of σ and gave the following strength equation:
 $S = c + \sigma \tan \phi$.

3. The critical shear stress causing failure of material depends upon _____

a) Properties of the material and normal stress on the plane

b) Intermediate principal stress

c) None of the mentioned

d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: According to Mohr's strength theory, the critical shear stress causing failure depends upon the properties of the materials as well as on normal stress on the failure plane.

4. Theory of failure, was first proposed by _____

a) Coulomb

b) Mohr

c) Casagrande

d) Darcy

[View Answer](#)

Answer: a

Explanation: The theory of failures was first expressed by coulomb in 1776 and later generalized by Mohr.

5. The Mohr-Coulomb theory can be expressed algebraically by, which of the following equation.

a) $S = c + \sigma \tan \phi$

b) $\tau_f = s = F(\sigma)$

c) $s = F(\sigma)$

d) $\tau_f = F(\sigma)$

[View Answer](#)

Answer: b

Explanation: The Mohr-Coulomb failure theory can be expressed algebraically by the equation: $\tau_f = s = F(\sigma)$

Where, $\tau_f = s$ = shear stress on failure plane, at failure = shear resistance of material

$F(\sigma)$ = function of normal stress.

6. According to Coulomb, the relationship between shear strength and normal stress could be represented by _____

- a) Linear curve
- b) Parabolic curve
- c) Straight line
- d) None of the mentioned

[View Answer](#)

Answer: b

Explanation: Coulomb considered that the relationship between shear strength and normal stress could be adequately represented by the straight line.

7. Mohr envelope can be considered to be straight if the angle of internal friction ϕ is assumed to be _____

- a) 90°
- b) $>90^\circ$
- c) $<90^\circ$
- d) None of the mentioned

[View Answer](#)

Answer: d

Explanation: Mohr envelope can be considered straight if the angle of internal friction ϕ is assumed to be a constant.
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8. Which of the following stresses does not have any influence on strength of a material?

- a) Major principal stress
- b) Minor principal stress
- c) Intermediate principal stress
- d) Shearing stress

[View Answer](#)

Answer: c

Explanation: When a material is subjected to three dimensional stresses, the intermediate principal stress does not have any influence on the strength of material.

9. The parameter ϕ in coulomb's equation " $S = c + \sigma \tan \phi$ ", represents _____

- a) Shearing resistance and Angle of internal friction
- b) Angle of slope
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The empirical constant ϕ in coulomb's equation represents angle of internal friction or shearing resistance respectively.

Direct Shear Test

1. Shearing resistance can be determined in the laboratory by _____ methods.

- a) 2
- b) 6
- c) 4
- d) 8

[View Answer](#)

Answer: c

Explanation: Shearing resistance can be determined in the laboratory by following four methods

- i) Direct shear test
- ii) Tri axial shear test
- iii) Unconfined shear test
- iv) Vane shear test.

2. Which of the following shear test is developed based on drainage conditions?

- a) Quick test and Consolidated un drained test
- b) Direct shear test
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: Depending upon drainage conditions, three types of shear tests have been developed:

- i) Un-drained test or quick test
- ii) Consolidated un-drained test
- iii) Drained test.

3. The direct shear test can also be called as _____

- a) Simple shear test
- b) Stress test
- c) Strain controlled shear box test
- d) All of the mentioned

[View Answer](#)

Answer: b

Explanation: Since the shearing strain is made to increase at a constant rate in a direct shear test, and hence the test is called the Strain controlled shear box test.

4. The commonly used apparatus used for performing shear box test is _____

- a) Shear-box apparatus
- b) Bishop's pore pressure apparatus
- c) Tri axial shear test apparatus

d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: Shear-box test is the most commonly used apparatus for the direct shear test.

5. To conduct un-drained test, which of the following is used?

- a) Slope grids
- b) Perforated grids
- c) Plain grids
- d) All of the mentioned

[View Answer](#)

Answer: c

Explanation: To conduct un-drained test, plane grids are used and for the drained test, perforated grids are used.

6. The drained test is also known as _____

- a) Direct shear test
- b) Slow test
- c) Vane shear test
- d) Quick test

[View Answer](#)

Answer: b

Explanation: In drained test, perforated grids are sheared sufficiently slowly so that complete dissipation of pore pressure takes place.

7. Which of the following is a disadvantage of the shear box test?

- a) Stress condition of soil is complex
- b) The test cannot be used for coarse grained soil
- c) No control on the drainage of soil
- d) The shear box test is more complex test

[View Answer](#)

Answer: a

Explanation: The stress condition across the soil sample is very complex. The distribution of normal stresses and shearing stresses over the potential surface of sliding is not uniform. The entire strength of the soil is not mobilized simultaneously.

8. The shearing of cohesive soil in drained test requires _____ days.

- a) 2
- b) 1 to 2
- c) 2 to 5
- d) 1

[View Answer](#)

Answer: c

Explanation: As the soil in drained test is sheared sufficiently slowly so that complete dissipation of pore pressure takes place, it takes 2 to 5 days long for shearing cohesive type of soil.

9. A major difference between the direct shear test and tri axial shear test is _____

- a) Control on the drainage level
- b) Stress condition
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: As compared to the tri axial system, there is a little control on the drainage of soil in the direct shear test.

10. In direct shear test, the soil load is subjected to more stress at _____

- a) Centre
- b) Edges
- c) Top and bottom
- d) All of the mentioned

[View Answer](#)

Answer: b

Explanation: In a direct shear test, the stress condition across the soil sample are very complex, the stress is more at the edges and less in the Centre. Due to this, there is a progressive failure of the specimen.

[Tri Axial Compression Test](#)

1. The Tri axial compression test was introduced by _____

- a) A. casagrande and Karl Terzaghi
- b) Mohr
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The tri axial compression test was first introduced in U.S.A by A. casagrande and Karl Terzaghi in 1936-37.

2. Which of the following strength test is commonly used in the laboratory?

- a) Direct shear test
- b) Confined compression test
- c) Tri axial shear test
- d) Unconfined shear test

[View Answer](#)

Answer: c

Explanation: As a shear test can be performed under all three drainage condition, tri axial test is most commonly used in research laboratory.

3. Which of the following outlet is provided at the base of the tri axial test apparatus?

- a) Cell fluid inlet
- b) Pore water outlet
- c) Drainage outlet
- d) All of the mentioned

[View Answer](#)

Answer: d

Explanation: Three outlet connections are generally provided through the base of the test apparatus: cell fluid test, pore water outlet from the bottom of the specimen and the drainage outlet from the bottom of the specimen.

4. Pore pressure developed in the tri axial test can be measured by _____

- a) Bishop's apparatus
- b) Pore pressure apparatus
- c) Terzaghi's apparatus
- d) Mohr's apparatus

[View Answer](#)

Answer: a

Explanation: Pore pressure developed in the specimen during the test can be measured with the help of a separate pore pressure measuring equipment such as Bishop's pore pressure apparatus developed by Bishop in 1950, 1961.

5. Bishop's apparatus does not contain which one of the following equipment?

- a) Porous disc

- b) Top cap
- c) Rollers
- d) All of the mentioned

[View Answer](#)

Answer: d

Explanation: Bishop's apparatus mainly consists of the null indicator, the control cylinder, pressure gauge, mercury manometer and burette.

6. The vertical stress on the solid cylindrical test apparatus is applied by _____

- a) Major principal stress
- b) Minor principal stress
- c) Intermediate principal stress
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: In tri axial test, the major principle stress σ_1 is applied in the vertical direction, and the other two principal stresses σ_2 and σ_3 are applied in the horizontal direction by the fluid pressure round the specimen.

7. The deviator stress developed in the proving ring, through the applied pressure is equal to are _____

- a) $\sigma_1 + \sigma_3$
- b) $\sigma_1 - \sigma_3$
- c) $\sigma_2 - \sigma_3$
- d) $\sigma_2 + \sigma_1$

[View Answer](#)

Answer: b

Explanation: The vertical stress applied by the loading frame, through the proving ring is equal to $(\sigma_1 - \sigma_3)$; this stress difference is called the deviator stress.

8. When the soil is in the state of stress, it is said to be in _____

- a) Constant state
- b) Plastic equilibrium
- c) Stress conditioned state
- d) Equilibrium condition

[View Answer](#)

Answer: b

Explanation: When the soil is in the state of stress defined by the equation $\sigma_1' = \sigma_3' \tan^2 \alpha' + 2c' \tan \alpha'$ as principal stress relationship, it is said to be in plastic equilibrium.

9. The deviator stress σ_d is given by _____

- a) $\sigma_d = \sigma_1 + \sigma_3$
- b) $\sigma_d = \sigma_3 - \sigma_1$
- c) $\sigma_d = \text{additional axial load}/A_2$

d) $\sigma_d = \sigma_1 - \sigma_3$

View Answer

Answer: c

Explanation: The deviator stress σ_d , is given as the ratio of additional axial load to the area A_2 at failure or during at any stage of the test.

10. Which of the following is an advantage of using tri axial test?

- a) Accurate result is not possible
- b) The plane of shear failure is predetermined
- c) Stress conditions are complex
- d) Precise measurement

View Answer

Answer: d

Explanation: In tri axial test, precise measurements of the pore pressure and volume change during the test are possible

[Unconfined Compression Test](#)

1. In unconfined compression test the value of σ_2 and σ_3 is equal to _____

- a) 1
- b) 0
- c) 0.5
- d) $\frac{1}{2}$

View Answer

Answer: b

Explanation: The unconfined compression test is a special case of tri axial compression test in which $\sigma_2 = \sigma_3 = 0$.

2. The unconfined compression test is derived from _____

- a) Direct shear test
- b) Vane shear test
- c) Tri axial compression tests
- d) Drained test

View Answer

3. The unconfined compression test is generally applicable to _____

- a) Unsaturated clay
- b) Saturated clay
- c) Fine grained soil
- d) Coarse grained soil

View Answer

Answer: b

Explanation: In the equation $\sigma_1 = 2c_u \tan(45^\circ + \phi_u/2)$, for determining major principal stress, there are 2 unknowns

c_u and ϕ_u which cannot be determined by unconfined test. Therefore, the unconfined compression test is generally applicable to saturated clays for which the apparent angle of shearing resistance ϕ_u is zero.

4. The unconfined compression test was first designed by _____

- a) A. casagrande and Goyal
- b) Singh
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: In 1958, Goyal and Singh designed the first unconfined compression tester.

5. In plastic failure, load corresponding to _____ strain is arbitrarily taken as the failure load.

- a) 10 %
- b) 5 %
- c) 20 %
- d) 50 %

[View Answer](#)

Answer: c

Explanation: In plastic failure, no definite maximum load is indicated. In such a case, the load corresponding to 20 % strain is arbitrarily taken as the failure load.

6. When the Mohr circle is drawn in confined compression test, its radius will be equal to _____

- a) C_u
- b) q_u
- c) R_u
- d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: When the Mohr circle is drawn, its radius is equal to $\sigma_1/2$,

Since, $\sigma_1 = 2c_u$

$\sigma_1 / 2 = 2c_u / 2$

Therefore, radius = c_u .

7. Stress condition in the Unconfined compression test represents _____

- a) Drained test
- b) Un-drained test
- c) Quick test
- d) All of the mentioned

[View Answer](#)

Answer: b

Explanation: The stress condition at failure, in the unconfined compression test which is essentially an un-drained test, if it is assumed that no moisture is lost from the specimen during the test.

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8. Which of the following parameter is used to represent unconfined compressive strength at failure?

- a) τ_f
- b) c_u
- c) q_u
- d) A_u

View Answer

Answer: c

Explanation: $\tau_f = q_u/2$

Where, q_u = unconfined compressive strength at failure.

[Shear Strength of Cohesive Soil](#)

1. The un-drained test is carried out on sample of clay, silt, and peat to determine _____

- a) Shear Strength of natural ground and Sensitivity
- b) Pore pressure
- c) None of the mentioned
- d) All of the mentioned

View Answer

Answer: a

Explanation: The un-drained test is carried out on undisturbed sample of clay, silt and peat to determine the strength of the natural ground and also carried out on remoulded samples of clay to measure its sensitivity.

2. In an un-drained test on saturated clays, both σ_1' and σ_3' is independent of _____

- a) Pore pressure
- b) Shear strength
- c) Cell pressure
- d) Effective pressure

View Answer

Answer: c

Explanation: In an un-drained test on saturated clays ($B=1$), both the major principal effective stress σ_1' and the minor principal effective stress σ_3' are independent of the magnitude of cell pressure applied.

3. The consolidated-un drained test can be performed in _____ methods.

- a) 3
- b) 2
- c) 4
- d) 1

View Answer

Answer: b

Explanation: The consolidated-undrained tests are performed by two methods: i) the remoulded specimens are sheared under a cell pressure. ii) the moulded specimens are consolidated under the same cell pressure and sheared with different cell pressure.

4. Which of the following cannot be obtained by using un-drained test?

- a) Effective stress failure envelope
- b) Shear strength
- c) sensitivity
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: Since only one Mohr circle in terms of effective stresses, is obtained from all un-drained tests, effective stress failure envelope cannot be obtained from this test.

5. The change in the pore pressure during an un-drained shear can be explained by _____

- a) Lateral pressure
- b) Effective stress
- c) Pore pressure parameter
- d) Mohr's circle

[View Answer](#)

Answer: c

Explanation: The change in the pore pressure due to change in the applied stress, during an un-drained, any be explained in terms of empirical coefficients called pore pressure parameters.

6. Factor affecting pore pressure parameters is _____

- a) Type of shear
- b) Temperature
- c) Nature of the fluid
- d) All of the mentioned

[View Answer](#)

Answer: d

Explanation: Type of shear, sample disturbance, and environment during shear such as temperature and nature of the fluid are the factors that affect pore pressure parameter.

7. The value of pore pressure parameter, at failure for saturated clay is _____

- a) 1.2 to 2.5
- b) 2 to 3
- c) 0.3 to 0.7
- d) 0.7 to 1.3

[View Answer](#)

Answer: b

Explanation: The approximate value of pore pressure parameter at failure for very loose, fine saturated sand, saturated clays is 2 to 3.

8. Negative pore pressure in clay or sand is developed due to _____

- a) Expansion on loading

- b) Over loading
- c) Loose structure
- d) Compaction

View Answer

Answer: a

Explanation: A negative pore pressure is developed when we apply load on a sample of clay or sand because both sand and clay tends to expand on loading.

9. If the pore pressure is measured during un-drained stage of the test, the result can be expressed in terms of

- _____
- a) C' and ϕ
 - b) c_u
 - c) None of the mentioned
 - d) All of the mentioned

View Answer

Answer: a

Explanation: Both effective parameters C' and ϕ' can be expressed when pore pressure is measured during un-drained stage of the test.

10. The equation for the unconsolidated un drainage strength of clay is _____

- a) $\tau = c + \sigma \tan \phi$
- b) $\tau_f = c_{cu} + \sigma \tan \phi_{cu}$
- c) $\tau = c + \sigma$
- d) $\tau = \sigma \tan \phi$

View Answer

Answer: b

Explanation: The equation for consolidated undrained strength of the preconsolidated clay in terms of total stress can be approximately expressed as $\tau_f = c_{cu} + \sigma \tan \phi_{cu}$ where, σ is the normal pressure.

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11. What will be the shearing resistance of a sample of clay in an unconfined compression test, falls under a load of 150 N? Take change of cross-section $A_f = 2181.7 \text{ mm}^2$.

- a) 68.75 kN/m^2
- b) 34.38 kN/m^2
- c) 11.35 kN/m^2
- d) 0.6875 kN/m^2

View Answer

Answer: b

Explanation: Given,
 $A_f = 2181.7 \text{ mm}^2$; $P_f = 150 \text{ N}$
 $q_u = P_f / A_f = 150 / 2181.7$
 $= 68.75 \text{ kN/m}^2$

Shear resistance = $qu/2 = 68.75/2$
 $= 34.38 \text{ kN/m}^2$

Therefore, Shearing resistance = 34.38 kN/m^2 .

The Mohr – Colomb Failure Envelope

1. The Mohr's theory of failure can be symbolically expressed as _____

- a) $\tau_{\max} = F(\sigma_n)$ and $\sigma_{\max} - \sigma_{\min} = f(\sigma_{\max} + \sigma_{\min})$
- b) $\tau_{\max} = \sigma_{\max} - \sigma_{\min}$
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: Mohr's theory of failure can be symbolically expressed as:
 $\sigma_{\max} - \sigma_{\min} = f(\sigma_{\max} + \sigma_{\min})$ or $\tau_{\max} = f(\sigma_n)$.

2. The concept of a three dimension yield envelope was presented by _____

- a) D.C. Drucker and Prager
- b) Mohr
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The effect of intermediate principal was studied by D.C. Drucker and W. Prager in 1952, who proposed the concept of a three dimensional yield envelope.

3. A major drawback of Mohr criterion is _____

- a) Shape of the envelope
- b) Principal stress
- c) Shape of the plane
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The major drawback of Mohr criterion is that the curved shape of the envelope, hence the functional form of the equation $\tau_{\max} = F(\sigma_n)$ is not amendable to mathematical computation.

4. The yield or failure criterion can be expressed as _____

- a) $f(I_1, I_2) = 0$
- b) $f(I_1, I_2, I_3) = 0$
- c) $f(\sigma_1, \sigma_2, \sigma_3) = 0$
- d) $f(\sigma_{\max} + \sigma_{\min})$

[View Answer](#)

Answer: b

Explanation: The yield criterion may be expressed as $f(I_1, I_2, I_3) = 0$
Where I_1, I_2, I_3 are the invariant of stress.

5. If the auxiliary plane in hydrostatic axis passes through the origin, then its equation is _____

- a) $\sigma_1 + \sigma_2 + \sigma_3 = 0$
- b) $\sigma_1 + \sigma_2 + \sigma_3 = \text{constant}$
- c) $I_1 + I_2 + I_3 = 0$
- d) $f(\sigma_1, \sigma_2, \sigma_3) = 0$

[View Answer](#)

Answer: a

Explanation: If the auxiliary plane passes through the origin its equation is $\sigma_1 + \sigma_2 + \sigma_3 = 0$ and equation will be $\sigma_1 + \sigma_2 + \sigma_3 = \text{constant}$ if the plane is perpendicular to the hydrostatic axis.

6. The intersection of the yield surface or envelope with octahedral plane is called _____

- a) Yield point
- b) Deviation point
- c) Failure locus
- d) Space diagonal

[View Answer](#)

Answer: c

Explanation: The intersection of yield surface with octahedral plane is called the failure locus. A point on the failure locus represents the stress state at incipient failure.

7. The hydrostatic pressure's inability to produce failure under normal pressure was first demonstrated by _____

- a) Cross land
- b) W. Pager
- c) D.C. Drucker
- d) Mohr

[View Answer](#)

Answer: a

Explanation: Experiments conducted by Cross land in 1965 have demonstrated that a pure state of hydrostatic pressure is unable to produce failure even under enormous pressure.

8. Which of the following equation represent hydrostatic pressure in its purest form?

- a) $\sigma_1 + \sigma_2 + \sigma_3 = 0$
- b) $\sigma_1 + \sigma_2 + \sigma_3 = \text{constant}$
- c) $\sigma_1 = \sigma_2 = \sigma_3$
- d) $\sigma_{\max} + \sigma_{\min}$

[View Answer](#)

Answer: c

Explanation: According to cross land $\sigma_1 = \sigma_2 = \sigma_3$ represent hydrostatic pressure in its purest form.

9. The Mohr-Coulomb criterion assumes that the strength of the soil is independent of _____

- a) σ_1
- b) σ_2
- c) σ_3
- d) All of the mentioned

[View Answer](#)

Answer: b

Explanation: The Mohr-Coulomb criterion implicitly assumes that the strength is independent of the intermediate principal stress σ_2 .

10. The auxiliary plane in the hydrostatic axis can also be called as _____

- a) Failure plane
- b) Octahedral plane
- c) Deviatoric plane
- d) Principal plane

[View Answer](#)

Answer: c

Explanation: Since all the points in the auxiliary plane represent deviatorial state of stress, the plane is also called the deviatoric plane.

[Active and Passive States](#)

1. The theory of plasticity pertaining to soils is based on _____

- a) Mohr's theory
- b) Rankine's method
- c) Mohr-coulomb theory
- d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: The theory of plasticity pertaining to soils is based on Mohr's theory of rupture.

2. On designing retaining walls it is necessary to take care of _____ exerted by soil mass.

- a) Erosion
- b) Lateral pressure
- c) Surcharge
- d) Lateral stress

[View Answer](#)

Answer: b

Explanation: In the designing of retaining walls; sheet piles or other earth-retaining structures, it is necessary to compute the lateral pressure exerted by the retained mass of soil.

3. The material retained or supported by the retaining structure is called _____

- a) Surcharge

- b) Support wall
- c) Back fill
- d) All of the mentioned

[View Answer](#)

Answer: c

Explanation: The material retained or supported by the structure is called backfill which may have its top surface horizontal or inclined.

4. The coefficient of earth pressure when the soil is at equilibrium is _____

- a) σ_v / σ_h
- b) σ_h / σ_v
- c) $\sigma_v \times \sigma_h$
- d) σ_1 / σ_3

[View Answer](#)

Answer: b

Explanation: When the soil is at elastic equilibrium (i.e. at rest) the ratio of horizontal to vertical stress is called the co-efficient of earth pressure of rest.

$\sigma_h / \sigma_v = K_0$.

5. The computation of stress in plastic equilibrium is based on _____

- a) Theory of plasticity
- b) Mohr's theory of rupture
- c) Rankine's theory
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The theory on which the computation of the stress in a state of plastic equilibrium is based is called the theory of plasticity.

6. The wedge-shaped portion of the backfill tending to move with the wall is called _____

- a) Wedge fall
- b) Active fall
- c) Failure wedge
- d) None of the mentioned

[View Answer](#)

Answer: c

Explanation: During the active state, the wall moves away from backfill and a certain portion of the backfill in wedged-shaped tend to move which is called a failure wedge.

7. In active stress, the major principal stress σ_1 acting on the wall will be in _____ plane.

- a) Vertical
- b) Horizontal
- c) Inclined

d) Zero

[View Answer](#)

Answer: b

Explanation: In an active state, the major principal stress σ_1 is vertical and the minor principal stress σ_3 is horizontal.

8. The plastic state of stress was proposed by _____

a) Mohr

b) Rankine

c) Coulomb

d) Darcy

[View Answer](#)

Answer: b

Explanation: The plastic state of stress when the failure is imminent was investigated by Rankine in 1860.

9. The position of the backfill lying above the horizontal plane at the top of wall is called _____

a) Active state

b) Plasticity

c) Surcharge

d) Slip lines

[View Answer](#)

Answer: c

Explanation: The position of the backfill lying above a horizontal plane at the elevation of the top of a wall is called the surcharge, and its inclination to the horizontal is called surcharge angle β .

10. What will be the co-efficient of passive earth pressure, at a depth of 8m in cohesion less soil sand with an angle of internal friction of 30° when the water rises to the ground level?

a) 4

b) 5

c) 3

d) 1

[View Answer](#)

Answer: c

Explanation: Given $\phi = 30^\circ$

Co-efficient of passive earth pressure, $K_p = (1 + \sin \phi) / (1 - \sin \phi)$

$K_p = (1 + \sin 30) / (1 - \sin 30^\circ)$

$K_p = 3$.

[Active Earth Pressure: Rankines Theory](#)

1. Originally, Rankine's theory of lateral earth pressure can be applied to only _____

a) Cohesion less soil

b) Cohesive soil

- c) Fine grained soil
- d) Coarse grained soil

[View Answer](#)

Answer: a

Explanation: As originally proposed, Rankine's theory of lateral pressure is applied to uniform cohesion less soils only. Later, it was extended to include cohesive soil.

2. Rankine's theory of lateral pressure was extended to other soil by _____

- a) Resal and Bell
- b) Mohr
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The theory of lateral pressure was extended to cohesive, stratified, partially immersed and submerged soil was by Resal in 1910 and by Bell in 1915.

3. Based on the assumptions of Rankine's theory, the soil mass is _____

- a) Stratified
- b) Submerged
- c) Homogeneous
- d) All of the mentioned

[View Answer](#)

Answer: c

Explanation: According to the assumption of Rankine's theory, the soil mass is semi-infinite, homogeneous, dry and cohesion less.

4. Which of the following cases for cohesion less backfill in Rankine's theory is considered?

- a) Submerged backfill
- b) Moist backfill with no surcharge
- c) Backfill with sloping surface
- d) All of the mentioned

[View Answer](#)

Answer: d

Explanation: In Rankine's theory the following cases of cohesionless backfill are considered

- i) Dry or moist backfill with no surcharge
- ii) Submerged backfill
- iii) Backfill with a sloping surface and inclined back and surcharge.

5. The factor that is responsible for inclination of resultant pressure to the retaining wall is _____

- a) Frictional force
- b) Surcharge
- c) Earth pressure

d) Weight of the wall

[View Answer](#)

Answer: a

Explanation: The retaining walls are constructed of masonry or concrete, due to this the frictional force develops. The existence of the friction makes the resultant pressure inclined to the wall at an angle that approaches the frictional angle between the soil and the wall.

6. If the sand filled behind the retaining wall with saturated water with water, then the possible lateral pressure is _____

a) Lateral pressure due to submerged weight and Lateral pressure due to water

b) Lateral pressure due to retaining wall

c) None of the mentioned

d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The lateral pressure is made up of two components for wetted soil in back of the retaining wall:

i) Lateral pressure due to submerged weight ' γ ' of the soil, and

ii) Lateral pressure due to water.

7. The earth pressure at rest exerted on a retaining structure can be calculated using _____

a) Theory of plasticity

b) Theory of elasticity

c) Mohr's theory of rupture

d) None of the mentioned

[View Answer](#)

Answer: b

Explanation: The earth pressure at rest, exerted on the back of the rigid, unyielding retaining structure, can be calculated using theory of elasticity.

8. The value of K_0 (coefficient of earth pressure at rest) for loose sand is _____

a) 0.6

b) 0.5

c) 0.4

d) 0.8

[View Answer](#)

Answer: c

Explanation: The value of K_0 for different soils is:

i) Loose sand – 0.4

ii) Dense sand – 0.6

iii) Soft clay – 0.6

iv) Hard clay – 0.5.

9. The expression for K_0 as given by Jacky is _____

a) $K_0 = 1 - \sin \phi$

- b) $K_0 = \sin \phi$
- c) $K_0 = 1 - \cos \phi$
- d) $K_0 = 1 + \sin \phi$

[View Answer](#)

Answer: a

Explanation: K_0 can be calculated by using the following equation as computed by Jacky in 1944:

$$K_0 = 1 - \sin \phi.$$

10. What will be the coefficient of earth pressure at rest for a rigid retaining wall, If the backfill consists of cohesion less soil having $\phi = 26^\circ$?

- a) 0.1295
- b) 0.6552
- c) 0.5616
- d) 0.7383

[View Answer](#)

Answer: c

Explanation: Coefficient of earth pressure, K_0 can be calculated using Jacky's formula:

Given: $\phi = 26^\circ$

Formula: $K_0 = 1 - \sin \phi$

$$K_0 = 1 - \sin 26^\circ$$

$$K_0 = 1 - 0.4383$$

$$K_0 = 0.561628.$$

[Coulombs Wedge Theory](#)

1. The wedge theory of earth pressure is based on the concept of _____

- a) Active earth pressure
- b) Sliding wedge
- c) Wall friction
- d) All of the mentioned

[View Answer](#)

Answer: b

Explanation: The wedge theory of earth pressure is based on the concept of a sliding wedge which is torn off from the rest of the backfill on a movement of the wall.

2. Which of the following is a basic assumption of the wedge theory?

- a) The slip surface is plane
- b) The backfill is dry
- c) The backfill is homogeneous
- d) All of the mentioned

[View Answer](#)

Answer: d

Explanation: Based on the assumptions of the wedge theory:

i. The backfill is dry, cohesion less, homogeneous, isotropic, and elastically undeformable.

- ii. The slip surface is a plane which passes through the heel of the wall
- iii. The sliding wedge itself acts as a rigid body.

3. The force acting on a wedge of soil are _____

- a) Frictional force
- b) Weight of the wedge and Active thrust
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: b

Explanation: According to wedge theory, the forces acting on a wedge of soil are its weight W , the reaction R along the plane of sliding and the active thrust against the retaining wall.

4. The active lateral pressure of intact saturated clays is calculated by assuming _____

- a) $\phi=0$ and $\phi_c=0$
- b) $\phi=90$
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The active lateral pressure of intact saturated clays for temporary works or immediately after construction of a retaining wall is calculated by assuming $\phi=\phi_c=0$.

5. The forces acting on the trial wedge which is used for finding Rankine's active earth pressure is _____

- a) Weight W of the wedge
- b) Resultant force
- c) Resultant reaction between wedge and soil
- d) All of the mentioned

[View Answer](#)

Answer: d

Explanation: The three forces acting on a trial wedge are: i) the resultant force that exist between the free body and the wall ii) the weight W of the wedge iii) the resultant reaction between the wedges and the rest of the soil along the surface.

6. The Rankine's active earth pressure can also be found out by method of _____

- a) Trial wedges
- b) Graphical method
- c) Sliding wedge
- d) Theoretical calculation

[View Answer](#)

Answer: a

Explanation: The Rankine's active earth pressure (assuming the wall to be smooth) can be found out by method of trial wedges.

7. Based on the assumptions of the wedge theory, pressure distribution is assumed to be _____

- a) Planar
- b) Hydrostatic
- c) Equal
- d) Distributed

[View Answer](#)

Answer: b

Explanation: The assumption is based on that, the total pressure distribution is hydrostatic, i.e., triangular

8. In Coulomb's wedge theory, the angle λ is referred as _____

- a) Angle of wall friction
- b) Surcharge angle
- c) Critical slip angle
- d) None of the mentioned

[View Answer](#)

Answer: c

Explanation: In wedge theory, the angle between the slip plane and the ground is called the critical angle λ .

9. The ϕ -line in wedge theory can also be called as _____

- a) Surcharge line
- b) Natural slope line and Repose line
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: b

Explanation: The ϕ -line shows a plane inclined at an angle ϕ to the horizontal at which the soil is expected to stay in the absence of any lateral support. The line therefore is called the natural slope line or repose line.

10. In coulomb's wedge theory, the criterion for maximum active pressure is present at _____

- a) Slip-plane
- b) Repose line
- c) Surcharge line
- d) Ground line

[View Answer](#)

Answer: a

Explanation: In 1971, Professor Rebhann presented that the criterion for maximum active pressure is present at the slip-plane of the assumed triangle.

[Culmanns Graphical Method for Active Pressure](#)

1. Culmann's solution can be conveniently used for _____

- a) Various type of surcharge loads

- b) Ground surface of any shape
- c) Backfill of different densities
- d) All of the mentioned

View Answer

Answer: d

Explanation: Culmann's graphical method can be conveniently used for the ground surface of any shape, for various types of surcharge loads, and for a layered backfill of different densities.

2. Culmann's solution is based on _____ theory.

- a) Coulomb's
- b) Rebhann's
- c) Mohr
- d) Rankine's

View Answer

Answer: a

Explanation: In 1886, Culmann gave a graphical solution to evaluate the active earth pressure by coulomb's theory.

3. Which of the following effect of line load can be taken into account by Culmann's graphical method?

- a) Railway track and Long wall of a building
- b) Road alignment
- c) None of the mentioned
- d) All of the mentioned

View Answer

Answer: a

Explanation: Culmann's graphical method can be used to take into account the effect of line of load, such as railway track or a long wall of a building etc., running parallel to the retaining wall.

4. Rebhann's graphical method can be used for the location of _____

- a) Slip plane and Total active earth pressure
- b) Passive earth pressure
- c) None of the mentioned
- d) All of the mentioned

View Answer

Answer: a

Explanation: In 1871, Rebhann presented a graphical method for the location of the slip plane and the total active earth pressure according to Coulomb's wedge theory.

5. Earth pressure for retaining walls, of less than 6m are obtained by _____

- a) Analytical method
- b) Graphical method
- c) Considering approximate value

d) All of the mentioned

View Answer

Answer: b

Explanation: In practice, earth pressures for retaining walls of less than 6m height are obtained from graphs or tables.

6. All available graphs and tables, used for finding earth pressure is based on _____

- a) Rankine's theory
- b) Coulomb's theory
- c) Culmann's theory
- d) Rebhann's graphical method

View Answer

Answer: a

Explanation: Almost all graphs and tables available in the literature which are used for finding earth pressure are based on Rankine's theory.

7. Which of the following is not one of the criteria, for design of gravity dam?

- a) The wall must be safe against sliding
- b) The wall must be safe against overturning
- c) The wall must be thinner in section
- d) No tension should be developed in the wall

View Answer

Answer: c

Explanation: As the gravity wall resists the earth lateral pressure by its weight, therefore it should be thicker in section.

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8. For the design of gravity dam, the minimum value of F(factor of safety) against sliding should be _____

- a) 2.0
- b) 1.5
- c) 0.5
- d) 4.0

View Answer

Answer: b

Explanation: From the equation $F = RV \cdot \mu / Rh$

The minimum value of factor of safety is found out to be 1.5.

[Stress Distribution in the Vicinity of Shafts](#)

1. A soil engineers usually encounter problems of stress distribution in _____

- a) Vicinity of vertical shafts and Vicinity of inclined shafts
- b) Vicinity of horizontal shafts
- c) None of the mentioned

d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: A soil engineer is commonly encountered with the problem of stress distribution in the vicinity of vertical or inclined shafts in an elastic semi-infinite solid with a horizontal or inclined surface.

2. The problem of stress distribution in the vicinity of shafts was first solved by _____

- a) Westergaard
- b) Terzaghi
- c) Darcy
- d) Biot

[View Answer](#)

Answer: a

Explanation: In 1940, Westergaard solved the problem of stress distribution by using the theory of plasticity using a suitable stress function.

3. The method given by Biot for solving the problem of stress distribution was based on _____

- a) Theory of elasticity
- b) Method of superposition
- c) Westergaard method
- d) All of the mentioned

[View Answer](#)

Answer: b

Explanation: The method suggested by Biot was based on the method of superposition as proposed by Terzaghi in 1943.

4. The stress component which acts on any point in the surrounding material before the excavation of the shaft can be resolved into _____ parts.

- a) 3
- b) 5
- c) 2
- d) 4

[View Answer](#)

Answer: a

Explanation: i) Stresses due to the weight of material and ii) stress due to pressure exerted by the equivalent liquid are the two stress component that acts at any point on the material.

5. Stress due to equivalent fluid pressure can be found out using _____

- a) Biot method
- b) Theory of elasticity
- c) Lamé's formula

d) Method of superposition

View Answer

Answer: c

Explanation: Stress due to equivalent fluid pressure can be found out by using the Lamé's formula for the state of stress in thick walled cylinder subjected to internal pressure.

6. After excavating the shaft, the shearing stresses along the walls of the shaft will be equal to _____

- a) Zero
- b) Normal stress
- c) Circumferential stress
- d) All of the mentioned

View Answer

Answer: a

Explanation: After the shaft has been excavated the shearing stresses along the walls of the shaft are equal to zero and the radial normal stresses are also equal to zero.

7. When the high value of σ_{θ} in the vicinity of the walls of a shaft exceeds the compressive strength it results in _____

- a) Plastic flow of soil
- b) Non uniform stress distribution
- c) Increase fluid pressure
- d) All of the mentioned

View Answer

Answer: a

Explanation: The high value of σ_{θ} in the vicinity of walls of a shaft may exceed the compressive strength of the soil, resulting in a plastic flow of the soil which continues until a state of plastic equilibrium.
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8. The stress component at any point, after the excavation of the shaft, will be equal to _____

- a) $\sigma_R = (\sigma_Z)1 - (\sigma_Z)2$
- b) $\sigma_Z = (\sigma_Z)1 - (\sigma_Z)2$
- c) $\sigma_{\theta} = (\sigma_{\theta})1 - (\sigma_{\theta})2$
- d) $\sigma_R = (\sigma_R)1 - (\sigma_R)2$

View Answer

Answer: b

Explanation: The stress component at any point, after the excavation of the shaft will be equal to the difference between the initial stresses i.e., $\sigma_Z = (\sigma_Z)1 - (\sigma_Z)2$.

[Classes of Underground Conduits](#)

1. Underground conduits are commonly used for, which of the following purpose?

- a) Sewers
- b) Gas lines

- c) Culverts
- d) All of the mentioned

[View Answer](#)

Answer: d

Explanation: Underground conduits are commonly used as sewers, drains, and water mains, gas lines, culverts etc.

2. A ditch conduits can be installed in a _____

- a) Shallow bedding
- b) Shallow ditch
- c) Narrow ditch
- d) All of the mentioned

[View Answer](#)

Answer: c

Explanation: A ditch conduit is the one which is installed in a narrow ditch, excavated in undistributed soil below ground level, which is then covered with earth backfill.

3. Underground conduits can be classified into _____ types.

- a) 2
- b) 4
- c) 3
- d) 5

[View Answer](#)

Answer: c

Explanation: Based on the type of installations, conduits can be classified into 3 types:

- i) Ditch conduits
- ii) Projecting conduits
- iii) Special conduits.

4. Ditch conduits are more commonly used in _____

- a) Sewers
- b) High way
- c) Railway culverts
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: Since narrow ditch can be installed in a narrow ditch below ground level, it is more commonly used as sewers, water mains etc.

5. The problem of computing the stress in the vicinity of a cylindrical tunnel was solved by _____

- a) Terzaghi
- b) Mindlin
- c) Biot

d) Rankine

[View Answer](#)

Answer: b

Explanation: The problem of computing the stress in the vicinity of a cylindrical tunnel corresponding to the state of elastic equilibrium has been solved more rigorously by Mindlin (1939), using the values of K_0 .

6. The transfer of pressure from a yielding part of soil mass to the less yielding part is defined by the term

a) Arching

b) Projecting conduits

c) Stress transfer

d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: Arching is defined as the phenomenon of the transfer of pressure from a yielding part of the soil mass to an adjoining less yielding or restrained part of the mass.

7. Which of the following conduit is installed in shallow bedding?

a) Ditch conduits

b) Positive projecting conduits

c) Special conduits

d) Negative projecting conduits

[View Answer](#)

Answer: b

Explanation: A passive projecting conduit is the one which is installed in shallow bedding, with its top projecting above the natural ground and which is then covered with an embankment.

8. Which of the following values of K_0 is used to compute the stress in the vicinity of a cylindrical tunnel?

a) $K_0 = 1$

b) $K_0 = \mu / 1 - \mu$

c) $K_0 = 0$

d) All of the mentioned

[View Answer](#)

Answer: d

Explanation: The problem of computing the stress in the vicinity of a cylindrical tunnel corresponding to the state of elastic equilibrium has been solved by Mindlin using the following valued of K_0 :

i) $K_0 = 1$ ii) $K_0 = \mu / 1 - \mu$ iii) $K_0 = 0$.

9. Terzaghi's experiment show that the value of K (empirical constant) varies from about _____ above the Centre of strip.

a) Unity

b) Zero

c) Less than unity

d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: Terzaghi's experiments show that the value of K varies from about unity (i.e., 1) immediately above the Centre of strip to a maximum of 1.5 at an approximate height above the strip.

10. Which of the following conduits are commonly used in highway or railway culverts?

a) Positive/Negative projecting conduits

b) Negative projecting conduits

c) Ditch conduits

d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: Negative and positive projective conduits are used in highway or railway culverts as both can be covered with an embankment.

[Load on Positive and Negative Projecting Conduits](#)

1. Positive projecting conduits are of _____ types.

a) 2

b) 5

c) 3

d) 4

[View Answer](#)

Answer: d

Explanation: Positive projecting conduits are of four types: i) complete ditch conditions ii) complete projection conduits iii) incomplete ditch conduit iv) incomplete projection conduits.

2. The settlement ratio for a negative projecting conduit is _____

a) Always positive

b) Always negative

c) Negative in some cases

d) None of the mentioned

[View Answer](#)

Answer: b

Explanation: The settlement ratio for negative projecting conduits is always negative since the settlement of the critical plane is more than the settlement of the natural ground.

3. The magnitude and direction of relative movements between the interior and exterior prisms of the conduits are dependent upon the _____

a) Settlement ratio

b) Projection ratio

c) Settlement of conduits

d) Compressive strain

[View Answer](#)

Answer: a

Explanation: The magnitude and direction of relative movements are dependent upon the settlement ratio r_{sd} defined by the equation:

$$r_{sd} = (s_m + s_g) - (s_f + d_c)/s_m.$$

4. Critical plane in conduit is located at _____

- a) Tangential to the top of the conduit
- b) Tangential to the bottom of the conduit
- c) Centre of the conduit
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The critical plane is a horizontal plane, located tangential to the top of the conduit.

5. If the critical plane settles more than the top of the conduit, the settlement ratio is _____

- a) Zero
- b) Negative
- c) Positive
- d) Unity

[View Answer](#)

Answer: c

Explanation: If the critical plane settles more than the top of the conduit i.e. if $(s_m + s_g)$ is more than $(s_f + d_c)$ the settlement ratio is positive.

6. Both the projection condition and the ditch conditions of a positive projecting conduit may be _____

- a) Complete
- b) Incomplete
- c) All of the mentioned
- d) None of the mentioned

[View Answer](#)

Answer: c

Explanation: Depending upon the position of plane of equal settlement, both the projection conditions and the ditch conditions of a positive projecting conduit may be complete or incomplete.

7. If the plane of settlement does not fall within the embankment, then such a condition is called _____

- a) Complete ditch condition and Complete project condition
- b) Incomplete ditch condition
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: If the embankment is not of sufficient height, the plane of equal settlement does not fall within the embankment (i.e., $H_e > H$); such a condition is called complete projection condition or complete ditch condition.

8. The sign used for complete projection is _____

- a) +
- b) –
- c) No sign is used
- d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: Since + is used for positive settlement ratio, (+) sign is used for complete projection and (–) sign used for complete ditch condition.

9. The recommended value of settlement ratio for embankment, to use in design is _____

- a) +0.5
- b) +1.0
- c) – 0.3
- d) – 0.4

[View Answer](#)

Answer: b

Explanation: The value of r_{sd} for embankment of rigid conduit type is +1.0, which can be used for any ordinary rock hard, hard or unyielding soil as foundation soil.

10. The load on a negative conduit is given by the equation _____

- a) $W_c = C_n \gamma B d$
- b) $W_c = C_n \gamma B d^2$
- c) $W_c = \gamma B d$
- d) $W_c = C_n B d^2$

[View Answer](#)

Answer: b

Explanation: The load on the conduit is given as $W_c = C_n \gamma B d^2$, where C_n = load coefficient for negative projecting conduit.

[Stability Analysis of Infinite Slopes](#)

1. Earth embankments or slopes are commonly required for which of the following purpose?

- a) Railways
- b) Earth dams
- c) Road ways
- d) All of the mentioned

[View Answer](#)

Answer: d

Explanation: Earth embankments are commonly required for railways, roadways, earth dams, levees and river training works.

2. The failure of slopes may take place due to _____

- a) Forces between the soil particle and High water content
- b) Action of gravitational force
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The failure of slopes takes place mainly due to the action of a gravitational force which tends to pull the upper portions of the soil mass downwards to a nearly more level surface.

3. Slopes is classified into _____ types.

- a) 2
- b) 3
- c) 4
- d) 5

[View Answer](#)

Answer: a

Explanation: Slopes may be of two types: i) infinite slopes and ii) finite slopes.

4. Which of the following is an example of slopes extending to infinity?

- a) Inclined face of Earth dams
- b) Embankments
- c) Cuts
- d) None of the mentioned

[View Answer](#)

Answer: d

Explanation: Slopes extending to infinity do not exist in nature.

5. Analysis of stability of slopes is used for determining _____

- a) Shearing strength and Stressed internal surface
- b) Properties of the soil
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: An analysis of stability of slopes consist of determining the most severely stressed internal surface and the magnitude of the shearing stress to which it is subjected and determining the shearing stress along the surface.

6. If the soil properties for all identical depths below the surface are constant, it is a _____

- a) Finite slope

- b) Infinite slope
- c) Planar failure surface
- d) All of the mentioned

View Answer

Answer: b

Explanation: If a slope represents the boundary surface of a semi-infinite soil mass, and the soil properties for all identical depths below the surface are constant, it is called an infinite slope.

7. A long natural slope of cohesion-less soil is inclined at 12° to the horizontal. What will be the factor of safety of the slope if $\phi = 30^\circ$?

- a) 1.6
- b) 2.7
- c) 0.13
- d) 0.4

View Answer

Answer: b

Explanation: Given $\phi = 30^\circ$ and $i = 12^\circ$

Formula, $F = \tan \phi / \tan i$

$F = \tan 30^\circ / \tan 12^\circ$

$F = 2.72$.

8. Factor of safety with respect to height is given by _____ equation.

- a) $FC = HC / H$
- b) $FC = C / C_m$
- c) $FC = \tau_f / \tau$
- d) $FC = \tau_c / \tau$

View Answer

Answer: a

Explanation: Since the factor of safety FC with respect to cohesion, also represent the factor of safety with respect to height

$FC = C / C_m = HC / H$

Where, C_m is the mobilized cohesion at a depth H.

9. In the limiting case of stability, the angle of slope is referred to as _____

- a) Angle of deviation
- b) Angle of repose
- c) Angle of unstable slope
- d) All of the mentioned

View Answer

Answer: b

Explanation: In the limiting case of stability, the angle of slope is known as the angle of repose ϕ .

10. The factor of safety against safety is given by _____ equation.

- a) $F = HC / H$
- b) $F = \tau_f / \tau$ and $F = \tan \phi / \tan i$
- c) None of the mentioned
- d) All of the mentioned

View Answer

Answer: b

Explanation: The factor of safety against sliding is given by equation:

$$F = \tau_f / \tau = \tan \phi / \tan i.$$

[Stability Analysis of Finite Slopes](#)

1. A basic type of failure at a finite slope may occur due to _____

- a) Slope failure and Base failure
- b) Toe failure
- c) None of the mentioned
- d) All of the mentioned

View Answer

Answer: a

Explanation: The two basic types of failure of a finite slope may occur: (i) slope failure (ii) base failure.

2. If the failure occurs along a surface of sliding that intersect the slope at its toe, the slide is known as _____

- a) Base failure
- b) Slope failure
- c) Face failure
- d) All of the mentioned

View Answer

Answer: b

Explanation: If the failure occurs along a sliding that intersects the slopes at or above its toe, the slide is known as slope failure.

3. The types of slip surface or failure surfaces are _____

- a) 4
- b) 2
- c) 3
- d) 5

View Answer

Answer: c

Explanation: The types of failure surface are: i) Planar failure surface ii) circular failure surface iii) Non-circular failure surface.

4. The ratio of total depth to depth H is called _____

- a) Depth factor
- b) Slope depth
- c) Depth failure
- d) Base failure

[View Answer](#)

Answer: a

Explanation: The ratio of the total depth (H + D) to depth H is called the depth factor Df.

5. The depth factor Df for toe failure is _____

- a) $Df > 1$
- b) $Df < 1$
- c) $Df = 1$
- d) $Df = 0$

[View Answer](#)

Answer: c

Explanation: For toe failure, $Df = 1$; for base failure, $Df > 1$.

6. Planar surface commonly occur in _____

- a) Embankment with specific plane of weakness
- b) All embankments
- c) Soil deposit
- d) Foundation of infinite depth

[View Answer](#)

Answer: a

Explanation: Planar failure surface may commonly occur in a soil deposit or embankment with a specific plane of weakness.

7. The stability of a finite slope can be investigated by which of the following method?

- a) Bishop's method
- b) Swedish circle method
- c) Friction circle method
- d) All of the mentioned

[View Answer](#)

Answer: d

Explanation: The stability of a finite slope can be investigated by the following methods:

- i) Culmann's method of planar failure surface
- ii) The Swedish circle method
- iii) Friction circle method
- iv) Bishop's method.

8. According to Bennet, non-circular slip surface may arise in _____

- a) Non homogeneous dam

- b) Embankment dams
- c) Homogeneous dam
- d) Soil deposit with a specific plane of weakness

View Answer

Answer: c

Explanation: According to Bennet (1951), non-circular or composite slip surface may arise in homogeneous dam have foundation of infinite depth, rigid boundary planes of maximum and presence of stronger or weaker layer.

9. The rupture mass sliding down a surface in a definite pattern resembles _____

- a) Curve
- b) Cycloid
- c) Ellipse
- d) Circle

View Answer

Answer: b

Explanation: Collin observed that the rupture mass slide down a sliding surface, in a definite pattern resembling that of a cycloid.

10. In stability computation, the curve representing the real surface of sliding is usually replaced by _____

- a) Arc of circle and Logarithmic failure
- b) Cycloid
- c) None of the mentioned
- d) All of the mentioned

View Answer

Answer: a

Explanation: Failure of finite slopes occurs along a curved surface. In stability computation, the curve is represented by an arc of a circle or logarithmic scale.

[The Swedish Slip Circle Method](#)

1. Rectangular plot method has been suggested by _____

- a) Culmann
- b) Bishop
- c) Singh
- d) Terzaghi

View Answer

Answer: c

Explanation: A simplified rectangular plot method for finding the stability of slopes was suggested by Singh in 1962.

2. The slip circle having the minimum factor of safety is called _____

- a) Critical circle

- b) Failure slip circle
- c) Critical slip circle
- d) None of the mentioned

View Answer

Answer: c

Explanation: A number of trial critical slip circle are chosen against sliding and factor of safety of each is computed. The circle having the minimum factor of safety is the critical slip circle.

3. In Swedish circle method _____ analysis cases are considered.

- a) $\phi C = 0$
- b) $C - \phi$ and $\phi u = 0$
- c) None of the mentioned
- d) All of the mentioned

View Answer

Answer: b

Explanation: In Swedish slip circle method two cases are considered: i) analysis of purely cohesive soil ($\phi u = 0$) and ii) analysis of a soil possessing both cohesion and friction ($C - \phi$ analysis).

4. When does the critical condition of d/s slope, occur in reservoir?

- a) Reservoir is full
- b) Pore pressure is high
- c) Steady seepage does not occur
- d) All of the mentioned

View Answer

Answer: a

Explanation: Critical condition of d/s slope occurs when the reservoir is full and percolation is at its maximum rate.

5. In the rectangular plot method if there are n-slices, the total number of ordinates will be _____

- a) $n - 1$
- b) n
- c) $n - 2$
- d) None of the mentioned

View Answer

Answer: a

Explanation: In the rectangular plot method if there are n-slices, the total number of ordinates will be (n-1), the ordinates at the end of the last strip being zero.

6. Stability of slopes of an earth dam is tested under, which of the following condition?

- a) Stability of downstream slope during steady seepage and Stability of upstream slope during a sudden drawdown
- b) Stability of upstream slope during sudden seepage
- c) None of the mentioned

d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The stability of slopes of an earth dam is tested under the following conditions:

- i) Stability of downstream slope during steady seepage
- ii) Stability of upstream slope during a sudden drawdown
- iii) Stability of upstream and downstream slopes during and immediately after construction.

7. When a dam is built of impervious compressible soil, water is entrapped in the pore space due to _____

- a) Excessive pore pressure
- b) Volume change in the soil mass
- c) Low shear strength of soil
- d) Unstable soil mass

[View Answer](#)

Answer: b

Explanation: When a dam is built of relatively impervious compressible soil, excess pore pressure develops in the air and water entrapped in the pore pressure. This is because the soil mass undergoes a change in the soil due to compaction of the dam construction and also due to a down weight.

8. The area of U-diagram in finding stability of D/S slope during steady seepage, can be measured by _____

- a) Planimeter and Rectangular plot method
- b) Fellinious method
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The area of U-diagram can be measured with the help of a planimeter, or else the rectangular plot method can be utilized.

9. The magnitude and distribution of pore water pressure on a slip surface can be calculated from _____

- a) Pressure net
- b) Test data
- c) Graphical method
- d) Rectangular plot method

[View Answer](#)

Answer: a

Explanation: The magnitude and distribution of pore water pressure on a likely slip surface is estimated from pressure net which are developed from the flow net.

10. The pore water pressure at any point on the slip surface is represented by _____

- a) Piezometric head
- b) Pore pressure
- c) Factor of safety

d) Failure plane

[View Answer](#)

Answer: a

Explanation: The pore water pressure at any point is represented by the piezometric head h_w at that point.
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11. The estimation of construction pore pressure can be made with the help of _____

- a) Swedish circle method
- b) Bishop's method
- c) Hilf's equation
- d) Rectangular plot method

[View Answer](#)

Answer: c

Explanation: The estimation of the construction pore pressure is made with the help of Hilf's equation:

$$u = p_a \Delta / (v_a + h_c \gamma_w - \Delta).$$

12. In Hilf's equation ' $u = p_a \Delta / (v_a + h_c \gamma_w - \Delta)$ ', h_c refers to _____

- a) Induced pore pressure
- b) Henry's constant
- c) Volume of pore water
- d) Volume of air voids

[View Answer](#)

Answer: b

Explanation: In Hilf's equation h_c refers to Henry's constant of solubility of air in water by volume (= 0.02 at 68°F).

[Friction Circle Method](#)

1. In the friction circle method, it is assumed that the resultant reaction is _____ to the friction circle.

- a) Perpendicular
- b) Tangential
- c) Parallel
- d) None of the mentioned

[View Answer](#)

Answer: c

Explanation: In the friction circle method, it is assumed that the resultant reaction is tangential in the friction circle, since the error involved in this assumption is of small magnitude.

2. The friction circle may be also referred as _____

- a) ϕ -circle
- b) Plane circle
- c) Cohesion circle

d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The friction circle having radius $r \sin \phi$ is also called as ϕ -circle.

3. A circle is considered to be a critical slip circle, if it has _____

a) Maximum factor of safety

b) Minimum factor of safety

c) Maximum radius

d) All of the mentioned

[View Answer](#)

Answer: b

Explanation: The circle giving minimum factor of safety F_c is considered as a critical slip circle.

4. The factor of safety with respect to cohesion is given by the equation _____

a) $FC = HC / H$

b) $FC = C / C_m$

c) $FC = \tau_f / \tau$

d) All of the mentioned

[View Answer](#)

Answer: b

Explanation: The factor of safety F_c with respect to cohesive strength, based on the assumption that the frictional strength has been fully mobilized, is given by

$FC = C / C_m$.

5. The friction circle method assumes the failure surface as _____

a) Cycloid

b) Curve

c) Arc of circle

d) None of the mentioned

[View Answer](#)

Answer: c

Explanation: Similar to Culmann's method, the friction circle method also assumes the failure surface as the arc of circle.

6. The forces acting on a sliding wedge are _____

a) Weight of the wedge

b) Total frictional force

c) Total cohesive resistance

d) All of the mentioned

[View Answer](#)

Answer: d

Explanation: The forces acting on a sliding wedge are i) the weight of the wedge ii) the total frictional resistance or resultant, and iii) total cohesive resistance along the slip circle.

7. The factor of safety F_c with respect to cohesive strength is based on the assumption that _____

- a) Frictional force is fully mobilized
- b) Frictional force is zero
- c) Total cohesive resistance is zero
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The factor of safety with respect to cohesive strength, based on the assumption that frictional force has been fully mobilized, and the equation is given by $F_c = C / C_m$.
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8. The factor K , in the radius of the friction circle ($Kr \sin \phi$) depends on _____

- a) Radius of the frictional circle
- b) Frictional resistances offered
- c) Cohesive resistance
- d) Central angle of the slip arc

[View Answer](#)

Answer: d

Explanation: In the frictional circle radius of $Kr \sin \phi$, the factor K depends on the central angle δ of the slip arc.

[Taylors Stability Number and Curves](#)

1. The total cohesion force which resists the slipping along the slip arc at critical equilibrium is proportional to _____

- a) Cohesion and Height of the slope
- b) Taylor's stability number
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The total cohesive force $c \hat{L}$, which resist the slipping along the slip arc at critical equilibrium, is proportional to the cohesion c and the height H of the slope.

2. The Taylor's stability number is based on _____

- a) Height of the slope and Pore pressure
- b) Factor of safety
- c) None of the mentioned

d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The Taylor's stability number is based on the factor of safety F_c with respect to cohesion assuming that the frictional resistance assuming that frictional force has been fully mobilized.

3. The factor of safety with respect to friction is _____

a) Unity

b) Zero

c) Greater than one

d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: The friction of safety F_ϕ with respect to friction is a unity which means that the frictional force has been fully mobilized.

4. According to Taylor, the force causing instability in the sliding wedge is _____

a) Cohesive resistance and Weight of the wedge

b) Total frictional resistance

c) None of the mentioned

d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The force causing instability is the weight of the wedge which is equal to unit weight γ .

5. Taylor's stability number is represented by the term _____

a) SC

b) S_n

c) C_m

d) HC

[View Answer](#)

Answer: b

Explanation: Taylor's stability is represented as S_n .

6. Which of the following quantity is called as Taylor's stability number?

a) $c/F_c \gamma H$

b) $c/\gamma H$

c) $cm/F_c \gamma$

d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: If F_c is the factor of safety with respect to cohesion,

We have $c \times H / Fc \times \gamma H^2$
 $= c / Fc \gamma H = S_n$

The dimensional quantity $c / Fc \gamma H$ is called as Taylor's stability number S_n .

7. For purely frictional soil, the Taylor's stability number is _____

- a) Unity
- b) Zero
- c) >1
- d) <1

[View Answer](#)

Answer: b

Explanation: For purely frictional soil ($c = 0$), the stability number is zero, and Taylor's stability curves do not apply.

8. The stability of a slope for a pure frictional soil, depends upon _____

- a) Slope angle
- b) Factor of safety
- c) Frictional resistance
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The stability of slope for a frictional soil entirely depends upon the slope angle i , irrespective of height of the slope.

9. What will be the factor of safety with respect to cohesion of a clay slope laid at 1 in 2 to a height of 10 m, if the angle of internal friction $\phi=10^\circ$; $c=25 \text{ k N/m}^2$ and $\gamma = 19 \text{ k N/m}^3$?

- a) 4.34
- b) 2.06
- c) 1.02
- d) 20.6

[View Answer](#)

Answer: b

Explanation: $i = \tan^{-1}(1/2) = 26.5^\circ$

For $i = 26.5^\circ$ and $\phi = 10^\circ$, $S_n = 0.064$

But, $S_n = c / Fc \gamma H$

Therefore, $Fc = c / S_n \gamma H$

$Fc = 25 / (0.064 \times 19 \times 10) = 2.06$.

10. A slope is to be constructed at an inclination of 30° with the horizontal. What will be the safe height of the slope at factor of safety of 1.5? The soil has the properties: $c = 15 \text{ k N/m}^2$, $\phi=22.5^\circ$ and $\gamma = 19 \text{ k N/m}^3$.

- a) 11.5
- b) 20.5
- c) 12

d) 18.64

[View Answer](#)

Answer: a

Explanation: The mobilized frictional angle ϕ_m is given by

$$\phi_m = \phi/F = 22.5/1.5 = 15^\circ$$

For, $i = 30^\circ$ and $\phi_m = 15^\circ$, $S_n = 0.046$

$$\text{Now } H = c/F \gamma S_n = 15/(0.0046 \times 1.5 \times 19) = 11.5 \text{ m.}$$

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11. When the slope is fully submerged, which of the following has to be used for finding stability number?

- a) Submerged density
- b) Shearing resistance
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: When the slope is fully submerged, the submerged density γ' , and weighted frictional angle ϕ_w should be used for computing stability number S_n .

[Rankines Analysis](#)

1. The gross pressure intensity (q) of a structure is _____

- a) Total pressure at base of the footing
- b) Excess pressure after the construction of the structure
- c) Minimum pressure intensity at the base
- d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: The gross pressure intensity q is the total pressure at the base of the footing due to the weight of the superstructure.

2. The ultimate bearing capacity and the net ultimate capacity are connected by the relation _____

- a) $q_f = q_{nf} + \bar{\sigma}$ and $q_f = q_f - \bar{\sigma}$
- b) $q_f = q_{nf} - \bar{\sigma}$
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The ultimate bearing capacity q_f and the net ultimate capacity are connected by the following relation:

$$q_f = q_{nf} + \bar{\sigma} \text{ (or) } q_f = q_f - \bar{\sigma}$$

where $\bar{\sigma}$ is the effective surcharge at the base level of the foundation.

3. The net safe bearing capacity is defined by which of the following equation?

- a) $q_{ns} = q_{nf} / F$
- b) $q_{ns} = q_{nf} + \bar{\sigma}$
- c) $q_{ns} = q_f - \bar{\sigma}$
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The net safe bearing capacity is the net ultimate bearing capacity divided by a factor of safety F i.e., $q_{ns} = q_{nf}/F$.

4. The safe bearing capacity can also be referred as _____

- a) Net safe bearing capacity
- b) Ultimate bearing capacity
- c) Safe bearing pressure
- d) Net soil pressure

[View Answer](#)

Answer: b

Explanation: Sometimes, the safe bearing capacity is also referred to as the ultimate bearing capacity q_f divided by a factor of safety F.

5. Rankine considered the first soil element (element 1) at _____

- a) Base of the structure
- b) Below the foundation
- c) Edge of the footing
- d) All of the mentioned

[View Answer](#)

Answer: b

Explanation: Rankine considered the equilibrium of two soil elements, The first one immediately below the foundation (element 1).

6. The bearing capacity of cohesion-less soil at the ground surface is _____

- a) Unity
- b) Less than one
- c) Zero
- d) Greater than one

[View Answer](#)

Answer: c

Explanation: According to Rankine's equation bearing capacity of cohesion less soil is zero at the ground surface.

7. When a state of equilibrium is reached under the footing?

- a) Load on footing increase
- b) Load on footing decreases

- c) Safe bearing capacity of the soil is reached
- d) None of the mentioned

View Answer

Answer: a

Explanation: When the load on footing increases, and approaches a value q_f , a state of plastic equilibrium is reached under the footing.

8. Rankine considered the equilibrium of second soil element at _____

- a) Base of the structure
- b) Below the foundation
- c) Edge of the footing
- d) Top of the foundation

View Answer

Answer: c

Explanation: Rankine considered the equilibrium of the other soil element (element 2) beyond the edge of the footing, but adjacent to element 1.

9. During the state of shear failure, which of the following principal stress relationship exist?

- a) $\sigma_1 = \sigma_3 \tan^2 \alpha + 2c \tan \alpha$
- b) $\sigma_1 = \sigma_3 \tan^2 \alpha + 2c \tan \alpha$
- c) $\sigma_1 = 2c \tan \alpha$
- d) $\sigma_1 = \sigma_3 \tan \alpha$

View Answer

Answer: b

Explanation: During the state of shear failure (plastic equilibrium), the following principal stress relationship exists $\sigma_1 = \sigma_3 \tan^2 \alpha + 2c \tan \alpha$ for cohesion-less soil, $\sigma_1 = \sigma_3 \tan^2 \alpha$.

10. The symbol $\bar{\sigma}$, represent which of the following term?

- a) Ultimate bearing capacity
- b) Effective surcharge
- c) Gross pressure intensity
- d) Bearing capacity

View Answer

Answer: b

Explanation: $\bar{\sigma}$ represents the effective surcharge at the base level of the foundation, assuming total unit weight for the portion of the soil above the water table and submerged unit weight for the portion below the water table.

[Types of Bearing Capacity Failures](#)

1. When a footing fails due to insufficient bearing capacity, distinct failure patterns are developed depending upon _____

- a) Failure mechanism

- b) Plastic equilibrium
- c) Shear strength
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: Experimental investigations have indicated that when a footing fails due to insufficient bearing capacity, distinct failure patterns are developed, depending upon the type of failure mechanism.

2. Vesic observed _____ types of bearing capacity failures.

- a) 2
- b) 4
- c) 3
- d) 5

[View Answer](#)

Answer: c

Explanation: In 1963, Vesic observed three types of bearing capacity failures:

- i) General shear failure
- ii) Local shear failure
- iii) Punching shear failure.

3. In general shear failure, continuous failure is developed between _____

- a) Ground surface and footing
- b) Edge of the footing and ground surface
- c) Foundation and the ground surface
- d) None of the mentioned

[View Answer](#)

Answer: b

Explanation: In the case of general shear failure, continuous failure surface develops between the edges of the footing and the ground surface.

4. Which of the following is a characteristic of general shear failure?

- a) Failure is accompanied by compressibility of soil
- b) Failure is sudden
- c) Bulging of shearing mass of soil
- d) All of the mentioned

[View Answer](#)

Answer: c

Explanation: A typical characteristic of general shear failure is

- a) Failure is sudden with pronounced peak resistance
- b) There is considerable bulging of sheared mass of soil adjacent to the footing.

5. In local shear failure, the development of plastic equilibrium is _____

- a) Full

- b) Partial
- c) Zero
- d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: In local shear failure there is only partial development of state of plastic equilibrium and there is a significant compression of the soil under the footing.

6. Punching shear may occur in loose sand with density less than _____

- a) 45 %
- b) 50 %
- c) 35 %
- d) 20 %

[View Answer](#)

Answer: c

Explanation: Punching shear may occur in relatively loose sand with relative density less than 35 %.

7. Local shear failure is associated with soils having _____

- a) High compressibility
- b) High pore pressure
- c) Low porosity
- d) Low compressibility

[View Answer](#)

Answer: a

Explanation: Local shear failure occurs in soil having high compressibility and in sands having relative density lying between 35 and 70 percent.

8. Which of the following is not one of the characteristics of a local shear failure?

- a) Failure is defined by large settlements
- b) Failure surface do not reach the ground surface
- c) Failure is sudden
- d) Ultimate bearing capacity is not well defined

[View Answer](#)

Answer: c

Explanation: In local shear stress there is no tilting of footing and therefore the failure is not sudden.

9. In local shear failure, the failure surface do not reach the ground surface because _____

- a) Compression of soil under the footing
- b) Ultimate bearing capacity is not well defined
- c) Failure is defined by large settlements

d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: In local shear failure there is a significant compression of the soil under the footing and only partial development of state of plastic equilibrium. Due to this reason, the failure surface does not reach the ground.

10. State of equilibrium is fully developed in which of the following bearing capacity failures?

- a) Local shear failure
- b) General shear failure
- c) Punching shear failure
- d) All of the mentioned

[View Answer](#)

Answer: b

Explanation: In general shear failure, when the pressure approaches the value of q_f , the state of equilibrium is reached initially in the soil around the soil and gradually spreads, ultimately the state of plastic equilibrium is fully developed throughout the soil above the failure surfaces.

[Terzaghis Analysis](#)

1. An analysis of the condition of complete bearing capacity failure is usually termed as _____

- a) General shear failure
- b) Terzaghi's analysis
- c) Bearing failure
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: An analysis of the condition of complete bearing capacity failure is termed as a general shear failure, can be made by assuming that the soil behaves like an ideally plastic failure.

2. The concept of analysis of bearing capacity failure was first developed by _____

- a) Terzaghi
- b) Meyerhof
- c) Prandtl
- d) Darcy

[View Answer](#)

Answer: c

Explanation: The concept of failure analysis was first developed by Prandtl, and later extended by Terzaghi, Meyerhof and others.

3. For purely cohesive soil, the bearing capacity is given by which of the following equation?

- a) $q_f = 5.7 c + \bar{\sigma}$
- b) $q_f = c + \bar{\sigma}$
- c) $q_f = 5.7 c$

d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: For purely cohesive soil the bearing capacity is

$$q_f = c N_c + \bar{\sigma} N_q = 5.7 c + \bar{\sigma}$$

Where $\bar{\sigma} = \gamma D$ if the water table is below the base of the footing.

4. The parameters N_c , N_q , N_γ in the equations of bearing capacity failure are known as _____

- a) Constant head
- b) Bearing capacity factors
- c) Effective pressure
- d) Load intensity

[View Answer](#)

Answer: b

Explanation: The parameters N_c , N_q , N_γ are the dimensionless numbers, known as bearing capacity factors depending only on the angle of shearing resistance of the soil.

5. For purely cohesive soil, local shear failure may be assumed to occur when the soil is _____

- a) Medium to soft
- b) Soft to medium
- c) Hard
- d) All of the mentioned

[View Answer](#)

Answer: b

Explanation: For purely cohesive soil, local shear failure may be assumed to occur when the soil is soft to medium, with an unconfined compressive strength $q_u \leq 100 \text{ kN/m}^2$.

6. Which of the following is a limitation, of assumption in Terzaghi's analysis?

- a) ϕ changes when the soil is compressed and strip footing has a rough base
- b) Soil is homogeneous
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: As the soil compress, ϕ changes; slight downward movement of footing may not develop fully the plastic planes.

7. Which of the following are original Terzaghi values for N_γ ?

- a) 34° and 48°
- b) 60°
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The values of $N\gamma$ for ϕ of 34° and 48° are the original Terzaghi values which were used by Bowles to back compute $K\gamma$.

8. According to the assumptions in Terzaghi's analysis, the soil is _____

- a) Homogeneous and Isotropic
- b) Non Homogeneous
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: In Terzaghi's analysis the soil is homogeneous and isotropic and its shear strength is represented by Coulomb's equation.

9. The Terzaghi's general bearing capacity equation is represented as _____

- a) $q_f = 5.7 c + \bar{\sigma}$
- b) $q_f = c N_c + \bar{\sigma} N_q + 0.5\gamma B N_\gamma$
- c) $q_f = c N_c + \bar{\sigma} N_q$
- d) $q_f = c N_c$

[View Answer](#)

Answer: b

Explanation: " $q_f = c N_c + \bar{\sigma} N_q + 0.5\gamma B N_\gamma$ " is known as Terzaghi's general bearing capacity equation for a continuous footing.

10. Local shear failure generally occurs in _____

- a) Dense sand
- b) Non-cohesive soil
- c) Loose sand
- d) All of the mentioned

[View Answer](#)

Answer: c

Explanation: Local shear failure generally occurs in loose sand while general shear failure occurs in dense sand.

11. The curve for N_q and N_γ for the transition state from $\phi = 28^\circ$ and $\phi = 38^\circ$ was given by _____

- a) Peck
- b) Hanson
- c) Thorn burn
- d) All of the mentioned

[View Answer](#)

Answer: d

Explanation: Peck, Hansen, and Thorn burn gave curves for N_q and N_γ for the transition state from $\phi = 28^\circ$ and $\phi = 38^\circ$, in which they assumed general shear failure when $\phi > 28^\circ$.

12. Terzaghi's bearing capacity equation is not applicable for _____

- a) Depth effect and Inclination factor
- b) Narrow slope
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: Terzaghi assumed the value of angle $\psi = \phi$, which is not true. Since footings are normally rough, ψ has been found close to $45^\circ + \phi/2$ than to ϕ , thus Terzaghi's bearing capacity equations do not have provision for including depth effects, inclination factors, etc.

[Effect of Water Table on Bearing Capacity](#)

1. When the water table is above the base of the footing, the submerged weight ' γ ' can be used to compute _____

- a) Effective pressure and Surcharge
- b) Pore pressure
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: When the water table is above the base of the footing, the submerged weight ' γ ' should be used for the soil below the water table for computing the effective pressure or the surcharge.

2. Which of the following is an essential difference between Vesic's and Hansen's procedure?

- a) Different values of N_γ and Variation on some of Hansen inclination
- b) Different value of N_q and N_c
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The essential difference in Vesic's and Hansen's procedure are i) use of slightly different values of N_γ and ii) a variation on some of Hansen's inclination, base and ground factors.

3. The equation $N_c = (N_q - 1) \cot \phi$, have been adopted by _____

- a) Terzaghi and Peck
- b) Hansen
- c) Vesic
- d) All of the mentioned

[View Answer](#)

Answer: d

Explanation: The two equations $N_c = (N_q - 1) \cot \phi$ and $N_q = \tan^2 (45 + \phi/2) \text{ ex } \tan \phi$ have been adopted by i) Terzaghi and Peck ii) Hansen iii) Vesic iv) Meyerhof and Bureau of Indian standards.

4. Which of the following N factors has the widest range of values?

- a) N_c
- b) N_q
- c) N_γ
- d) All of the mentioned

[View Answer](#)

Answer: c

Explanation: The N_γ factor has the widest suggested range of any value of N factors. A literature value reveals that for $\phi = 40^\circ$, $38 \leq N_\gamma \leq 192$.

5. Which of the following term does not contribute to q_f ?

- a) N_c
- b) N_γ
- c) N_q
- d) All of the mentioned

[View Answer](#)

Answer: b

Explanation: The N_γ term does not contribute significantly to q_f so that almost any reasonable value can be used. Bureau of Indian standards (BIS) recommends using the value of N_γ , given by Vesic.

6. Meyerhof's extended the analysis of plastic equilibrium of a surface footing to _____

- a) Shallow foundation and Deep foundation
- b) Inclined foundation
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: M Meyerhof's extended the analysis of plastic equilibrium of a surface footing to Shallow and Deep foundation according to both Terzaghi and Meyerhof analysis.

7. In the Bowl's method for finding the effect of water table, which of the following factor is used for soil in the wedge zone?

- a) Water reduction factor
- b) Effective unit weight
- c) Overburden pressure
- d) Average unit weight

[View Answer](#)

Answer: b

Explanation: In the third method (Bowles, 1988), no water reduction factor is used, but effective unit weight (γ_e) is used for the soil in the wedge zone.

8. Which of the following equation has been recommended by Indian standard for finding reduction factor in water table?

- a) $R_w = 0.5 (1 + z w^2/B)$
- b) $R_w = (1 + z w^2/B)$
- c) $R_w = c N_c + \bar{\sigma} \cdot N_q + 0.5 \gamma B N_\gamma$
- d) $R_w = z w^2 / B$

[View Answer](#)

Answer: a

Explanation: $R_w = R_{w2} = 5 (1 + z w^2 / B)$ has been recommended by Indian standard at a depth D_1 below the ground level.

9. The value of N_c and N_q are same for, which of the following methods?

- a) Meyerhof
- b) Hansen
- c) Vesic
- d) All of the mentioned

[View Answer](#)

Answer: d

Explanation: The value of N_c and N_q are same for Meyerhof, Hansen and Vesic method, while subscripts for N_γ identify the author, i.e. $N_{\gamma(H)}$ = valued by Hansen etc.

10. The factor $N_{\gamma(M)}$ identifies which of the following author?

- a) Vesic
- b) Meyerhof
- c) Hansen
- d) Terzaghi

[View Answer](#)

Answer: b

Explanation: The factor $N_{\gamma(M)}$ gives values by Meyerhof, as it has the subscript (M) in it.

[Plate Load Test](#)

1. The plate load test is essentially a _____

- a) Laboratory test
- b) Field test
- c) Graphical method analysis
- d) None of the mentioned

[View Answer](#)

Answer: b

Explanation: Plate load test is a field test to determine the ultimate bearing capacity of the soil, and the probable settlement under a given loading.

2. The plate load test consists in loading a rigid plate at the _____

- a) Base of the footing
- b) Bottom of the construction
- c) Foundation level
- d) All of the mentioned

[View Answer](#)

Answer: c

Explanation: The plate load test essentially consists in loading a rigid plate at the foundation level, and determining the corresponding to each load increment.

3. The bearing plate used in plate load test is in the shape of _____

- a) Square
- b) Rectangular and Circular
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: b

Explanation: The bearing plate is either circular or square, made of mild steel of not less than 25 mm in thickness.

4. The size of bearing plate, which used in plate load test varies from _____

- a) 300 to 750 mm
- b) 25 to 100 mm
- c) 100 to 300 mm
- d) 25 to 300 mm

[View Answer](#)

Answer: a

Explanation: The bearing plate used varies in size from 300 to 750 mm with a chequered or grooved bottom.

5. The loading to the test plate is applied with _____

- a) Fluid tube
- b) Hydraulic jack
- c) Sand bags
- d) Cross-joists

[View Answer](#)

Answer: b

Explanation: The loading to the test plate may be applied with the help of a hydraulic jack. The reaction of the hydraulic jack may be borne by either any of gravity loading method or reaction truss method.

6. For clayey and silty soils, which of the following bearing plate can be used?

- a) Square plate and Concrete block

- b) Circular plate
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: For clayey and silty soils and for loose medium dense sandy soils with $N < 15$, a 450 mm square plate or concrete block shall be used.

7. The settlement of the plate in a load test is measured with the help of _____

- a) Sensitive dial gauges
- b) Test plate
- c) Measuring unit
- d) Datum bar

[View Answer](#)

Answer: a

Explanation: The settlement of the plate is measured with the help of sensitive dial gauges. For square plate, two dial gauges are used. The dial gauges are mounted on independently supported datum bar.

8. According to Indian standard method, the loading of the plate should be borne with either by _____

- a) Gravity loading platform and Reaction truss
- b) Concrete blocks
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: Indian standards (IS: 1888: 1982) recommend that the loading of the plate should invariably be borne either by gravity loading platform or by the reaction truss.

9. A seating pressure of _____ is applied on the plate before starting the load test.

- a) 70 g/cm²
- b) 30 g/cm²
- c) 50 g/cm²
- d) 100 g/cm²

[View Answer](#)

Answer: a

Explanation: A minimum seating pressure of 70 g/cm² (0.7 t/m²), shall be applied and removed before starting the load test.

10. Which of the following type of loading method is popular now-a-days?

- a) Gravity loading platform
- b) Reaction truss
- c) Concrete blocks

d) All of the mentioned

[View Answer](#)

Answer: b

Explanation: The use of reaction truss is more popular now-a-days since this is simple, quick and less clumsy.

11. The value of factor of safety used, for finding safe bearing capacity is _____

a) 2.5

b) 2

c) 4

d) 3

[View Answer](#)

Answer: b

Explanation: In order to determine the safe bearing capacity, it would be normally sufficient to use a factor of safety of 2 or 2.5 on the ultimate bearing capacity.

12. Which of the following pose a limitation to plate load test?

a) Effect of size of foundation and Test on cohesive soil

b) Load increment

c) None of the mentioned

d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: A limitation of plate load test is

i) Effect of the size of foundation. For clayey soils the ultimate pressure for a large foundation is the same as that of the test plate. But in dense sandy soils, the bearing capacity increases, with the size of the foundation

ii) Plate load test is essentially a short duration test, and hence the test does not give the ultimate settlement, particularly in the case of cohesive soil.

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13. For a $c-\phi$ soil, Housel suggested which of the following expression?

a) $Q = A \cdot q + P \cdot s$

b) $Q = A \cdot q$

c) $q f = M + N(BF/B p)$

d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: In 1929, Housel suggested the following expression for a $c-\phi$ soil:

$Q = A \cdot q + P \cdot s$

Where, Q = total load on bearing area;

P = perimeter of footing;

S = perimeter shear;

A = contact area of footing or plate.

14. For clay soil the value of n can be taken as _____ in the absence of test data.

- a) 0.4 to 0.5
- b) 0.20 to 0.25
- c) 0.003 to 0.05
- d) 0.08 to 0.10

[View Answer](#)

Answer: c

Explanation: The value of index n can be determined by carrying out two or more plate load tests on different size plate. In absence of test data, the following values of n can be adopted:

Dense sand : 0.4 to 0.5
Loose sand : 0.20 to 0.25
Clay : 0.003 to 0.05
Sand clay : 0.08 to 0.10.

[Standard Penetration Test](#)

1. The two commonly used penetration tests are _____

- a) Standard penetration test
- b) Cone penetration test
- c) All of the mentioned
- d) None of the mentioned

[View Answer](#)

Answer: c

Explanation: According to Indian standard, the two commonly used penetration tests are static cone penetration test and standard penetration test.

2. The values derived from penetration tests can be used for finding _____

- a) Depth of hard stratum and Strength of soil
- b) Soil saturation
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The penetration test are useful for general exploration of erratic soil profiles, for finding depth to bed rock or hard stratum, and to have an approximation indication of the strength and other properties of soils.

3. The observed value of N in static cone penetration test is corrected by _____

- a) Overburden and Dilatancy /submergence
- b) Effective pressure
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The N-value for cohesion less soil shall be corrected for overburden and the values N_0 obtained after overburden correction is corrected further for dilatancy.

4. Correction for increasing effective overburden pressure have been proposed by _____

- a) Gibbs and Holtz
- b) Peck
- c) Thornburn
- d) All of the mentioned

[View Answer](#)

Answer: d

Explanation: For a constant density index, the N value increase with increasing effective overburden pressure for which correction have been proposed by Gibbs and Holtz, peck, Thornburn, Whitman and others.

5. The split tube used in static cone penetration test, is commonly known as _____

- a) Split spoon sampler
- b) Split tube sampler
- c) Tube sampler
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The split tube sampler, used in a test for standard penetration is commonly known as split spoon sampler resting on the bottom of the bore hole which is allowed to sink under its own weight.

6. The total blow required for the second and third 15 cm of penetration in standard penetration test is taken as _____

- a) Seating drive
- b) Penetration resistance
- c) Overburden pressure
- d) Dilatancy/submergence

[View Answer](#)

Answer: a

Explanation: In standard penetration test, the first 15 cm of drive may be considered to be a seating drive. The total blows required for the second and third 15 cm of penetration is termed as the penetration resistance N.

7. The expression for C_n as given by Lio and Whitman is _____

- a) $C_n = \sqrt{(\sigma')}$
- b) $C_n = \sqrt{(100/\sigma')}$
- c) $C_n = 0.77 \log_{10}(2000/\sigma')$
- d) None of the mentioned

[View Answer](#)

Answer: b

Explanation: In 1986, Lio and Whitman gave the following expression for

Normalizing factor C_n :

$$C_n = \sqrt{(100/\sigma')}$$

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8. The cone test is useful in determining the bearing capacity of _____

- a) Cohesion less soil and Fine sand
- b) Clay soil
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The cone test is considered very useful in determining the bearing capacity of pits in cohesion less soils, particularly in fine sands of varying density.

9. The cone resistance q_c , for sandy silt type of soil is _____

- a) 3.5
- b) 6
- c) 2
- d) 5

[View Answer](#)

Answer: c

Explanation: For silts, sandy silts, slightly cohesive silt sand mixture type of soil, the cone resistance q_c is 2.

[Permissible Total and Differential Settlements](#)

1. The analytical methods used for finding bearing capacity of footing is based on _____

- a) Shear failure
- b) Effective pressure
- c) Overburden pressure
- d) Size of the footing

[View Answer](#)

Answer: a

Explanation: The analytical methods for the determination of bearing capacity of footings are based essentially on shear failure.

2. The effect of settlement on structure depends upon its _____

- a) Magnitude and Uniformity
- b) Size
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The effect of settlement upon the structure depends on its magnitude, the length of the time over which it takes place, its magnitude and the nature of the structure itself.

3. The vertical downward movement of the base of the structure is called _____

- a) Penetration resistance
- b) Settlement
- c) Effective pressure
- d) Shear failure

[View Answer](#)

Answer: b

Explanation: The vertical downward movement of the base of the structure is called settlement and its effect depends upon its magnitude and uniformity etc.

4. The allowable pressure, that should be selected for a maximum settlement is _____

- a) 40 mm
- b) 25 mm
- c) 30 mm
- d) 10 mm

[View Answer](#)

Answer: b

Explanation: It is suggested that allowable pressure should be selected such that maximum settlement of any individual foundation is 25 mm.

5. The maximum allowable settlement for warehouses are _____

- a) 25
- b) 38
- c) 50
- d) Less than 0.5

[View Answer](#)

Answer: c

Explanation: The allowable maximum settlement for warehouse type of structure is 50 mm.

6. According to National building code of India, the differential settlement can be kept within limits by _____

- a) Suitably designing the foundation
- b) Decreasing the total settlements
- c) Increasing the allowable pressure.
- d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: According to National Building Code of India (SP: 7-1970) the differential settlement shall be kept within limits to which the super-structure can accommodate itself without the distortion, by suitably designing the foundation.

7. For simple spread footing on clayey soil, the differential settlement should not exceed _____

- a) 1/400
- b) 1/300
- c) 1/100
- d) 1/3

[View Answer](#)

8. According to Polish and Tokar brick masonry will crack, when the unit elongation amounts to _____

- a) 0.5
- b) 0.005
- c) 1.0
- d) 0.05

[View Answer](#)

Answer: b

Explanation: According to Polishin and Tokar (1957), brick masonry will crack due to differential settlement when the unit elongation amount to 0.005.

9. The recommendation of American code, for a differential settlement depends upon _____

- a) Type of structure and Pattern of loading
- b) Settlement depth
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The recommendation of American code are based upon that if the maximum total settlement is kept within a reasonable limit, the differential settlement will only be a fraction depending upon the type of structure and pattern of loading.

10. The rate of differential settlement is defined by which of the following equation?

- a) H/L
- b) L/H
- c) H/H c
- d) None of the mentioned

[View Answer](#)

Answer: b

Explanation: The rate of settlement is defined as the slope or the relative settlement between two points divided by the horizontal distance.

Rate of differential settlement = L/H .

[Types of Foundation](#)

1. Foundations can be broadly classified under _____

- a) Shallow foundation and Deep foundation
- b) Pile foundation
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: Foundations may be broadly classified under two heads: shallow foundations and deep foundations.

2. A foundation is said to be shallow if its depth is _____ than its width.

- a) Equal to and Less than
- b) Greater than
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: According to Terzaghi, a foundation is shallow if its depth is equal to or less than its width. In the case of deep foundations, the depth is equal to or greater than the width.

3. which of the following, is a type of shallow footing?

- a) Spread footing
- b) Pile foundation
- c) Pier foundation
- d) Well foundation

[View Answer](#)

Answer: a

Explanation: The shallow foundations are of the following types: spread footing (or simple footing), strap footing, combined footing, and mat footing or raft footing.

4. Which of the below is the most commonly used shallow foundation?

- a) Strap footing
- b) Spread footing
- c) Combined footing
- d) Raft footing

[View Answer](#)

Answer: b

Explanation: In spread footing, load is transmitted through an isolated column or wall to the subsoil; hence this is most common type of foundation.

5. The pressure intensity beneath the footing depends upon _____

- a) Rigidity of the footing
- b) Soil type

- c) Condition of soil
- d) All of the mentioned

[View Answer](#)

Answer: d

Explanation: Both from observations as well as the analytical studies from elasticity, it is known that the pressure distribution beneath footing is not uniform and it depends on the rigidity of footing, the soil type, and the condition of the soil.

6. Once the pressure distribution is known _____ in the reinforced concrete footing can be calculated.

- a) Bending moment and Shear force
- b) Bearing pressure
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: Knowing the pressure distribution is known, the bending moment and shear force can be calculated, and the thickness of the structural member of the member can be calculated using properties of reinforced concrete.

7. In conventional design, allowable bearing capacity should be taken smaller than which of the following value?

- a) Safe bearing capacity and Allowable bearing pressure
- b) The pressure intensities beneath the footing
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: In conventional design, the allowable bearing capacity should be taken as the smaller of the following two values: i) the safe bearing capacity based on ultimate capacity, and ii) the allowable bearing pressure on tolerable settlement.

8. In cohesive soil, the pressure distribution beneath the footing is _____

- a) Linear
- b) Non linear
- c) Zero
- d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: When a footing rests on cohesive soil, the edge stresses may be very large, but the pressure distribution may be considered to be linear.

9. When do strap footings are used in foundation?

- a) To transfer load of an isolated column
- b) Distance between the columns are long
- c) Two column loads are unequal

d) All of the mentioned

View Answer

Answer: b

Explanation: A strap footing may be used where the distance between the columns is so great that the combined trapezoidal footing becomes quite narrow, with a high bending moment.

10. When two column loads are unequal, which of the possible footing can be provided?

- a) Strap footing
- b) Raft footing
- c) Trapezoidal combined footing
- d) Mat footing

View Answer

Answer: c

Explanation: When the two columns load are unequal, with the outer column carrying a heavier load, and when there is space limitation beyond the outer column, a trapezoidal footing is provided.

Settlement of Footings

1. The total settlement of a footing in clay is considered to be consisting of _____ components.

- a) One
- b) Three
- c) Two
- d) Four

View Answer

Answer: b

Explanation: According to Skempton and Bjerrum, the total settlement of a footing in clay may be considered to consist of three components

$$S = S_i + S_c + S_s.$$

2. The component S_c , used in the total settlement of clay refers to which of the following?

- a) Total settlement
- b) Consolidation settlement
- c) Immediate plastic settlement
- d) Settlement due to secondary consolidation of clay

View Answer

Answer: b

Explanation: The three components used in total settlement of clay are given below:

S_c = consolidation settlement

S_i = immediate elastic settlement

S_s = settlement due to secondary consolidation of clay.

3. The immediate settlement can be computed from the expression, based on _____

- a) Theory of plasticity
- b) Theory of elasticity

- c) Terzaghi's analysis
- d) Pressure distribution

[View Answer](#)

Answer: b

Explanation: The immediate settlement is the elastic settlement and can be computed from the following expression based on the theory of elasticity,

$$S_i = q B (1 - \mu^2 / E_s) I_w.$$

4. The influence factor for rigid square footing is _____

- a) 0.88
- b) 0.82
- c) 1.06
- d) 1.70

[View Answer](#)

Answer: b

Explanation: As suggested by BIS Code IS: 8009 Part 1, 1976 the value of influence factor I_w for rigid footing is 0.82.

5. The equation for computing immediate settlement " $S_i = \mu_0 \mu_1 q B (1 - \mu^2 / E_s)$ " was proposed by _____

- a) Janbu
- b) Bjerrum
- c) Kjaernli
- d) All of the mentioned

[View Answer](#)

Answer: d

Explanation: In 1966, Janbu, Bjerrum, and Kjaernli have proposed the following equation for computing the immediate settlement:

$$S_i = \mu_0 \mu_1 q B (1 - \mu^2 / E_s).$$

6. The value of E_s used in the immediate settlement equation, can be found out using _____

- a) Triaxial test
- b) Compression test
- c) Direct shear test
- d) Rankine's theory

[View Answer](#)

Answer: a

Explanation: The modulus of elasticity E_s used in the equation $S_i = \mu_0 \mu_1 q B (1 - \mu^2 / E_s)$ is computed from triaxial test data, where

$$E_s = (\sigma_1 - \sigma_3) / \Delta L / L.$$

7. A combined footing may be rectangular in shape if both the columns carry _____

- a) Unequal loads
- b) Equal loads

- c) No load
- d) All of the mentioned

View Answer

Answer: b

Explanation: The combined footing may be rectangular in shape if both the columns carry equal loads, or may be trapezoidal if they carry unequal loads.

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8. The influence factor I_w for rigid rectangular footing with $L/B = 1.5$ is _____

- a) 0.88
- b) 0.82
- c) 1.70
- d) 1.06

View Answer

Answer: d

Explanation: $I_w =$ influence factor = 1.06 for rigid rectangular footing, with $L/B = 1.5 = 1.70$ for rigid rectangular footing, with $L/B = 5$.

[Combined Footing and Strap Footing](#)

1. The design of rigid rectangular combined footing consist in determining the _____

- a) Pressure distribution
- b) Location of center of gravity of column
- c) Shear force
- d) Safe bearing pressure

View Answer

Answer: b

Explanation: The design of rigid rectangular footing consists in determining the location of center of gravity of the column loads and using length and width dimension such that centroid of footing and the center of gravity of columns loads coincide.

2. If the independent spread footing of two columns are connected by a beam, it is called _____

- a) Combined footing
- b) Trapezoidal combined footing
- c) Strap footing
- d) Raft footing

View Answer

Answer: c

Explanation: In strap footing, two independent columns are supported by as trap or beam at the bottom.

3. Which of the following condition is true regarding the transfer of load from strap to soil, used in strap footing?

- a) Transfer load to soil

- b) Does not transfer load to soil
- c) Partially transfer to load
- d) None of the mentioned

View Answer

Answer: b

Explanation: The strap used does not remain in contact with soil, and thus does not transfer any pressure to the soil.

4. When the allowable soil is low or the building loads are heavy, the footing used is _____

- a) Raft footing
- b) Strap footing
- c) Trapezoidal combined footing
- d) Rectangular combined footing

View Answer

Answer: a

Explanation: When the allowable soil pressure is low, or the building loads are heavy, the use of spread footings would cover more than one-half of the area and it may prove more economical to use mat or raft foundation.

5. If the resultant of the soil pressure coincides with the resultant of the loads, the soil is pressure is assumed to be _____

- a) Non-uniformly
- b) Uniformly distributed
- c) Zero
- d) None of the mentioned

View Answer

Answer: b

Explanation: If the resultant of the soil pressure coincides with the resultant of the loads and the center of gravity of the footing, the soil pressure is assumed to be uniformly distributed.

6. In designing rectangular combined footing _____ should be adopted as the design value.

- a) Stress distribution
- b) Compression index
- c) Maximum bending moment
- d) Safe bearing pressure

View Answer

Answer: c

Explanation: The maximum bending moment should be adopted as the design value for the reinforced concrete rectangular footing, which should also be checked for maximum shear and bond etc.

7. For a rectangular combined footing, \bar{x} is given as _____

- a) $\bar{x} = L/2$
- b) $L/3 < \bar{x} < L/2$
- c) $\bar{x} = L/3$

d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: For a rectangular combined footing, $\bar{x} = L/2$ and for a trapezoidal combined footing solutions lies between the limits $L/3 < \bar{x} < L/2$.

8. Generally combined footing is assumed to rest on _____

- a) Cohesive soil
- b) Homogeneous soil
- c) Cohesion-less soil
- d) Non homogeneous soil

[View Answer](#)

Answer: b

Explanation: It is assumed that the combined footings are rigid and rests on a homogeneous soil, so as to give rise to a linear stress distribution on the bottom of the footing.

9. The design procedure of strap footing is essentially that of _____

- a) Direct method
- b) Trial and error method
- c) Graphical method
- d) None of the mentioned

[View Answer](#)

Answer: b

Explanation: The designing of strap or cantilever footing is based on trial and error method, it begins with a trial value of e so that the length L_1 is known. The calculations are repeated with another value of e till values of the reactions R_1 and R_2 calculated by both the procedure, coincide.

10. What will be the shape of footing if $a=0$, is substituted in the pressure intensity equation " $q_2 = a \cdot q_s$ "?

- a) Rectangular
- b) Triangular
- c) Trapezoidal
- d) Circular

[View Answer](#)

Answer: b

Explanation: In the pressure intensity equation $q_2 = a \cdot q_s$, if $a=0$ we have a triangle with $\bar{x} = L/3$.

[Mat or Raft Footing](#)

1. The foundation that is used when the soil mass is sufficiently erratic?

- a) Strap footing
- b) Combined footing
- c) Mat footing

d) Rectangular combined footing

[View Answer](#)

Answer: c

Explanation: Mat footing is used where the soil contains compressible lenses or the soil is sufficiently erratic so that the differential settlement would be difficult to control.

2. Usually, rafts are designed as _____

- a) Reinforced slabs
- b) Reinforced concrete flat slabs
- c) Ordinary concrete slab
- d) Inverted flat slabs

[View Answer](#)

Answer: b

Explanation: Ordinarily, rafts are designed as reinforced concrete flat slabs using heavy beams.

3. The weight of the raft is not considered in the structural design, because _____

- a) Weight is carried by subsoil
- b) Raft does not remain contact with soil
- c) The weight is transferred to column
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The weight of the raft is not considered in the structural design because it is assumed to be carried by directly by the subsoil.

4. If a maximum settlement of 50 mm is permitted for a raft, the differential settlement must not exceed

- a) 30 mm
- b) 10 mm
- c) 20 mm
- d) 25 mm

[View Answer](#)

Answer: c

Explanation: A raft may undergo large settlement without causing harmful differential settlement. For this reason, almost double settlement of that permitted for footing is acceptable for raft. Therefore if a maximum settlement of 50 mm (2 in) is permitted for a raft, the differential settlement is not likely to exceed 20 mm (0.75 in).

5. The net ultimate bearing capacity for raft may be determined by _____

- a) Skempton's equation and Terzaghi's equation
- b) Darcy's equation
- c) None of the mentioned

d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The net ultimate bearing capacity may be determined from both Skempton and Terzaghi's equation as given below:

i) Skempton's equation: $q_{nf} = 5 [1 + 0.2D/B] [1 + 0.2B/L]c$

ii) Terzaghi's equation: $q_{nf} = 5.7 [1 + 0.3B/L]c$.

6. In raft footing, if the C.G of the load coincide with the centroid of the raft, the upward load is considered as

a) Non uniform pressure

b) Uniform pressure

c) Excess pressure

d) None of the mentioned

[View Answer](#)

Answer: b

Explanation: If the Center of gravity of the load coincides with the centroid of the raft, the upward load is regarded as a uniform pressure, which will be equal to the downward load divided by the area of the raft.

7. Raft is subdivided in to series of beams to establish _____

a) Shear failure and Moment diagrams

b) Pressure distribution

c) None of the mentioned

d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The raft is subdivided into a series of continuous beams (strips) centered on the appropriate column rows to establish shear failure and moment diagram.

8. The penetration resistance N for designing of raft should be taken at _____ intervals.

a) 50 cm

b) 60 cm

c) 75 cm

d) 20 cm

[View Answer](#)

Answer: c

Explanation: The penetration resistance N values should be taken at 75 cm intervals for a depth equal to width of the raft, below the base of the raft.

9. If the penetration resistance N is less than 5, which of the following measures can be adopted?

a) Using piles and piers and Compacting sand

b) Using inverted flat slab

c) None of the mentioned

d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: If N is less than 5, sand should be compacted by artificial means to rise N above 10, or else piles or piers should be used.

10. The net pressure can be calculated for raft having width greater than _____

- a) 6 m
- b) 20 cm
- c) 30 cm
- d) 4 m

[View Answer](#)

Answer: a

Explanation: Based on the settlement criterion for raft, the net pressure can be calculated from the following equation having its width greater than 6m.

$$q_p = 20(N-3) R_w^2 \text{ kN/m}^2.$$

[Types of Piles](#)

1. The art of driving piles into the ground was first established by _____

- a) Greeks
- b) Romans
- c) Philippians
- d) None of the mentioned

[View Answer](#)

Answer: b

Explanation: The art of driving was first well-established in Roman times and the details of such foundation were recorded by Vitruvius in 59 A.D.

2. Based on the function, piles can be classified into _____ types.

- a) 4
- b) 6
- c) 8
- d) 3

[View Answer](#)

Answer: c

Explanation: Based on the function or the use, piles may be classified as 1) end bearing piles 2) friction piles 3) compaction piles 4) tension pile 5) anchor pile 6) fender pile 7) batter pile 8) sheet pile.

3. Which of the following piles is used to compact loose granular soil?

- a) Friction piles
- b) End bearing piles
- c) Compaction piles

d) Tension piles

[View Answer](#)

Answer: c

Explanation: Compaction piles are used to compact loose granular soil, thus increasing their bearing capacity.

4. Sheet piles are commonly used as _____ in hydraulic structure.

- a) Bulk heads
- b) Bearing stratum
- c) Boulders
- d) Composite piles

[View Answer](#)

Answer: a

Explanation: Sheet piles are commonly used as bulkheads, or as an impervious cutoff to reduce seepage and uplift under the hydraulic structure.

5. The piles that are used for protecting structures from ships and floating object is _____

- a) Anchor piles
- b) Fender piles
- c) Compaction piles
- d) Batter piles

[View Answer](#)

Answer: c

Explanation: Fender piles and dolphins are used to protect waterfront structures against the impact of ships or other floating objects.

6. Modern pile driving method was first invented by _____

- a) Romans
- b) Nasmyth
- c) Terzaghi
- d) Vitruvius

[View Answer](#)

Answer: b

Explanation: Modern pile driving started with the first steam pile drivers, invented by Nasmyth in 1845.

7. The precast concrete piles are generally used for a maximum design load of about _____

- a) 50 tonnes
- b) 100 tonnes
- c) 75 tonnes
- d) 80 tonnes

[View Answer](#)

Answer: d

Explanation: The precast concrete piles are generally used for a maximum design load of about 80 tonnes, except for large pre-stressed piles.

8. Cast-in-situ piles may be classified in to _____ classes.

- a) Three
- b) Eight
- c) Two
- d) Four

[View Answer](#)

Answer: c

Explanation: Cast-in-situ piles can be classified in to two classes: driven piles(cased or uncased) and bored piles(pressure piles, pedestal piles and under reamed piles).

9. Which of the following piles is a cast-in-situ type of concrete pile?

- a) Under-reamed pile
- b) Raymond standard pile
- c) Pressure pile
- d) Anchor pile

[View Answer](#)

Answer: b

Explanation: Raymond standard pile and Raymond step-taper pile are the common types of cast-in-situ piles.

10. Composite piles are suitable for _____

- a) Maximum design load
- b) Project above the water table
- c) Compacting the soil
- d) Protect water front structures

[View Answer](#)

Answer: b

Explanation: Composite piles are suitable where the upper part of a pile is to project above the water table. Such a pile consists of a lower portion of untreated timber and the upper portion of concrete.

11. Piles are commonly driven in to ground by means of special device called _____

- a) Pile driver and Hammer
- b) Driller
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: Piles are commonly driven by means of hammer supported by a crane or by a special device known as pile drivers.

12. The types of hammer used for driving piles are _____

- a) Drop hammer
- b) Diesel hammer
- c) Vibratory hammer
- d) All of the mentioned

View Answer

Answer: d

Explanation: Hammer of the following types: i) drop hammer ii) single acting hammer iii) double acting hammer iv) diesel hammer v) vibratory hammer.

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13. If a hammer is raised by steam and allowed to fall by gravity on top of the pile, it is called as _____

- a) Diesel hammer
- b) Vibratory hammer
- c) Single acting hammer
- d) Drop hammer

View Answer

Answer: c

Explanation: If a hammer is raised by steam, compressed air or internal combustion, but is allowed to fall by gravity alone, it is called as single acting hammer. The energy of such hammer is equal to the weight of the ram times the height of the fall.

14. Single acting hammers provide an advantage in _____ type of soil.

- a) Compact soil and Hard soil
- b) Light weight soil
- c) None of the mentioned
- d) All of the mentioned

View Answer

Answer: a

Explanation: Single acting hammers are advantageous when driving heavy piles in compact or hard piles.

[Load Carrying Capacity of Piles](#)

1. The maximum load which can be carried by a pile is defined as its _____

- a) Ultimate load carrying capacity
- b) Ultimate bearing resistance
- c) Ultimate bearing capacity
- d) All of the mentioned

View Answer

Answer: d

Explanation: The ultimate load carrying capacity, or ultimate bearing resistance or ultimate bearing capacity Q_{up} is

defined as the maximum load which can be carried by a pile and at which the pile continues to sink without further increase of load.

2. The allowable load which the pile can carry safely is determined on the basis of _____

- a) Factor of safety
- b) Load test
- c) Stability of the pile foundation
- d) All of the mentioned

[View Answer](#)

Answer: c

Explanation: The allowable load Q_a is the safe load which the pile can carry safely and is determined on the basis of: i) overall stability of the pile-foundation ii) the permissible settlement iii) ultimate bearing resistance divided by factor of safety.

3. The load carrying capacity of a pile can be determined by which of the following methods?

- a) Dynamic formulae
- b) Static formulae
- c) Plate load test
- d) All of the mentioned

[View Answer](#)

Answer: d

Explanation: The load carrying capacity of a pile can be determined by the following methods: i) Penetration tests ii) Dynamic formulae iii) Static formulae iv) Plate load test.

4. Which of the following are some of the commonly used dynamic formula?

- a) Engineers News formula and Hiley's formula
- b) Static formula
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The Engineers News formula as proposed by Wellington and Hiley's formula given by the original expression of Hiley are the commonly used dynamic formula.

5. When a pile hammer hits the pile, the total driving energy is equal to _____

- a) Weight of hammer times the height of drop
- b) Weight of the ram time times the height of the stroke
- c) Sum of the impact of the ram
- d) Sum of the impact of ram plus the energy delivered by explosion

[View Answer](#)

Answer: a

Explanation: When a pile hammer hits the pile, the total driving energy is equal to the weight of hammer the height of drop or stroke.

6. Dynamic formulae are best suited for _____ type of soil.

- a) Fine grained soil
- b) Coarse grained soil
- c) Cohesive soil
- d) None of the mentioned

[View Answer](#)

Answer: b

Explanation: Dynamic formulae are best suited to coarse grained soils for which the shear strength is independent of rate of loading.

7. Dynamic formula does not indicate about _____

- a) Temporary change in soil structure and Future settlement
- b) Allowable load
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: A disadvantage of a dynamic formula is that it gives no indication about the reduced bearing future settlement or temporary changes in soil structure.

8. The dynamic formula is valueless for which of the following type of soil?

- a) Loose sand
- b) Saturated soil
- c) Clay soil
- d) Compacted soil

[View Answer](#)

Answer: c

Explanation: For clays, the dynamic formulae are valueless because the skin friction developed in clay during driving is very much less than which occurs after a period of time.

9. In dynamic formulae what are the energy losses, that is not accounted?

- a) Energy Loss due to vibration and Energy loss due to heat
- b) Frictional loss
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: In dynamic formulae, the energy loss due to vibrations, heat and damage to dolly or packaging are not taken into account.

10. The greater objection to any of the pile driving formulae is _____

- a) Uncertainty in relation between dynamic and static resistance

- b) Shear strength of the soil
- c) Uncertainty in the allowable pressure
- d) None of the mentioned

View Answer

Answer: a

Explanation: The greater objection to any of the pile driving formulae is the uncertainty about the relationship between the dynamic and static resistance to soil.

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11. The static formula is based on the assumption that the ultimate bearing capacity Q_{up} is equal to _____

- a) $R_f + Q_a$
- b) $R_f + R_p$
- c) $A_s + A_p$
- d) Q_{up} / F

View Answer

Answer: b

Explanation: The static formulae are based on the assumption that the ultimate bearing capacity Q_{up} of a pile is the sum of the total ultimate skin friction R_f and total ultimate point or end bearing resistance R_p :

$Q_{up} = R_f + R_p$.

[Pile Load Tests](#)

1. The pile load test should be performed on _____

- a) Working pile
- b) Test pile
- c) All of the mentioned
- d) None of the mentioned

View Answer

Answer: c

Explanation: The pile load test can be performed on a working pile which forms the foundation of the structure or on a test pile.

2. A Factor of safety that should be adopted for finding an allowable load for a pile is _____

- a) 2.5 and 3
- b) 4
- c) None of the mentioned
- d) All of the mentioned

View Answer

Answer: a

Explanation: The IS code recommends that for working out allowable load, a minimum factor of safety 2.5 or 3 should be used.

3. For pile in cohesive soil _____ is neglected for individual pile action.

- a) Frictional resistance
- b) Surface area of pile
- c) Shear strength of soil
- d) All of the mentioned

[View Answer](#)

Answer: b

Explanation: For the pile in cohesive soil, point bearing is generally neglected for individual pile action, since it is negligible as compared to frictional resistance.

4. The allowable load for the pile is given by _____ equation.

- a) $Q_a = Q_{up} / F$
- b) $Q_a = Q_{up} \times F$
- c) $Q_a = WH / F(S+C)$
- d) $Q_a = WH / 6(S+2.5)$

[View Answer](#)

Answer: a

Explanation: The allowable load Q_p for a pile is given by dividing the ultimate bearing capacity Q_{up} by a suitable factor of safety F .

$$Q_a = Q_{up} / F.$$

5. The separation of Q at any stage of loading into R_p and R_f in cyclic test is based on experimental value found out by _____

- a) Hailey
- b) A.F. Van Weele
- c) A.M. Wellington
- d) MacArthur

[View Answer](#)

Answer: b

Explanation: The separation of Q at any stage of loading into R_p and R_f in cyclic test is based on experimental found value of A.F. Van Weele (1957) that the load on the pile toes (1957) that the load on the pile toe (i.e. R_p) increases linearly with the elastic compression of the soil.

6. The test which can be used for separating load carried by the pile is _____

- a) Cyclic load test
- b) Pile load test
- c) Penetration test
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The cyclic load test is particularly useful in separating the load carried by the pile into the skin friction and point bearing resistance.

7. The result of Dutch cone penetration test can be applied to determine _____

- a) Ultimate skin friction
- b) Total ultimate point
- c) Ultimate bearing capacity
- d) None of the mentioned

[View Answer](#)

Answer: c

Explanation: The result of Dutch cone penetration test can be applied with sufficient accuracy to determine the ultimate bearing capacity of piles in cohesion soils.
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8. The elastic compression ΔL of a pile can be calculated by the expression based on _____

- a) Terzaghi's theory
- b) Hooke's law
- c) Meyerhof's theory
- d) Hiley's formula

[View Answer](#)

Answer: b

Explanation: The elastic compression ΔL of the pile corresponding to any load $Q (= R_f + R_p)$ can be calculated from the following expression based on Hooke's law,
 $\Delta L = (Q - R_f/2) L / AE.$

[Group Action in Piles](#)

1. The efficiency of pile group depends upon _____

- a) Characteristic of pile and Spacing of pile
- b) Bearing capacity of soil
- c) All of the mentioned
- d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: The efficiency of pile group depends upon the following factors: Characteristics of pile (i.e. length, diameter, material etc.), spacing of pile, total number of piles in a row and number of rows etc.

2. Which of the following formulae can be used for determining the efficiency of pile group?

- a) Dynamic formulae
- b) Static formulae
- c) Feld's formulae
- d) Hiley's formulae

[View Answer](#)

Answer: c

Explanation: Converse Labarre formulae, Seiler-kenney formulae, Feld's rule are some of the common formulae available for determining the efficiency of pile group.

3. In which of the following rule, the value of each pile is reduced by one-sixteenth?

- a) Converse Labarre formulae
- b) Feld's formulae
- c) Seiler-Keeney formulae
- d) All of the mentioned

[View Answer](#)

Answer: b

Explanation: According to Feld's rule, the value of each pile is reduced by one-sixteenth on account of the effect of the nearest pile in each diagonal or straight row of which the pile in question is a member.

4. The bearing capacity of a single pile in clay is mainly due to _____

- a) Friction
- b) Shear strength of soil
- c) Allowable load
- d) Ultimate load

[View Answer](#)

Answer: a

Explanation: The bearing capacity of single pile in clay is mainly due to friction, and the friction and the point bearing resistance may be negligible.

5. The downward drag acting on a pile due to the movement of the surrounding is called _____

- a) Skin friction
- b) Negative skin friction
- c) Frictional force
- d) None of the mentioned

[View Answer](#)

Answer: b

Explanation: Negative skin friction is downward drag acting on a pile due to the downward movement of the surrounding compressible soil relative to the pile.

6. The area of the pile group along the failure surface is equal to _____

- a) Perimeter \times Area of cross section
- b) Breadth \times Length
- c) Perimeter \times Length
- d) Perimeter/area of cross section

[View Answer](#)

Answer: c

Explanation: The area of the pile group, along failure surface is approximately equal to the perimeter P of the pile group multiplied by the length L of the pile.

7. The pile spacing of each pile is taken as _____ diameter of the pile.

- a) Four
- b) Five
- c) Three
- d) Ten

View Answer

Answer: c

Explanation: A spacing of three times the diameter of piles is commonly selected as trial spacing between the piles and checked against the criterion that the resistance Q_s obtained.
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8. The settlement of a group of friction piles can be computed on the assumption that _____

- a) Clay is incompressible
- b) Pile below the lower level is ignored
- c) Bearing resistance is zero
- d) None of the mentioned

View Answer

Answer: a

Explanation: As a rough approximation, the settlement of a group of friction piles can be computed on the assumptions that the clay contained between the top of piles is incompressible.

9. The equation used for determining the bearing capacity of a group of friction piles is _____

- a) $Q_{up} = R_f + R_p$
- b) $Q_{ug} = n Q_{up} \cdot \eta_g$
- c) $Q_{ug} = n Q_{up} / \eta_g$
- d) None of the mentioned

View Answer

Answer: b

Explanation: A method of estimating the bearing capacity of a group of friction piles is to multiply the quantity nQ_{up} by a reduction factor called the efficiency of pile group.

$Q_{ug} = n Q_{up} \cdot \eta_g$.

[Reamed Pile Foundations](#)

1. When the under-reamed pile has only one bulb, it is called _____

- a) Multi-under reamed pile
- b) Single-under reamed pile
- c) Unique-under reamed pile
- d) All of the mentioned

View Answer

Answer: b

Explanation: When the pile has only one bulb, it is known as single-under reamed pile, while the pile with more than one bulb is known as multi-under reamed pile.

2. The diameter of the under-reamed pile is kept equal to _____ times the diameter of pile stem.

- a) 4
- b) 5
- c) 2.5
- d) 2

[View Answer](#)

Answer: c

Explanation: Generally the diameter of the under-reamed pile bulb is kept equal to 2.5 times the diameter of pile stem. However, it may vary from 2 to 3 times the stem diameter of pile stem.

3. Under-reamed pile foundation is most suitable for _____ type of condition.

- a) Seasonal moisture change
- b) Dry conditioned soil
- c) Cohesive type of soil
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The under-reamed pile foundation find application in widely varying situations in a type of soils where foundation are required to laid on undesirable effect of seasonal moisture change as in expansive soils.

4. The load carrying capacity of a under-reamed pile may be determined by _____

- a) Safe load test
- b) Penetration test
- c) Pile load test
- d) Cyclic load test

[View Answer](#)

Answer: a

Explanation: The load carrying capacity of an under-reamed pile may be determined from safe load test, in the absence of actual test.

5. The under-reamed piles are connected by a beam known as _____

- a) Capping beam and Grade beam
- b) Reamed beam
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The under-reamed piles are connected by a reinforced concrete beam, known as capping beam or grade beam.

6. The maximum spacing of the under-reamed pile should not normally exceed _____

- a) 2 meters
- b) 2½ meters
- c) 1.5 meters
- d) 30 centimeters

[View Answer](#)

Answer: b

Explanation: The maximum spacing of the under-reamed pile should not normally exceed 2½ m as to avoid heavy capping beams.

7. Under reamed piles are normally bored _____ piles.

- a) Cast-in-situ piles
- b) Pre-cast-piles
- c) Steel piles
- d) Composite piles

[View Answer](#)

Answer: a

Explanation: Under reamed piles are bored cast-in-situ concrete piles having one or more bulbs formed by enlarging the bore hole.

8. The spacing of the piles in under-reamed pile foundation depends on which of the following factor?

- a) Nature of the ground and Type of pile
- b) Load acting on the pile
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The spacing of the piles shall be considered in relation to the nature of the ground, the types of pile and the manner in which the pile transfers the load to the ground.

9. The grade beams are designed for a maximum bending moment of _____ if the beams are supported.

- a) $(wL^2)/50$
- b) $(wL^2)/30$
- c) (wL^2)
- d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: The grade design are designed for a maximum bending moment of $(wL^2)/50$ if the beam are supported during the construction, and for a bending moment of $(wL^2)/30$ if the beams are not supported.

10. The details of the depth of beam and reinforcement required for various loading is provided by _____

- a) Indian standard code

- b) Central Building Research Institute, Roorkee
- c) M.I.T system
- d) None of the mentioned

View Answer

Answer: b

Explanation: Design of grade beam, depth of beam and reinforcement required for various loading is provided by Central Building Research Institute, Roorkee.

[Construction of under – Reamed Pile Foundation](#)

1. The equipment required for construction of a under-reamed pile is _____

- a) Auger boring guide
- b) Spiral auger
- c) Concreting funnel
- d) All of the mentioned

View Answer

Answer: d

Explanation: The equipment required for the construction of pile are i) Auger boring guide ii) spiral auger with extension rods iii) under-reamer with soil bucket and iv) concreting funnel.

2. The use of bore guide in under-reamed pile foundation is essential for _____

- a) To drill the bore hole
- b) To provide a support to the pile
- c) To keep the bore holes vertical
- d) To set the guide assembly in position

View Answer

Answer: c

Explanation: The used of boring guide is essential in order to keep the bore holes vertical and also in its position.

3. Which of the following stages are involved in the construction of under reamed piles?

- a) Concreting of piles and Boring by auger
- b) Concreting the funnel
- c) None of the mentioned
- d) All of the mentioned

View Answer

Answer: a

Explanation: The various stage involved in the construction of under reamed pile foundation are i) boring by auger ii) under-reaming by under-reamer iii) placing reinforcement cage in position iv) concreting of pile caps, plinth beams and curtain walls.

4. The depth of the bore hole is checked at _____ before insertion of the under-reamer.

- a) At the start and At the end

- b) Each time
- c) None of the mentioned
- d) All of the mentioned

View Answer

Answer: a

Explanation: The depth of the bore hole is checked each time before insertion of the under-reamer so that any loose earth spilled from the bucket is removed.

5. Routine tests are usually carried out on _____

- a) Test piles
- b) Working piles
- c) None of the mentioned
- d) All of the mentioned

View Answer

Answer: b

Explanation: Routine test should be carried out on test piles while initial test are preferably carried on test piles.

6. In the process of pile foundation, boring is done with the help of _____

- a) Boring guide
- b) Under-reamer
- c) Spiral auger
- d) Pile beams

View Answer

Answer: c

Explanation: Boring is done with the help of spiral auger, present at the circular collar of the guide assembly.

7. Enlarging the stem of bore hole at the depth is done by using _____

- a) Spiral auger
- b) Under-reamer
- c) Boring guide
- d) None of the mentioned

View Answer

Answer: b

Explanation: Under-reaming or enlarging the stem of bore hole at the required depths is achieved by means of the under-reamer consisting of a set of two collapsible blade assembly.

8. For completion of one under-ream, how many buckets of earth are required for removal?

- a) Five
- b) Ten
- c) Eight

d) Three

[View Answer](#)

Answer: c

Explanation: Generally, removal of eight buckets full of earth is required for completion of one under-ream.

9. Pile groups in under-reamed pile foundation can be tested by means of _____

a) Free standing piles and Pile foundation

b) Cannot be tested

c) None of the mentioned

d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: Pile groups may be tested as both free standing piles or piled foundation by applying series of load.

10. The dimension of the bulb in an under-reamed pile can be checked by _____

a) Meter scale

b) G.I pipe assembly

c) Auger

d) Under-reamer

[View Answer](#)

Answer: b

Explanation: The dimensions of the bulb can be checked by means of a graduated G.I. pipe assembly.

Cased Cast – Situ Concrete Piles

1. Cased cast-in-situ piles are suitable for _____ conditions.

a) Seasonal moisture change

b) Dry condition

c) All ground conditions

d) All of the mentioned

[View Answer](#)

Answer: c

Explanation: Cased cast-in-situ piles are suitable in practically all ground conditions.

2. Bored compaction piles are the modification of _____

a) Composite piles

b) End bearing piles

c) Compaction piles

d) Under-reamed piles

[View Answer](#)

Answer: c

Explanation: Bored compaction piles are the modification of under-reamed piles. These piles are also cast-in-situ piles, same as under-reamed piles.

3. The types of Raymond concrete piles in use are _____

- a) Raymond standard concrete pile and Raymond step-taper pile
- b) Raymond cased pile
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: At present, two types of Raymond piles are in use i) Raymond standard concrete pile and ii) Raymond step-taper concrete pile.

4. The Raymond standard pile is used primarily as a _____

- a) Compaction pile
- b) Tension pile
- c) Friction pile
- d) End bearing pile

[View Answer](#)

Answer: c

Explanation: The Raymond standard pile is used primarily as a friction pile since its uniform heavy taper of 1 in 30 usually results in shorter piles.

5. One of the main advantages of using cased piles are _____

- a) On-the-job-length flexibility and Internal inspection after being driven
- b) Protect concrete fillings
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The advantages of using cased piles are the on-the-job length flexibility, internal inspection after it is driven.

6. Who was the first to develop a method for placing cast-in-situ concrete piles?

- a) McArthur
- b) A.M. Wellington
- c) Raymond
- d) Hiley

[View Answer](#)

Answer: c

Explanation: In 1897, A.A. Raymond patented the Raymond pile system and was first develop a practical, economical way of placing cast-in-situ concrete piles.

7. Raymond concrete pile is reinforced with _____

- a) Corrugated steel shell
- b) Steel mandrel
- c) Steel bars
- d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: The Raymond standard concrete pile consists of thin corrugated sheet steel closed at the bottom that acts as a reinforcement.

8. The type of cased piles used in soil, where the driving is very hard?

- a) McArthur cased pile
- b) Raymond standard pile
- c) Western button bottom piles
- d) Swage pile

[View Answer](#)

Answer: d

Explanation: Swage piles are used with advantage in some soil where it is designed to leave watertight shell for some time before filling the concrete.

9. Western button bottom piles uses _____ for driving.

- a) Concrete plug
- b) Auger
- c) Conical shoe
- d) Under-reamer

[View Answer](#)

Answer: a

Explanation: The western button pile uses a concrete plug, of the shape of a button to form an enlarged hole in the soil for driving.

10. The piles that are suitable for end-bearing to friction friction-load carrying soils is _____

- a) Swage piles
- b) Union metal monotone piles
- c) McArthur cased piles
- d) Western button pile

[View Answer](#)

Answer: b

Explanation: Monotube piles use tapered fluted steel without mandrel, so they are suitable for a wide variety of soil conditions, from end-bearing to friction-load-carrying soils.

[Uncased Cast – Situ Concrete Piles](#)

1. Which of the following is an advantage of using uncased cast-in-situ piles?

- a) They need no storage place
- b) The concrete cannot be damaged by driving
- c) Special equipment is not required
- d) All of the mentioned

[View Answer](#)

Answer: d

Explanation: The uncased piles have the advantage that i) They need no storage place ii) they do not require cutting off excess length iii) do not require special equipment and iv) the concrete is not liable to damage from driving.

2. The types of uncased piles used are _____

- a) Swage pile
- b) McArthur cased pile
- c) Simplex pile
- d) All of the mentioned

[View Answer](#)

Answer: c

Explanation: The following are the common types of uncased cast-in-situ concrete piles:

- i) Simplex pile
- ii) Vibro pile
- iii) Franki pile
- iv) Padestal pile.

3. The uncased cast-in-situ piles can be used only in the condition, where _____

- a) Water should not fall in the hole and Adjacent pile will not damage the concrete
- b) Seasonal condition change
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The uncased piles are used only where it is certain that neither soil nor water will fall in to the hole after withdrawing a driven mandrel or shell and also where adjacent pile will not damage the green concrete.

4. In Franki pile foundation, the bottom of the pile is provided in the shape of _____

- a) Spherical
- b) Mush-room
- c) Cone
- d) Rectangular

[View Answer](#)

Answer: b

Explanation: The Franki pile has an enlarged base of mush-room shape, which gives the effect of a spread footing.

5. Which of the following pile is used, when the ground is soft?

- a) Franki pile
- b) Simplex pile
- c) Vibro-piles
- d) Pedestal piles

[View Answer](#)

Answer: c

Explanation: Vibro-piles are used where the ground is shaft, thus offering little frictional resistance to the flow of concrete.

6. The bearing capacity of vibro-pile can be increased by _____

- a) Increasing its diameter
- b) Elongation of the pile
- c) By using cone-shape base at the bottom
- d) By adding more load

[View Answer](#)

Answer: a

Explanation: The bearing capacity of vibro-expanded piles is increased by enlarging its diameter at the bottom.

7. If tamping of concrete is provided at regular intervals in a simplex pile, it is called as _____

- a) Simplex standard pile
- b) Simplex tamped pile
- c) Tamped standard pie
- d) None of the mentioned

[View Answer](#)

Answer: c

Explanation: In a simplex tamped pile, tamping of green concrete is done after the casing is withdrawn, at regular intervals.

8. The base of an vibro-pile should be in the shape of _____

- a) Conical shoe
- b) Mushroom
- c) Sphere
- d) Rectangle

[View Answer](#)

Answer: a

Explanation: The bottom of a vibro-pile is provided with a conical shoe so that it can be easily driven up to the desired depth.

9. In which of the following piles, alligator jaw point can be used?

- a) Vibro-pile
- b) Pedestal pile

- c) Franki pile
- d) Simplex pile

View Answer

Answer: d

Explanation: In simplex pile if the soil is firm enough to stand, the cast iron shoe at the base is provided with alligator jaw point.

10. Franki piles are best suited for _____ type of soil.

- a) Cohesive soil
- b) Clay
- c) Granular soil
- d) Cohesion less soil

View Answer

Answer: c

Explanation: Franki pile is more useful where a bearing stratum of limited thickness can be reached at a reasonable depth, so they are best suited for the granular type of soil.

Bored Piles

1. There are _____ types of bored piles.

- a) 4
- b) 2
- c) 5
- d) 3

View Answer

Answer: d

Explanation: Bored piles are of three types: i) Pressure piles, ii) under-reamed piles, and iii) Bored compaction piles.

2. In bored pile, concreting is done by using _____

- a) Auger
- b) Casing tube
- c) Under-reamer
- d) Concrete plug

View Answer

Answer: b

Explanation: Bored piles are done by forming a bore hole in the ground and then concreting it, either with the help of a casing tube.

3. A major difference between the procedure of construction in bored piles and cast-in-situ driving piles is

- a) Driving equipment
- b) Method of driving

- c) Concrete filling
- d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: The procedure of construction in bored piles is different than the cast-in-situ driven pile where heavy pile driving equipment is required.

4. The type of bored pile that is suitable for congestion sites?

- a) Under-reamed piles
- b) Bored compaction piles
- c) Pressure piles
- d) Simplex piles

[View Answer](#)

Answer: c

Explanation: Pressure piles are most suitable where heavy pile driving machinery cannot be used and in congested sites because of its compact structure.

5. In pressure piles, the soil is excavated by _____

- a) Casing tube
- b) Under-reamer
- c) Concrete plug
- d) All of the mentioned

[View Answer](#)

Answer: b

Explanation: Boring tool such as auger working inside the steel tube excavates the soil in pressure piles.

6. An advantage of preferring bored piles is _____

- a) The concrete is not liable to damage
- b) Vibration caused by driving can be avoided
- c) They need no storage space
- d) No requirement of special handling equipment

[View Answer](#)

Answer: b

Explanation: Bored piles have an advantage of avoiding vibrations and noise caused by driving of piles.

7. In pressure pile, the frictional resistance is increased by _____

- a) Compression of soil and Rough irregular surface
- b) Bearing capacity
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The diameter of the pile exceeds that of the tube, owing to the compression of soil, and rough irregular surface is formed which increases the frictional resistance of piles.

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8. The bearing value of the pressure pile can be increased by which of the following?

- a) Cement grout
- b) Increasing diameter
- c) Changing the shape of base
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: If it is required to increase the bearing value of the pile, an enlarged base is formed by introducing cement grout after the tube is sunk and forced it by air pressure into the adjacent soil.

[Shapes of Wells and Component Parts](#)

1. The common types of well shape are _____

- a) Rectangular
- b) Dumb bell
- c) Single circular
- d) All of the mentioned

[View Answer](#)

Answer: d

Explanation: The common types of well shapes are: i) single circular ii) Twin circular iii) Dumb-well iv) Double-D v) Twin-hexagonal vi) Twin-octagonal vii) Rectangular.

2. Well are also called as _____

- a) Open caissons
- b) Shell sunk
- c) Caisse
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: Open caissons (“caisson” a French word) are called as wells.

3. _____ forms the most common type of deep foundation for bridges.

- a) Pile foundation
- b) Well foundation
- c) Shallow foundation
- d) Pier foundation

[View Answer](#)

Answer: b

Explanation: In India, well foundation forms the most common type of deep foundation for bridges.

4. The choice of a particular shape for a well depends on _____

- a) Dimension of the base and Cost of sinking
- b) Type of soil condition
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The choice of a particular shape of well depends upon the dimension of the pier or abutment, the care and cost of sinking, the considerations of the tilt and shift during the sinking.

5. What are the types of caissons that can be used as a foundation?

- a) Box caissons and Open caissons
- b) Closed caissons
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The caissons are of three types: i) Box caissons ii) open caissons iii) pneumatic caissons.

6. Which of the following caissons, permits excavation in dry?

- a) Pneumatic caissons
- b) Box caissons
- c) Open caissons
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: A pneumatic caisson has its lower end designed as a working chamber in which compressed air is forced to prevent the entry of water and thus permit excavation in dry.

7. The sinking of the dredge is uniform in which of the following, shapes of well?

- a) Double-D
- b) Rectangular
- c) Circular
- d) Dumb-well

[View Answer](#)

Answer: c

Explanation: As the perimeter of the circle is equidistant at all points from the center of the dredge hole, the sinking is more uniform than other shapes.

8. The components that are needed to be considered in designing of a well foundation is _____

- a) Shape of the well

- b) Sand filing
- c) Bottom plug
- d) Dredge hole

View Answer

Answer: c

Explanation: The following components of a well have to be considered in the design of a well foundation: well curb cutting edge, steining, Bottom plug and well cap.

9. A disadvantage in using circular shape of well foundation is _____

- a) Minimum perimeter
- b) Skin friction is maximum
- c) Diameter of well is more than required
- d) Sinking is more uniform

View Answer

Answer: c

Explanation: The disadvantage of a circular well is that in the direction parallel to the span of the bridge, the diameter of the well is much more than the minimum size required.

10. The most economical shape, of a well for the construction of large pier is _____

- a) Twin circular
- b) Double-D
- c) Rectangular
- d) Single circular

View Answer

Answer: b

Explanation: The dredge area for a double-D shape is smaller when compared to others; hence it can be more economical than a singular circular well.

[Analysis of Well Foundation](#)

1. The selection of the depth of a well is based on which of the following criteria?

- a) Adequate embedded length should be provided and The well should rest on strata of adequate bearing capacity
- b) The perimeter of the well should be minimum
- c) None of the mentioned
- d) All of the mentioned

View Answer

Answer: a

Explanation: The selection of the depth of a well is based on the following two criteria:

- i) There should be the adequate embedded length of well, called the grip length below the lowest scour level.
- ii) The well should be taken deep enough to rest on strata of adequate bearing capacity in relation to the load transmitted.

2. For alluvial soil, the normal scour depth can be calculated by _____ formula.

- a) Rankine's formula
- b) Lacey's formula
- c) Converse Labarre formula
- d) Terzaghi's formula

[View Answer](#)

Answer: b

Explanation: For alluvial soil mostly met with in North Indian Rivers, the normal scour depth can be calculated by Lacey's formula:

$$RL = 1.35(q^2/f)^{1/3}.$$

3. The grip length of well is taken as _____ below the scour level in roads.

- a) $\frac{1}{2}$ R
- b) $1\frac{1}{2}$ R
- c) $\frac{1}{3}$ R
- d) 1 R

[View Answer](#)

Answer: c

Explanation: According to the code of practice of the Indian Road Congress, the grip length is taken as $\frac{1}{3}$ R below the scour level.

4. For piers and abutment, the minimum depth of embedment below the scour level should be taken as _____ m.

- a) 2.0
- b) 1.2
- c) 3
- d) 1.5

[View Answer](#)

Answer: a

Explanation: According to IRC code, it is recommended that the minimum depth of embankment below the scour level should not be less than 2.0 m for piers and abutment with arches and 1.2 m for other types of structures.

5. What are the horizontal forces that are prone to act on a well foundation?

- a) Wind force
- b) Earth pressure
- c) Seismic force
- d) All of the mentioned

[View Answer](#)

Answer: d

Explanation: A well foundation is liable to the following horizontal forces: i) force on account of water current ii) wind forces iii) seismic forces iv) earth pressure v) centrifugal forces.

6. The analysis of well foundation is done based on the assumptions of _____

- a) Banerjee and Gangopadhyay
- b) Lacey
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: Based on the assumptions done by Banerjee and Gangopadhyay in 1960, the analysis of well foundation can be done.

7. The maximum depth of scour at the nose of pier is _____ Lacey's value.

- a) Twice
- b) Thrice
- c) Half
- d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: The maximum depth of scour at the nose of the pier, is found to be twice the Lacey's value of normal scour depth: $R = 2RL$.

8. Coefficient of horizontal soil reaction m , depends on _____

- a) Shape of the area carrying load and Nature of soil
- b) Skin friction
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: Factor m , called the coefficient of horizontal soil reaction depends on the nature of soil, size and shape of the area which carries the load.

9. When a rigid well starts moving parallel, it transforms the soil in to _____

- a) Active and passive states
- b) Rigid state
- c) Loose sand
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: When a rigid soil, embedded in sand, starts moving parallel to its original position under the action of a horizontal force, it transforms the soil on one side to passive state and the other side in to active state.

10. According to Terzaghi and Peck, the ultimate bearing capacity can be determined by which of the following expression?

- a) $Q_f = Q_p + 2\pi R f_s D_f$
- b) $Q_p = \pi R^2(Q_p + 2\pi R f_s D_f)$
- c) $Q_p = 2\pi R f_s D_f$
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: According to Terzaghi and Peck, the ultimate bearing capacity can be determined from the following expression:

$$Q_f = Q_p + 2\pi R f_s D_f$$

Where R = radius of well, D_f = depth of well, f_s = average skin friction.

[Well Curb, Cutting Edge, Steining and Bottom Plug](#)

1. The well curb is designed for which of the following purpose?

- a) For avoiding skin friction
- b) Supporting the weight of well
- c) For designing the well
- d) All of the mentioned

[View Answer](#)

Answer: b

Explanation: The well curb is designed for supporting the weight of the well with well partial support at the bottom of the cutting edge.

2. Which of the following can be assumed for design purpose of well curb?

- a) Three point support of cutting edge
- b) Boulders
- c) Skin friction
- d) Steining

[View Answer](#)

Answer: a

Explanation: A three-point support of the cutting edge resting on a log may be assumed for design purposes of well curb.

3. An effective well curb should withstand _____

- a) Maximum stress
- b) Stress due to sand blows
- c) Its own weight
- d) Blasting

[View Answer](#)

Answer: b

Explanation: The well curb has to withstand stress due to sand blows, as well as due to light blasting required when boulder obstructs the sinking of well.

4. The cutting edge should be provided with an angle of _____

- a) 45°
- b) 60°
- c) 90°
- d) 30°

[View Answer](#)

Answer: d

Explanation: The cutting edge should have as sharp an angle of 30° practicable for knifing into the soil without making it too weak to resist the various stresses induced.

5. A sharp vertical edge for the well is provided at _____

- a) Inner Face of the well
- b) Out of the well
- c) Outside face of the caisson
- d) All of the mentioned

[View Answer](#)

Answer: c

Explanation: A sharp vertical edge or cutting edge should be provided along the outside face of the caisson or open well.

6. At a given depth, the skin friction of the well is equal to _____

- a) Diameter of well
- b) μ times the lateral earth pressure
- c) Stress condition
- d) All of the mentioned

[View Answer](#)

Answer: b

Explanation: The unit skin friction increases with depth, and at a given depth, the skin friction is equal to the coefficient of friction μ times the lateral earth pressure.

7. For loose sand, the value of skin friction is between _____

- a) 0.73-2.93
- b) 4.9-19.5
- c) 1.22-3.42
- d) 3.42-6.84

[View Answer](#)

Answer: c

Explanation: For the purpose of design, the values of skin friction given by Terzaghi and peck may be used:

Silt and soft clay: 0.73-2.93 t/m²

Very stiff clay: 4.9-19.5 t/m²

Loose sand: 1.22-3.42 t/m²

Dense sand: 3.42-6.84 t/m²

Dense gravel: 4.9 -9.4 t/m².

8. Frictional resistance developed during the sinking the well depends on _____

- a) Roughness of the surface of contact
- b) Diameter of the well
- c) Type of soil
- d) Lateral earth pressure

[View Answer](#)

Answer: a

Explanation: Frictional resistance depends on the roughness of the surface of contact. For example, a smoothly plastered well steining surface is said to reduce frictional resistance.

9. The skin friction developed in San Francisco Oakland Bay Bridge, was reduced by, which of the following methods?

- a) By introducing special equipment
- b) By coating smooth oil surface
- c) By decreasing the stress developed
- d) All of the mentioned

[View Answer](#)

Answer: b

Explanation: In order to reduce the skin friction on the in San Francisco Oakland Bay Bridge, a coating which gave a smooth oily surface that was estimated to reduce the friction between the concrete and fairly clay by 40 %.

10. The bottom plug is designed in _____ shape.

- a) Rectangular
- b) Mushroom
- c) Bowl-shaped
- d) Circular

[View Answer](#)

Answer: c

Explanation: The bottom-plug is made in bowl-shaped so as to have inverted arch actions.

[Well Sinking](#)

1. Laying of the well curb in river bed having water, is done by _____

- a) Draining out the water
- b) Diverting the water
- c) Constructing cofferdams
- d) None of the mentioned

[View Answer](#)

Answer: c

Explanation: If water is present in the river, suitable cofferdams are constructed around the site of the well and islands are made.

2. To avoid the setting of the cutting edge unevenly, _____ can be introduced.

- a) Wooden sleepers
- b) Smooth oil surface
- c) Bottom plug
- d) Steining bars

[View Answer](#)

Answer: a

Explanation: It is desirable to insert wooden sleepers below the cutting edge at regular intervals so as to distribute the load and avoid setting of the cutting edge unevenly during concreting.

3. The inside shuttering of the well curb is made up of _____

- a) Steel
- b) Wood
- c) Brick masonry
- d) Concrete

[View Answer](#)

Answer: c

Explanation: The inside shuttering of the well curb is generally made of brick masonry built to proper profile and plastered and the outer shuttering is made by wood or steel.

4. Excavation of soil inside the well in river beds can be done by _____

- a) Auger
- b) Sending in Workers
- c) Special equipment
- d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: Excavation and scooping out of the soil inside the well can be done by sending down workers inside the well till the depth of water inside becomes about 1 m.

5. When the well is sunk deeper, the skin friction is decreased by which of the following method?

- a) Use of phawrah jhams
- b) By tilting and shifting
- c) By applying kentledge
- d) All of the mentioned

[View Answer](#)

Answer: c

Explanation: To overcome the increased skin friction and the loss of weight due to buoyancy when the well is sunk deeper, additional load known as kentledge is applied on the well.

6. Unequal dredging of well causes _____

- a) Collapsing of well

- b) Tilting
- c) Open excavation
- d) Maximum skin friction

[View Answer](#)

Answer: b

Explanation: When the dredging is done unequally tilts and cannot be rectified if the well is sunk to a greater depth.

7. The radius of the well curb should be kept _____ larger than the outside radius of well steining.

- a) 2 cm and 4 cm
- b) 2 m
- c) All of the mentioned
- d) None of the mentioned

[View Answer](#)

Answer: a

Explanation: As a precaution to avoid tilts and shifts, the radius of curb should be kept 2 to 4 cm larger than the outside radius of well steining.

8. To counter act the tilts in the well during sinking operations, which of the following measures can be used?

- a) Regulation of grabbing
- b) Strutting the well
- c) Pushing by jack
- d) All of the mentioned

[View Answer](#)

Answer: d

Explanation: Any of the following measures can usefully be employed to counteract the tilts in the well during sinking operations: i) regulating of grabbing ii) water jetting iii) eccentric loading iv) pulling the well vi) pushing by jacks.

9. In which of the following methods, hydraulic jack is used to counter attack the tilt in the well?

- a) Pulling the well
- b) Eccentric loading
- c) Pushing by jack
- d) Pulling the well

[View Answer](#)

Answer: c

Explanation: In pushing by jack method, the well may be pushed by force applied by hydraulic or mechanical jack on the tilted side of the wall.

10. The method that is used to avoid the further increase in tilt is _____

- a) Pushing by jack
- b) Eccentric loading
- c) Strutting the well

d) Pushing the well

[View Answer](#)

Answer: c

Explanation: Strutting the well method is used to avoid any further increase in the tilt of the well rather than rectifying it.

[Pneumatic Caissons](#)

1. The essential feature of a pneumatic caissons are _____

- a) Tilting can be avoided and Removing water by Compressed air
- b) Skin friction is zero
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The essential feature of a pneumatic caisson is that compressed air is used to exclude or remove water from the working chamber at the bottom.

2. The method of construction of pneumatic caisson is similar to _____

- a) Box caissons
- b) Open caissons
- c) Rectangular caissons
- d) All of the mentioned

[View Answer](#)

Answer: b

Explanation: The method of construction of pneumatic caisson is similar to that for open caissons (well) except that the working chamber is kept air tight.

3. The working chamber of pneumatic caissons are kept airtight because _____

- a) To avoid tilting
- b) To remove the soil
- c) To prevent water from entering the chamber
- d) None of the mentioned

[View Answer](#)

Answer: c

Explanation: In order that sub-soil water may not enter the working chamber, the pressure of air in the shaft is kept airtight.

4. The allowable pressure that is allowed inside the working chamber of pneumatic caissons is _____

- a) 2 kg/cm²
- b) 4 kg/cm²
- c) 3.5 kg/cm²

d) 7 kg/cm²

[View Answer](#)

Answer: c

Explanation: Normally the tolerable air pressure under which a man can work is limited to 3.5 kg/cm² in pneumatic caissons.

5. Advantage of using pneumatic caissons are _____

- a) Affords easy inspection and Process is done under control conditions
- b) Sinking process is easy
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: An advantage of pneumatic caisson is that the entire process of sinking well is carried out under controlled conditions and it affords easy inspection work.

6. Disadvantage of using pneumatic caissons are _____

- a) Process cannot be done under control conditions
- b) Sinking process is tedious
- c) Inspection process is time consuming
- d) All of the mentioned

[View Answer](#)

Answer: b

Explanation: In pneumatic caissons, the sinking of pneumatic caissons are tedious, time consuming and expensive.

7. In order to prevent leakage of air in the working chamber _____ is provided.

- a) Arrangement of double gates
- b) Air compressor
- c) Air lock
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: In order to prevent leakage of air, the arrangement of double gates is provided. The person enters the first gate, where pressure is atmospheric.

8. The limiting head of water value in pneumatic caisson is _____

- a) 40 m
- b) 25 m
- c) 35 m
- d) 50 m

[View Answer](#)

Answer: c

Explanation: As the maximum air pressure is limited to 3.5 kg /cm². the limiting head of water is given by:
 $h_{lim} = 3.5/0.1 = 35 \text{ m}$.

9. In order to assist sinking of well _____ method is used in pneumatic caissons.

- a) Air pressure is reduced and Using explosive
- b) Using airlocks
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: In order to assist sinking process, air pressure may be reduced for a short while. Sometimes explosive may be employed in this case, it is essential to make arrangements for the immediate removal of fall fumes.

10. Pneumatic caissons are closed at _____ during construction.

- a) Bottom
- b) Top
- c) Top and bottom
- d) None of the mentioned

[View Answer](#)

Answer: b

Explanation: Pneumatic caissons are closed at the top and open at the bottom during construction.

[Types of Pavement](#)

1. Which of the following is a classification of pavements?

- a) Load pavement
- b) Sub-grade pavement
- c) Flexible pavement
- d) Rigidity pavement

[View Answer](#)

Answer: c

Explanation: Pavements are classified in to Flexible, rigid and semi-flexible, based on distributing loads.

2. Pavements are classified, based on _____ factors.

- a) Earth surface
- b) Materials used
- c) Rigidity of the pavement
- d) Distributing loads

[View Answer](#)

Answer: c

Explanation: Depending upon the mode of supporting and distributing loads, pavements are classified in to Flexible, rigid and semi-flexible.

3. The thickness design of the flexible pavement is influenced by _____

- a) Distributing load
- b) Strength of sub-grade
- c) Sub-base
- d) Soil properties

[View Answer](#)

Answer: b

Explanation: The design of flexible pavement is based on the principal that a surface load is dissipated by carrying it deep in to the ground through the layer of sub-grade.

4. The essential difference between rigid flexible pavements is _____

- a) Distribution of load over sub-grade
- b) Distribution of load over sub-base
- c) Materials used
- d) Thickness of layers

[View Answer](#)

Answer: a

Explanation: The essential difference between rigid flexible pavements is the manner in which they distribute the load over the sub-grade.

5. Rigid pavement are commonly made of _____

- a) Bitumen
- b) Portland cement concrete
- c) Dry-lean concrete
- d) None of the mentioned

[View Answer](#)

Answer: b

Explanation: Rigid pavements are made up of Portland cement concrete and may or may not have a base course between the pavement and the sub-grade.

6. Which of the following pavement is capable of resisting small tensile strength?

- a) Semi-flexible pavement
- b) Rigid pavement
- c) Flexible pavement
- d) All of the mentioned

[View Answer](#)

Answer: c

Explanation: A flexible pavement consists of relatively thin wearing surface and hence, can resist only very small tensile strength than the other pavement.

7. The wearing surface of pavement are made of _____

- a) Bituminous materials

- b) Portland cement concrete
- c) Dry-lean concrete
- d) Other materials

[View Answer](#)

Answer: a

Explanation: The purpose of wearing course, made of bituminous materials is to provide a smooth riding surface that is re silent and to resist the pressure exerted by the tyres.

8. The stability of sub-grade in a pavement is influenced by _____

- a) Compaction
- b) water contact
- c) Materials used
- d) Rigidity

[View Answer](#)

Answer: b

Explanation: Stability of the sub-grade is influenced by soil texture, water content, density, frost action, shrinkage and swelling and other climatic factors.

9. In pavements, _____ forms the foundation layer.

- a) Base course
- b) Sub-base
- c) Sub-grade
- d) Wearing course

[View Answer](#)

Answer: c

Explanation: The sub-grade is the foundation layer, the structure which must eventually support all the loads which come on to the pavement.

10. Base course and sub-base course are used under flexible pavements for _____ purpose.

- a) To provide foundation
- b) To increase durability
- c) To increase load supporting capacity
- d) All of the mentioned

[View Answer](#)

Answer: c

Explanation: Base course and sub-base course are used under flexible pavements primarily to increase the load supporting capacity of the pavement by distributing the load through a finite thickness of pavement.
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11. The flexible pavement-thickness consists of _____ components.

- a) Two
- b) Three

- c) Four
- d) Five

View Answer

Answer: b

Explanation: Generally, the flexible pavement-thickness consists of three components: surfacing, base and sub-base course.

12. Which of the following pavement can be used, for construction on black cotton soils?

- a) Flexible pavement
- b) Semi-flexible pavement
- c) Rigid pavement
- d) All of the mentioned

View Answer

Answer: c

Explanation: The rigid pavements are used for heavier loads and can be constructed over relatively poor sub-grade such as black cotton or plastic soils, peat etc.

13. Which of the following layer of pavement should withstand a high level of deformation?

- a) Base course
- b) Sub-base
- c) Sub-grade
- d) Surfacing course

View Answer

Answer: a

Explanation: The base course lies close to the pavement surface, and hence it must possess high resistance to deformation in order to withstand high pressure imposed on it.

[Mechanical Stabilisation](#)

1. Stabilisation of soils are most commonly used in _____ engineering works.

- a) Air-field pavements
- b) Foundations of buildings
- c) Pile construction
- d) All of the mentioned

View Answer

Answer: a

Explanation: The most common application of stabilisation is in the construction of roads and air-field pavements.

2. Method of stabilisation can be grouped under _____ main types.

- a) three
- b) two
- c) one

d) four

[View Answer](#)

Answer: b

Explanation: Method of stabilisation may be grouped under two main categories: i) modification of soil property of existing soil without any admixture ii) modification of soil property with the help of admixtures.

3. Example of modification of soil property with the help of admixtures is _____

- a) Compaction
- b) Drainage
- c) Mechanical stabilisation
- d) Particle size distribution

[View Answer](#)

Answer: c

Explanation: Example of modification of soil property with the help of admixtures is: mechanical stabilization, stabilization with cement, lime, bitumen and chemicals etc.

4. The important factors that governs the engineering behavior of soil are _____

- a) Densification
- b) Stabilisation
- c) Tensile strength
- d) Particle size distribution

[View Answer](#)

Answer: d

Explanation: The particle size distribution and composition are the important factors governing the engineering behavior of soil.

5. Mechanical stabilisation of soil involves which of the following operation?

- a) Compaction and Changing the composition of soil
- b) Leveling
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: Mechanical stabilisation involves two operations: i) changing the composition of soil by addition or removal of certain constituents, and ii) densification or compaction.

6. For mechanical stabilized bases, liquid limit should not exceed _____

- a) 35 %
- b) 25 %
- c) 50 %
- d) 10 %

[View Answer](#)

Answer: b

Explanation: For bases, liquid limit should not exceed 25 % and plasticity index must not exceed 6.

7. The properties of a soil under compaction depend upon _____

- a) Swelling
- b) Placement condition
- c) Water content
- d) Permeability

[View Answer](#)

Answer: c

Explanation: The properties of soil under compaction depend upon the water content, amount of compaction, and the type of compaction.

8. The properties of soil that are affected by compaction are _____

- a) Swelling
- b) Water absorption
- c) Permeability
- d) All of the mentioned

[View Answer](#)

Answer: d

Explanation: Compaction has a great effect on soil properties, such as strength and stress-strain characteristics, permeability, compression, swelling, and water absorption.

9. The soil stabilised with cement is called _____

- a) Lime cement
- b) Soil cement
- c) Cementing soil
- d) None of the mentioned

[View Answer](#)

Answer: b

Explanation: The soil stabilised with cement (Portland cement) is usually known as soil cement.

10. The important factor affecting soil cement is _____

- a) Admixtures
- b) Swelling
- c) Water absorption
- d) Permeability

[View Answer](#)

Answer: a

Explanation: The important factors affecting the soil cement are: nature of soil, cement content, conditions of mixing, compaction and curing and admixtures.

11. The binding action of individual particles through cement is possible only in _____ type of soil.

- a) Fine-grained soil
- b) Clayey soil
- c) Coarse-grained soil
- d) All of the mentioned

[View Answer](#)

Answer: c

Explanation: The binding action of individual particles through cement may be only possible in coarse-grained soil. In fine-grained, cohesive soils, only some of the particles can be expected to have cement bonds, and the rest may be bonded through natural cohesion.

[Site Exploration](#)

1. Which of the following is proved to be useful, ongoing over the site?

- a) Excavation
- b) Escarpments
- c) Flood marks
- d) All of the mentioned

[View Answer](#)

Answer: d

Explanation: On going over the site, a study of the following features may be useful: local topography, excavations, cuttings, escarpments, flood marks and evidence of erosion.

2. The methods of site investigation are dependent upon _____

- a) Climatic condition
- b) Nature of engineering project
- c) Local topography
- d) All of the mentioned

[View Answer](#)

Answer: b

Explanation: The methods of site investigation are largely dependent upon the nature of the engineering project and the site.

3. The information that should be yielded on site exploration is _____

- a) Rock formation
- b) Depth of ground water
- c) Structural loading
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: Site exploration should yield precise information about the following: i) the order of occurrence and extent of soil and rock strata ii) the nature and engineering properties of soil, and iii) the location of ground water.

4. In site exploration, depth up to which the increase in pressure is likely to cause shear failure is known as _____

- a) Failure depth
- b) Significant depth
- c) Pressure depth
- d) Depth of exploration

[View Answer](#)

Answer: b

Explanation: Exploration in general, should be carried out to a depth up to which the increase in pressure due to structural loading is likely to cause perceptible failure or shear failure. Such a depth is known as the significant depth.

5. Depending upon the details, the site exploration may be classified as _____

- a) General and Detailed
- b) Complex
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: Depending upon the details or the precision of the sub-soil data to be obtained, the site exploration may be classified as general (or preliminary) and detailed.

6. The general exploration gives information about which of the following features?

- a) Depth of rock
- b) Composition of soil strata
- c) Ground water level
- d) All of the mentioned

[View Answer](#)

Answer: d

Explanation: The general exploration is able to give information about the following:

- i) Depth, extent and composition of soil strata.
- ii) Depth of rock, when necessary
- iii) Ground water level
- iv) Preliminary selection of foundation type
- v) Compressibility of soil strata.

7. For pile foundations, the depth of exploration at the start of the work is _____

- a) 10 meters
- b) 40 meters
- c) 70 meters
- d) 200 meters

[View Answer](#)

Answer: a

Explanation: The depth of exploration at the start of the work or the significant depth, for pile foundation, should be 10 to 30 meters, or more, at least one and a half times the width of the structure.

8. What are the methods used for general exploration?

- a) Subsurface penetration
- b) Ground water exploration
- c) Rock Cuttings
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: Exploratory borings, shallow test pits, subsurface penetration, soundings and geophysical methods are used for general exploration.

9. The feature that helps to estimate the relative density of coarse-grained soil is _____

- a) Soundings
- b) Shallow test pits
- c) Exploratory borings
- d) Geophysical method

[View Answer](#)

Answer: a

Explanation: Penetration and soundings help in estimating the relative density and strength properties of coarse-grained soils and also to locate the weaker strata and lenses.

10. The number and disposition of bore holes are varied, depending upon _____

- a) Surroundings
- b) Strata
- c) Subsoil condition
- d) Ground water

[View Answer](#)

Answer: c

Explanation: Depending upon the subsoil conditions the number and disposition of bore holes are varied, usually in the valley floor, on the abutment etc.
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11. In detailed exploration, the field test is conducted to determine _____

- a) Tensile strength
- b) Rigidity
- c) Permeability
- d) Water content

[View Answer](#)

Answer: c

Explanation: The field test may be conducted for determining the in-situ values of density, bearing capacity, shearing strength, permeability, and pore pressure.

12. The various method of site exploration can be grouped under, which of the following?

- a) Open excavations and Borings
- b) Soil strata
- c) None of the mentioned
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: The various method of exploration may be grouped as follows:

- i) Open excavation
- ii) Borings
- iii) Sub-surface soundings
- iv) Geophysical methods.

13. Exploratory borings in general exploration is carried out by using _____

- a) Auger
- b) Bore equipment
- c) Well curb
- d) All of the mentioned

[View Answer](#)

Answer: a

Explanation: In general exploration, exploratory borings are carried out by auger, auger and shell and by wash boring.

[Method of Site Exploration](#)

1. Hand auger can be used for depths up to _____

- a) 7 m
- b) 6 m
- c) 2 m
- d) 10 m

[View Answer](#)

Answer: b

Explanation: Mechanical augers are used for greater depth and Hand augers are used for depth up to 6 m.

2. Auger boring is used in _____ type of soil.

- a) Cohesion less soil
- b) Cohesive soil
- c) Coarse-grained soil
- d) Pervious soil

[View Answer](#)

Answer: b

Explanation: Augers are used in cohesive and other soft soils above the water table.

3. The type of boring, used for making deep excavations is _____

- a) Cylindrical augers
- b) Percussion boring
- c) Rotary boring
- d) Wash boring

[View Answer](#)

Answer: a

Explanation: Cylindrical augers and shell with cutting edge on teeth at the lower end can be used for making deep boring.

4. Which of the following method is adopted for fast boring?

- a) Cylindrical augers
- b) Percussion boring
- c) Rotary boring
- d) Wash boring

[View Answer](#)

Answer: d

Explanation: Wash boring is a fast and simple method for advancing holes for all types of soils.

5. Rotary boring can also be called as _____

- a) Percussion boring
- b) Wash boring
- c) Core boring
- d) Pit boring

[View Answer](#)

Answer: c

Explanation: Rotary borings are used for rotary drilling and simultaneously obtaining the rock cores or samples. The method is then also known as core boring or core drilling.

6. Auger boring is most suitable for _____ type of work.

- a) Air field pavement
- b) Highway exploration
- c) Dam construction
- d) Buildings

[View Answer](#)

Answer: b

Explanation: Auger boring is fairly satisfactory for highway explorations at shallow depths and for exploring borrow pits.

7. Wash boring cannot be used for _____ type of soil strata.

- a) Cohesive soil

- b) Cohesion less soil
- c) Boulder
- d) All of the mentioned

[View Answer](#)

Answer: c

Explanation: Wash boring cannot be used for strata containing boulders and rocks, as they cannot be penetrated by this method.

8. Mud rotary drilling belongs to _____ type of boring method.

- a) Percussion boring
- b) Rotary boring
- c) Wash boring
- d) Auger boring

[View Answer](#)

Answer: b

Explanation: A drilling mud is forced down in rotary boring, hence the method is also known as mud rotary drilling.

9. The Instruments used in hand augers are _____

- a) Post hole auger
- b) Sand pump
- c) Wash boring apparatus
- d) Stationary piston

[View Answer](#)

Answer: a

Explanation: Helical auger and Post hole auger are the common types of Hand auger in use.

10. The type of boring method that can be used for both rock and soils are _____

- a) Shell boring
- b) Wash boring
- c) Auger boring
- d) Rotary boring

[View Answer](#)

Answer: d

Explanation: Rotary boring or rotary drilling is a very fast method of advancing hole in both rocks and soil by drill rod.

11. The commonly used geophysical method for site exploration is _____

- a) Gravitational method
- b) Electrical resistivity
- c) Magnetic method

d) All of the mentioned

[View Answer](#)

Answer: b

Explanation: The electrical resistivity and seismic refraction methods are the most commonly used for civil engineering purposes.

12. Electrical resistivity method is based on measurement of _____

- a) Specific resistance
- b) Voltage
- c) Potential drop
- d) Current

[View Answer](#)

Answer: a

Explanation: The electrical resistivity method is based on the measurement and recording of changes in the mean resistivity or apparent specific resistance of the various soils.
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13. The method used for studying of horizontal changes in the sub-soil is _____

- a) Resistive soundings
- b) Resistive mapping
- c) Mean resistivity
- d) Critical distance

[View Answer](#)

Answer: b

Explanation: For knowing the horizontal changes in the sub-soil, the electrodes kept at a constant spacing are moved as a group along the line of test. This method is known as resistive mapping.

14. The commonly used penetration test are _____

- a) IS penetration test
- b) Cone penetration test
- c) Dutch standard test
- d) All of the mentioned

[View Answer](#)

Answer: b

Explanation: Standard penetration test and the cone penetration test is the two commonly used penetration test.

15. In the seismic refraction method, the waves sent along the ground surface is picked by _____

- a) Geo satellite instrument
- b) Geophone
- c) Wave detector
- d) All of the mentioned

[View Answer](#)

Answer: b

Explanation: The radiating shock waves created in to the soil at the ground level are picked up by the vibration detector known as a geophone.