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Q : 1) Flow index is-

A: The rate at which a soil mass loses its shear strength with an increase in water content.

B: The rate at which a soil mass gains its shear strength with an increase in water content.

C: The rate at which a soil mass loses its shear strength with a decrease in water content.

D: The rate at which a soil mass gains its shear strength with a decrease in water content.

Q : 2) Consider the following statements:

- 1. When a soil sample is dried beyond its shrinkage limit, the volume of the soil slowly decreases**
- 2. Plastic limit is always lower than the liquid limit for any type of soil**
- 3. At the liquid limit, the soil behaves like a liquid and possesses no shear strength at all**
- 4. When subjected to drying, the volume of the soil remains unchanged once the water content of the soil goes below its shrinkage limit.**

Which of the above statements are correct?

A: 1 and 3 only

B: 1 and 4 only

C: 2 and 3 only

D: 2 and 4 only

Q : 3) At which consistency limit, further reduction of the water content will not decrease the volume of soil mass?

- A: Plastic limit**
- B: Semisolid state**
- C: Liquid limit**
- D: Shrinkage limit**

Q : 4) Swelling of clayey soil directly depends on

A: Percentage of clay fraction

B: Plasticity index of the soil

C: Type of clay minerals

D: Liquid limit of the soil

Q : 5) Which one of these methods is used to find the in-situ density of soil?

- A: Pycnometer method**
- B: Torsion balance method**
- C: Alcohol method**
- D: Rubber balloon method**

Q : 6) A soil sample is subjected to laboratory sieve analysis using a complete set of standard IS sieves. Out of 2 kg of soil used in the test, 800 gram was retained on IS 600 micron sieve, 1000 gram was retained on IS 500 micron sieve and the remaining 200 gram was retained on IS 425 micron sieve. The uniformity co-efficient for the soil is:

A: 1.412

B: 1.2

C: 0.833

D: 0.71

Q : 7) Read the following statement is

- (i) The liquid limit (LL) can be more than 100%**
- (ii) The shear strength of all the soils at plastic is the same**

A: Both (i) and (ii) are correct

B: Both (i) and (ii) are wrong

C: Only (i) is correct

D: Only (ii) is correct

Q : 8) The property of soil to regain its strength from remoulded state after sometime, without loss of moisture content is called:

A: Boiling

B: Thixotropy

C: Quickness

D: Sensitivity

Q : 9) The following index properties were determined for four soils A, B, C and D.

Soil property	A	B	C	D
Liquid limit	0.50	0.49	0.43	0.47
Plastic limit	0.23	0.17	0.21	0.26

Which soil has more plastic index?

A: B

B: C

C: D

D: A

Q : 10) The ratio between liquid limit-water content and plasticity index for a soil mass is called

A: Liquid index

B: Shrinkage ratio

C: Consistency index

D: Toughness index

Q : 11) In a plasticity chart, A-line separates-

A: Clays from silt

B: Clays from sand

C: Silt from organic soils

D: Silt from gravel

Q : 12) The silt has range of size is:

A: 0.002 – 0.075 mm

B: 0.002 – 0.045 mm

C: 0.002 – 0.055 mm

D: 0.02 – 0.065 mm

Q : 13) Which one of the clay mineral has expansive properties?

A: Halloysite

B: Antigorite

C: Kaolinite

D: Montmorillonite

Q : 14) Which of the following is NOT a soil classification system employed in pavements?

A: Bur mister descriptive system

B: Civil aeronautics administration system

C: Casagrande soil classification

D: US department of agriculture system

Q : 15) According to IS classification system, the soils can be classified into

A: 18 groups

B: 15 groups

C: 3 groups

D: 7 groups

Q : 16) The maximum size of clay particle is:

A: 0.1 mm

B: 0.03 mm

C: 0.002 mm

D: 0.0002 mm

Q : 17) 70% of a soil is retained on 75- μ I.S. sieve. 60% of the course fraction is retained on 4,75 mm I.S. sieve. The uniformity coefficient is 5 and the coefficient of curvature is 2. What is the soil designation accordingly to IS classification?

- A: SP (Partly graded sand)**
- B: SW (Well graded sand)**
- C: GP (partly graded gravel)**
- D: GW (Well graded gravel)**

Q : 18) The smallest sieve size according to Indian standards is

A: 0.0045 mm

B: 0.045 mm

C: 0.45 mm

D: 0.154 mm

Q : 19) The correct sequence of plasticity of minerals in soil in an increasing order is

A: Kaolinite, silica, illite, montmorillonite

B: Silica, kaolinite, illite, Montmorillonite

C: Silica, kaolinite, montmorillonite, illite

D: Kaolinite, silica, montmorillonite, illite

Q : 20) Among the following types of water, which one is chemically combined in the crystal structure of the soil mineral and can be removed only by breaking the crystal structure?

A: Structural water

B: Hygroscopic water

C: Capillary water

D: Absorbed water

Q : 21) The property of the soil mass which permits the seepage of water through its interconnecting voids, is called

A: Capillarity

B: Permeability

C: Porosity

D: None of these

Q : 22) Which of the following statement is incorrect in respect to capillarity in soils

A: Gravitational water may be removed from soils by drainage

B: At the water table, the pore water pressure is greater than zero

C: Capillary water is held above the water table by ‘surface tension’

D: Capillary rise is controlled by pore size and not the grain size, and that the same soil mass with the same D₁₀ can have different pore size distributions depending upon soil structure and fabric, geological history etc.

Q : 23) The unit-weight and viscosity of percolating fluid are reduced to 80% and 60% respectively due to rise in temperature. Other things being constant, the change in coefficient of permeability will be:

A" 11.1%

B: 22.2%

C: 33.3%

D: 44.4%

Q : 24) The co-efficient of permeability of a soil is 5×10^{-5} cm/sec for a certain pore fluid. If the viscosity of the pore fluid is reduced to half, the co-efficient of permeability will be:

A: 5×10^{-5} cm/sec

B: 10×10^{-5} cm/sec

C: 2.50×10^{-5} cm/sec

D: 1.25×10^{-5} cm/sec

Q : 25) Coefficient of permeability is inversely proportional to which of the following?

A: Viscosity

B: Effective diameter

C: Unit weight of water

D: Void ratio

Q : 26) Which of the following formations has poor permeability, but seepage is possible?

A: Aquifer

B: Aquiclude

C: Aquifuge

D: Aquitard

Q : 27) Statement (I): Saturated fine, as well as medium, sands of uniform particle size are most susceptible to liquefaction.

Statement (ii): Fine particles reduce the permeability which is a prime factor for liquefaction.

A: Both statements-I and statement-II are individually true and statement-II is the correct explanation of statement-I

B: Both statements-I and statement-II are individually true but statement-II is not the correct explanation of statement-I

C: Statement-I is true but statement-II is false

D: Statement-I is false but statement-II is true.

Q : 28) Radius of influence, R , can be related to draw down in a well, S , and coefficient of permeability, k , in m/s as:

A: $R = 3000 S\sqrt{k}$

B: $R = 1000 S\sqrt{k}$

C: $R = 3000 \sqrt{S} \cdot k$

D: $R = 1000 \sqrt{S} \cdot k$

Q : 29) Consider the following statements:

- (i) Permeability of a soil decreases as the effective stress acting on the soil increases**
- (ii) The presence of organic matter in the soil increase its permeability**
- (iii) Entrapped air decreases the permeability of a soil**

A: (i) only

B: (i) and (ii) only

C: (ii) and (iii)

D: (i) and (iii)

Q : 30) The porosity and specific gravity of solid of a sand lying below a masonry dam as 40% and 2.67 respectively. The maximum permissible upward gradient with a factor of safety 4 is

A: 0.25

B: 0.5

C: 1.0

D: 4.0

Q : 31) During seepage through an earth mass, the direction of seepage is

- A: Parallel to equipotential lines**
- B: Perpendicular to the stream lines**
- C: Perpendicular to the equipotential lines**
- D: Along the direction of gravity**

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Q : 32) Seepage velocity of water in soil is equal to the

A: Discharge velocity divided by porosity

B: Discharge velocity multiplied by porosity

C: Discharge velocity divided permeability

D: Discharge velocity multiplied by permeability

Q : 33) The free fall of hammer for compaction of soil in standard proctor test is

A: 10.5 cm

B: 20.5 cm

C: 30.5 cm

D: 40.5 cm

Q : 34) For road construction, in general, sheep foot rollers are most suitable for which of the following soils?

A: Silt

B: High plasticity clay

C: Sands

D: Gravels

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Q : 35) The basic action involved in sheep foot rolling is-

A: Kneading

B: Pressing

C: Tamping

D: Vibration

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Q : 36) Match List-I (Test) with List-II (Property) and select the correct answer using the codes given below the lists:

List-I (Test)	List-II (Property)
A. Proctor test	1. Grain size analysis
B. Vane test	2. Shear strength
C. Penetration test	3. Bearing capacity
D. Hydrometer test	4. Compaction

Code:

A: 2, 4, 1, 3

B: 4, 2, 1, 3

C: 4, 2, 3, 1

D: 2, 4, 3, 1

Q : 37) Sheep foot rollers are used for:

A: Compacting soil in confined areas and at corners

B: Compacting road and railway embankments of sandy soils

C: Densifying sandy soils over large area and to larger depth

D: Compacting clayey soil fills

Q : 38) The followings soils are compacted at the same compactive effort in the field. Which one of the following is the correct sequence in the increasing order of their maximum dry density?

A: Clay < silty clay < sand < gravel sand clay mixture

B: Silty clay < sand < gravel sand clay mixture < clay

C: Sand < gravel sand < clay mixture < clay < silty clay

D: Sand < clay < silty clay < gravel sand clay mixture

Q : 39) Sheep-foot rollers are recommended for compacting:

A: Hard rock

B: Granular soil

C: Cohesive soil

D: Any type of soil

Q : 40) Compaction is a process of

A: Rearrangement of soil particles by dynamic pressure

B: Rearrangement of soil particles by static pressure

C: Decrease in pore water without replacement by air

D: Changes in water content without change in volume

Q : 41) Pressure induced in isotropic soil due to the force of water in the force of water in the direction of flow is turned as:

A: Passive pressure

B: Negative pore pressure

C: Pore pressure

D: Seepage pressure

Q : 42) The densification of a soil by machines is called

A: Compression curve

B: Compression

C: Compaction

D: Soil stabilization

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Q : 43) Trenching machines can not be used for:

A: Rocks

B: Hard clay

C: Muddy clay

D: Loose material

Q : 44) Consider the following effects as indicative of complete saturation of a soil sample:

- 1. Pore water pressure is positive.**
- 2. Volume of water to volume of voids is equal to 1.**
- 3. Relative density is equal to 1.**

Which of the above statements are correct?

- A: 1 and 2 only**
- B: 1 and 3 only**
- C: 2 and 3 only**
- D: 1, 2 and 3**

Q : 45) The exit gradient of the seepage water through a soil is:

A: Slope of flow line

B: Slope of equipotential line

C: Ratio of total head to the length of seepage

D: ratio of the head loss to the length of the seepage

Q : 46) The piping failure of a hydraulic structure can be prevented by:

A: Increasing pressure due to body forces

B: Increasing the seepage length of the flow

C: Providing filters at down stream end

D: All of these

Q : 47) A rise in the ground water table up to the capillary zone results in

A: A decrease in the degree of saturation

B: An increase in the effective stress

C: A decrease in the effective stress

D: No change in the pore water pressure

Q : 48) A river 5m deep consist of sand bed with saturated unit weight of 20 kN/m³, determine the effective vertical stress at 5 m below the bed of the river. (Take unit weight of water as 9.81 kN/m³)

A: 100 kN/m²

B: 149 kN/m²

C: 51 kN/m²

D: 65 kN/m²

Q : 49) For a standard compaction test, the mass of hammer and the drop of hammer are as follows

A: 2.60 kg. and 450 mm

B: 2.60 kg. and 310 mm

C: 4.89 kg. and 310 mm

D: 4.89 kg. and 450 mm

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Q : 50) The pore water pressure in a capillary zone is

A: Zero

B: Positive

C: Negative

D: Very low