

1. The water content of a highly organic soil is determined in an oven at temperature of:
 - a) 105°C
 - b) 80°C
 - c) 60°C
 - d) 27°C
2. Pycnometer method for water content determination is more suitable for:
 - a) Clay
 - b) Loess
 - c) Sand
 - d) Silt
3. The ratio of the volume of voids to the total volume of soil is:
 - a) Voids ratio
 - b) Degree of saturation
 - c) Air content
 - d) Porosity
4. Dry density of soil is equal to the:
 - a) Mass or solids to the volume of solids.
 - b) Mass of solids to the total volume of soil.
 - c) Density of soil in the dried condition.
 - d) None of the above,
5. The most accurate method for the determination of water content in the laboratory is:
 - a) Sand bath method.
 - b) Oven-drying method.
 - c) Pycnometer method.
 - d) Calcium carbide method.
 - e)
6. A soil sample has a specific gravity of 2.60 and a void ratio of 0.78. The water content required to fully saturate the soil at that void ratio will be
 - a) 20%
 - b) 30%
 - c) 40%
 - d) 60%
7. A soil has a liquid limit of 40% and a plasticity index of 20%. The plastic limit of the soil will be.....
 - a) 20%,
 - b) 30%,
 - c) 40%,
 - d) 60%.
8. The maximum size of particles of silt is
 - a) 75 μ
 - b) 60 μ
 - c) 2 μ
 - d) 0.2 μ
9. The maximum size of particles of clay is
 - a) 0.2 mm
 - b) 0.02 mm
 - c) 0.002 mm
 - d) 0.0002 mm

10. The soils which plot above the A line in the plasticity chart are
a) clays
b) silts
c) sands
d) organic soils
11. The behaviour of clay is governed by
a) Mass energy
b) Surface energy
c) Both (a) and (b)
d) Neither (a) and (b)
12. The plasticity characteristics of clays are due to
a) Adsorbed water
b) Free water
c) Capillary water
d) None of above
13. Capillary rise in a small tube is due to
a) Cohesion
b) Adhesion
c) Both cohesion and adhesion
d) Neither (a) not (b)
13. Compaction of soil is measured in terms of
a) dry density,
b) specific gravity,
c) compressibility,
d) permeability.
14. The permeability of soil varies
a) inversely as square of grain size
b) as square of grain size
c) as grain size
d) inversely as void ratio.
15. The maximum particle size for which Darcy's law is applicable is
a) 0.2 mm
b) 0.5 mm
c) 1.0 mm
d) 2.0 mm
16. The coefficient of permeability of clay is generally.
a) Between 10^{-4} und 10^{-2} mm/s
b) Between 10^{-5} and 10^{-4} mm/s
c) Between 10^{-5} and 10^{-8} mm/s
d) Less then 10^{-8} mm/s
17. A constant-head permeameter is used for
a) Coarse-grained soil
b) Silty soils
c) Clayey soils
d) Organic soils

18. Cohesionless soils are formed due to:

- a) Oxidation
- b) Hydration
- c) Physical disintegration
- d) Chemical decomposition

19. The coefficient of permeability of a soil

- a) Increases with an increase in temperature.
- b) increases with a decrease in temperature.
- c) increases with a decrease in unit weight of water.
- d) decreases with an increase in void ratio.

20. A soil has a discharge velocity of 6×10^{-7} m/s and a void ratio of 0.50. Its seepage velocity is

- a) 18×10^{-7} m/s
- b) 12×10^{-7} m/s
- c) 24×10^{-7} m/s
- d) 36×10^{-7} m/s

21. The phreatic line in a homogeneous dam is

- a) Circular
- b) Elliptical
- c) Hyperbolic
- d) Parabolic

22. The pressure on a phreatic line is

- a) equal to atmospheric pressure.
- b) greater than atmospheric pressure.
- c) less than atmospheric pressure.
- d) not related to the atmospheric pressure.

23. A flow net has 4 flow channels and 20 equipotential drops, the shape factor is

- a) 1/5
- b) 5
- c) 80
- d) None of above

24. If the flow net of a cofferdam foundation has

$h = 6\text{m}$, $N_f = 6$ and $N_d = 18$, $k = 4 \times 10^{-5}$ m/min, then the seepage discharge (in m^3/d) per m length is

- a) 0.2304
- b) 0.1152
- c) 1.0368
- d) 2.304

25. A flow net can be used to determine

- a) Seepage, coefficient of permeability and uplift pressure
- b) Seepage, coefficient of permeability and exit gradient
- c) Seepage, exit gradient and uplift pressure
- d) Seepage and exit gradient only

26. For a flow net with $N_f = 5$ and $N_d = 20$, the shape factor is

- a) 0.25
- b) 4.0
- c) 100
- d) 1.0

26. The critical gradient of a soil increases with

- a) increase in void ratio
- b) decrease in void ratio**
- c) decrease in specific gravity
- d) None of above

27. The exit gradient is equal to the ratio of

- (a) total head to total length
- (b) slope of flow line
- (c) slope of equipotential line
- (d) head loss to length of flow field at exit.**

28. The effective stress is

- a) actual contact stress
- b) an abstract quantity**
- c) equal to total stress
- (cl) None of above

29. The effective stress controls the following properties of soils :

- a) Shear strength
- b) Compressibility
- c) Permeability
- d) All the above**

30. Quick sand is

- a) a type of sand
- b) a condition in which a cohesionless soil loses its strength because of upward flow of water.**
- c) a condition in which a cohesive soil loses its strength.
- d) none of above.

31. The seepage pressure is proportional to

- a) hydraulic gradient
- b) unit weight of water
- c) length of the specimen
- d) all the above.**

32. The water head in the laboratory permeability test must be for the fine soil particles

- a) dropped**
- b) fixed
- c) Changed increasingly
- d) Constant
- e) Non of these

33. Choose the most suitable compacter to compact a trench with width equal to 1.5m filled with soil classified as CM.

- a) Rammer
- b) Sheep-Foot Roller
- c) Nuclear machine
- d) Hand-Held Vibrating Plate**
- e) None of these

34. Rise of water table above the ground surface causes ...

- a) Increase in total stress**

- b) Increase in effective stress
- c) Decrease in effective stress
- d) All of these
- e) None of these

35. With water table lowering, the effective stress will ...

- a) Decreases
- b) **Increases**
- c) Decreases then increases
- d) All of these
- e) None of these

36. The principles of soil mechanics are:

- a) a description of the basic soil properties.
- b) defined the basic soil properties.
- c) **The application of soil properties to the solution of soil engineering problems**
- d) The use of the above soil structure properties to the solution of soil engineering problems.
- e) Solids and voids

37. The role of the void phase is:

- a) **Chemical & physical Interaction**
- b) Crushing the particles
- c) Bending the grains
- d) all of these
- e) None of these

38. GM symbol means:

- a) Gravelly clay soil
- b) Clayey gravel soil
- c) **Gravelly silt soil**
- d) Silty gravel soil
- e) None of these

39) For flow net in Figure 1, the number of flow channels is:

- a) **4**
- b) 6
- c) 8
- d) 9
- e) 10

40) For flow net in Figure 1, the number of drops is:

- a) **7**
- b) 5
- c) 9
- d) 10
- e) 11

41) For flow net in Figure 1, the head difference (H) is:

- a) **3.5**
- b) 5.5
- c) 7.5
- d) 10
- e) 11

42. For flow net in Figure 2, the number of flow channels is:

- a) 5
- b) **3**

- c) 7
- d) 10
- e) 11

43. For flow net in Figure 2, the number of drops is:

- a) 5
- b) 3
- c) 7
- d) 10
- e) 11

44. For flow net in Figure 2, the head difference (H) is:

- a) 50
- b) 40
- c) 70
- d) 100
- e) 110

45. A compacted soil sample using 10% moisture content has a weight of 200 g and mass unit weight of 2.0 g/cm³. If the specific gravity of soil particles and water are 2.7 and 1.0, the degree of saturation of the soil is

- a) 11.1%,
- b) 55.6%,
- c) 69.6%,
- d) none of these.

46. If the flow net of a cofferdam foundation has $h = 6\text{m}$, $N_f = 6$ and $N_d = 18$, $k = 4 \times 10^{-5}$ m/min then the seepage discharge (in m³/day) per m length is

- a) 0.2304
- b) 0.1152
- c) 1.0368
- d) 2.304

47. The high density of the soil placed in a fill is desired in order to ?

- a) increase its shear resistance
- b) reduce future settlements
- c) reduce percolation through the fill
- d) all of these

48. A dry soil sample weighing 100 g has volume of 60 ml and specific gravity 2.5. Its void ratio ?

- a) 0.4
- b) 0.5
- c) 0.6
- d) 0.8

49. The ratio of the unit weight of soil solids to that of water is called ?

- a) void ratio
- b) porosity
- c) specific gravity
- d) degree of saturation

50) The property of a soil which is of great importance in finding settlement of structures, is ?

- a) Permeability
- b) Shear strength
- c) Consolidation
- d) Compressibility

