01. Degree of consolidation is

a. Directly proportional to time and inversely proportional to drainage path
b. Directly proportional to time and inversely proportional to square of drainage path
c. Directly proportional to drainage path and inversely proportional to time
d. Directly proportional to square of drainage path and inversely proportional to time

02. Time factor for a clay layer is

a. A dimensional parameter
b. Directly proportional to permeability of soil
c. Inversely proportional to drainage path
d. Independent of thickness of clay layer

03. If the time required for 50% consolidation of a remoulded sample of clay with single drainage is t, then the time required to consolidate the same degree of consolidation but with double drainage is

a. t/4
b. t/2
c. 2t
d. 4t

04. Clay layer A with single drainage and coefficient of consolidation C takes 6 months to achieve 50% consolidation. The time taken by clay layer B of the same thickness with double drainage and coefficient of consolidation C /2 to achieve the same degree of consolidation is

a. 3 months
b. 6 months
c. 12 months
d. 24 months

05. Coefficient of consolidation for clays normally

a. Decreases with increase in liquid limit
b. Increase with increase in liquid limit
c. First increases and then decreases with increase in liquid limit
d. Remains constant at all liquid limits

06. Direct measurement of permeability of the specimen at any stage of loading can be made

a. Only in fixed ring type consolidometer
b. Only in floating ring type consolidometer
c. Both (a) and (b)
d. None of the above

07. Compressibility of sandy soils is

a. Almost equal to that of clayey soils
b. Much greater than that of clayey soils
c. Much less than that of clayey soils
d. None of the above

08. Select the correct statements.

a. Coefficient of compressibility of an over-consolidated clay is less than that of a normally consolidated clay
b. Coefficient of compressibility of an over-consolidated clay is greater than that of a normally consolidated clay
c. Coefficient of compressibility is constant for any clay
d. None of the above

09. Coefficient of compressibility is

a. Constant for any type of soil
b. Different for different types of soils and also different for a soil under different states of consolidation
c. Different for different types of soils but same for a soil under different states of consolidation
d. Independent of type of soil but depends on the stress history of soil

10. The ultimate consolidation settlement of a structure resting on a soil

a. Decreases with the increase in the initial voids ratio
b. Decreases with the decrease in the plastic limit
c. Increase with the increase in the initial voids ratio
d. Increases with the decrease in the porosity of the soil

11. The ultimate consolidation settlement of a soil is

a. Directly proportional to the voids ratio
b. Directly proportional to the compression index
c. Inversely proportional to the compression index
d. None of the above

12. A normally consolidated clay settled 10 mm when effective stress was increased from 100 kM/m² to 200 kN/ m². if the effective stress is further increased from 200 kN/ m² to 400 kN/ m² then the settlement of the same clay is

a. 10 mm
b. 20 mm
c. 40 mm
d. None of the above

13. Coarse grained soils are best compacted by a

a. Drum roller
b. Rubber tyred roller
c. Sheep's foot roller
d. Vibratory roller

14. With the increase in the amount of compaction energy

a. Optimum water content increases but maximum dry density decreases
b. Optimum water content decreases but maximum dry density increases
c. Both optimum water content and maximum dry density increases
d. Both optimum water content and maximum dry density decreaes.

15. The maximum dry density upto which any soil can be compacted depends upon

a. Moisture content only
b. Amount of compaction energy only
c. Both moisture content and amount of compaction energy
d. None of the above

16. Relationship between dry density yd, percentage air voids n_a water content w and specific gravity G of any soil is

a. $\Upsilon d = \frac{(1+n_a)G\Upsilon_w}{1+wG}$
b. $\Upsilon d = \frac{(1+n_a)G\Upsilon_w}{1-wG}$
c. $\Upsilon d = \frac{(1-n_a)G\Upsilon_w}{1+wG}$
d. $\Upsilon d = \frac{(1-n_a)G\Upsilon_w}{1-wG}$

17. For better strength and stability the fine grained soils and coarse grained soils are compacted respectively as

a. Dry of OMC and wet of OMC
b. Wet of OMC and dry of OMC
c. Wet of OMC and wet of OMC
d. Dry of OMC and dry of OMC

18. Select the incorrect statements.

a. Effective cohesion of a soil can never have a negative value
b. Effective angle of internal friction for coarse grained soils is rarely below 30^0.
c. Effective angle of internal friction for a soil increase as state of compactness increases.
d. Effective angle of internal friction is a complicated function of mineralogy and clay size content.

19. For a loose sand sample and a dense sand sample consolidated to the same mineralogy stress

a. Ultimate strength is same and also peak strength is same
b. Ultimate strength is different but peak strength is same
c. Ultimate strength is same but peak strength of dense sand is greater than that of loose sand
d. Ultimate strength is same but peak strength of loose sand is greater than that of dense sand

20. The shear strength of a soil

a. Is directly proportional to the angle of internal friction of the soil
b. Is inversely proportional to the angle of internal friction of the soil
c. Decreases with increase in normal stress
d. Decreases with decrease in normal stress

21. In a consolidated drained test on a normally consolidated clay, the volume of the soil sample during shear

a. Decreases
b. Increases
c. Remains unchanged
d. First increases and then decreases

22. skempton's pore pressure coefficient B for saturated soil is

a. 1
b. Zero
c. Between 0 and 1
d. Greater than 1

23. Shear strength of a soil is a unique function of

a. Effective stress only
b. Total stress only
c. Both effective stress and total stress
d. None of the above

24. In a deposit of normally consolidated clay

a. Effective stress increase with depth but water content of soil and undrained strength decrease with depth
b. effective stress and water content increase with depth but undrained strength decreases with depth
c. Effective stress and undrained strength increases with depth but water content decreases with depth
d. Effective stress, water content and undrained strength decrease with depth

25. Select the incorrect statement. effective angle of shearing resistance

a. Increases as the size of particles increases
b. Increases as the soil gradation improves
c. Is limited to a maximum value of 45^0
d. Is rarely more than 30^0 for fine grained soil

26. Unconfined compressive strength test is

a. Undrained test
b. Drained test
c. Consolidated undrained test
d. Consolidated drained test

27. A cylindrical specimen of saturated soil failed under an axial vertical stress of $100kN/m^2$ when it was laterally unconfined. The failure plane was inclined to the horizontal plane at an angle of 45^0 the value of cohesion and angle of interval friction for the soil are respectively

a. $0.5\ N/mm^2$ and 30^0
b. $0.05\ N/mm^2$ and 0^0
c. $0.2\ N/mm^2$ and 0^0
d. $0.05\ N/mm^2$ and 45^0

28. In an unconfined compression test on a clay specimen of initial volume V and length L, the area of cross-section at failure is taken as

a. $\frac{V}{L-\Delta L}$
b. $\frac{V+\Delta V}{L-\Delta L}$
c. $\frac{V-\Delta V}{L-\Delta L}$
d. $\frac{V}{L+\Delta L}$

29. The angle that coulomb's failure envelope makes with the horizontal is called

a. Cohesion
b. Angle of internal friction
c. Angle of repose
d. None of the above

30. In a triaxial compression test on a soil specimen, the intermediate principal stress is equal to

a. Major principal stress
b. Minor principal stress
c. Difference between major and minor principal stresses
d. None of the above