01. If the water table rises upto ground surface then the

a. Effective stress is reduced due to decrease in total stress only but pore water pressure does not change
b. Effective stress is reduced due to increase in pore water pressure only but total stress does not change
c. Total stress is reduced due to increase in pore water pressure only but effective stress does not change
d. Total stress is increased due to decrease in pore water pressure but effective stress does not change

02. The critical hydraulic gradient I_c of a soil mass of specific gravity G and voids ratio e is given by

a. $i_c = \frac{G+1}{1-e}$
b. $i_c = \frac{G-1}{1+e}$
c. $i_c = \frac{G+1}{1+e}$
d. $i_c = \frac{G-1}{1-e}$

03. Quick sand is a

a. Type of sand
b. Flow condition occurring in cohesive soils
c. Flow condition occurring in cohesionless soils
d. Flow condition occurring in both cohesive and cohesionless soils

04. The hydraulic head that would produce a quick condition in a sand stratum of thickness 1.5 m, specific gravity 2.67 and voids ratio 0.67 is equal to

a. 1.0 m
b. 1.5 m
c. 2.0 m
d. 3 m

05. Physical properties of a permeant which influence permeability are

a. Viscosity only
b. Unit weight only
c. Both viscosity and unit weight
d. None of the above

06. Select the correct statements

a. The greater the viscosity the greater is permeability
b. The greater the unit weight the greater is permeability
c. The greater the unit weight the smaller is permeability
d. Unit weight does not affect permeability

07. Effective stress on soil

a. Increase voids ratio and decreases permeability
b. Increase both voids ratio and permeability
c. Decrease both voids ratio and permeability
d. Decrease voids ratio and increases permeability

08. If the permeability of a soil is 0.8 mm/sec, the type of soil is

a. Gravel
b. Sand
c. Silt
d. clay

09. Which of the following methods is more suitable for the determination of permeability of clayey soil

a. Constant head method
b. Falling head method
c. Horizontal permeability test
d. None of the above

10. Which of the following methods is best suited for determination of permeability of coarse-grained soils

a. Constant head method
b. Falling head method
c. Both the above
d. None of the above

11. Due to a rise in temperature, the viscosity and the unit weight of the percolating fluid are reduced to 60% and 90% respectively. If other things remain constant, the coefficient of permeability

a. Increase by 25%
b. Increase by 50%
c. Increase by 33.3%
d. Decrease by 33.3%

12. Coefficient of permeability of soil

a. Does not depend upon temperature
b. Increase with the increase in temperature
c. Increase with the decrease in temperature
d. None of the above

13. The average coefficient of permeability of natural deposits

a. Parallel to stratification is always greater than that perpendicular to stratification
b. Parallel to stratification is always less than that perpendicular to stratification
c. Is always same in both directions
d. Parallel to stratification may or may not be greater than that perpendicular to stratification

14. The total discharge from two wells situated near to each other is

a. Sum of the discharges from individual wells
b. Less than the sum of the discharges from individual wells
c. Greater than the sum of the discharges from individual wells
d. Equal to larger of the two discharges from individual wells

15. The flownet for an earthen dam with 30 m water depth consists of 25 potential drops and 5 flow channels the coefficient of permeability of dam material is 0.03 mm/ sec. the discharges per metre length of dam is

a. 0.00018 m^3/sec
b. 0.0045 m^3/sec
c. 0.18 m^3/sec
d. 0.1125 m^3/sec

16. The most suitable method for drainage of fine grained cohesive soils is

a. Well point system
b. Vacuum method
c. Deep well system
d. Electro-osmosis method

17. Total number of stress components at a point within a soil mass loaded at its boundary is

a. 3
b. 6
c. 9
d. 16

18. Boussinesq's influence factor for vertical pressure at depth z and at the centre of a circular area for diameter 'a' carrying uniformly distributed load is

a. $\left[1-\frac{1}{1+\left(\frac{a}{z}\right)^2}\right]^{3/2}$
b. $\frac{3}{2\pi}\left[\frac{1}{1+\left(\frac{a}{z}\right)^2}\right]^{5/2}$
c. $1-\left[\frac{1}{1+\left(\frac{a}{z}\right)^2}\right]^{3/2}$
d. $1-\left[\frac{1}{1+\left(\frac{a}{2z}\right)^2}\right]^{3/2}$

19. The intensity of vertical pressure directly below a concentrated load of 3/2π tonnes at a depth of 3/2 π meters is given by

a. 1t/m^2
b. $\frac{1}{2}t/m^2$
c. $\frac{3}{2}t/m^2$
d. $\left(\frac{3}{2\pi}\right)^{3/2}t/m^2$

20. Vertical stress on a vertical line at a constant radial distance from the axis of a vertical load

a. Is same at all depths
b. Increases with depth
c. First increase, attains a maximum value and then decrease
d. First decrease, attains a minimum value and then increases

21. Phreatic line in an earthen dam is

a. Straight line
b. Parabolic
c. Circular
d. elliptical

22. The hydrostatic pressure on the phreatic line within a dam section is

a. Less than atmospheric pressure
b. Equal to atmospheric pressure
c. Greater than atmospheric pressure
d. None of the above

23. Rate of consolidation

a. Increases with decrease in temperature
b. Increases with increase in temperature
c. Is independent of temperature
d. Is unaffected by permeability of soil

24. The unit of the coefficient of consolidation is

a. Cm^2/gm
b. Cm^2/sec
c. $Gm/cm^2/sec$
d. Gm-cm/sec

25. terzaghi's basic differential equation for one dimensional consolidation of clayey soils is

a. $\frac{\partial \overline{u}}{\partial t} = C_v \frac{\partial \overline{u}}{\partial z}$

b. $\frac{\partial \overline{u}}{\partial z} = C_v \frac{\partial^2 \overline{u}}{\partial t^2}$

c. $\frac{\partial^2 \overline{u}}{\partial t^2} = C_v \frac{\partial \overline{u}}{\partial z}$

d. $\frac{\partial \overline{u}}{\partial t} = C_v \frac{\partial^2 \overline{u}}{\partial z^2}$

26. The slope of isochrones at any point at a given time indicates the rate of change of

a. Effective stress with time
b. Effective stress with depth
c. Pore water pressure with depth
d. Pore water pressure with time

27. Within the consolidation process of a saturated clay

a. A gradual increase in neutral pressure and a gradual decrease in effective pressure takes place and sum of the two is constant
b. A gradual decrease in neutral pressure and a gradual increase in effective pressure takes place and sum of the two is constant
c. Both neutral pressure and effective pressure decrease
d. Both neutral pressure and effective pressure increase

28. The value of compression index for a remoulded sample whose liquid limit is 50% is

a. 0.028
b. 0.28
c. 0.36
d. 0.036

29. Which one of the following clays behaves like a dense sand

a. Over-consolidated clay with a high over-consolidation ratio
b. Over-consolidated clay with a low over-consolidation ratio
c. Normally consolidated clay
d. Under-consolidated clay

30. Coefficient of consolidation of a soil is affected by

a. Compressibility
b. Permeability
c. Both compressibility and permeability
d. None of the above