01. If a cohesive soil specimen is subjected to a vertical compressive load. The inclination of the cracks to the horizontal is

    a. 90^0
    b. 45^0
    c. 22.5^0
    d. 0^0

02. Select the incorrect statements.

    a. In a direct shear box test, the plane of shear failure is predetermined
    b. Better control is achieved on the drainage of the soil in a triaxial compression test.
    c. Stress distribution on the failure plane in the case of triaxial compression test is uniform
    d. Unconfined compression test can be carried out on all types of soils.

03. If the shearing stress is zero on two planes, then the angle between the two planes is

    a. 45^0
    b. 90^0
    c. 135^0
    d. 225^0

04. In the triaxial compression test, the application of additional axial stress (i.e. deviator stress) on the soil specimen produces shear stress on

    a. Horizontal plane only
    b. Vertical plane only
    c. Both horizontal and vertical planes
    d. All planes except horizontal and vertical planes

05. The state of stress on a plane inclined at an angle of 45 to the horizontal plane is represented on the Mohr's circle by a point at which

06. In a triaxial compression test when drainage is allowed during the first stage (i.e application of cell pressure) only and not during the second stage (i.e application of deviator stress at constant cell pressure), the test is known as

    a. Consolidated drained test
    b. Consolidated undrained test
    c. Unconfined drained test
    d. Unconfined undrained test

07. When a soil sample is subjected to a uniformly distributed fluid pressure only in a triaxial compression test, the Mohr representation of the state of stress on sample is
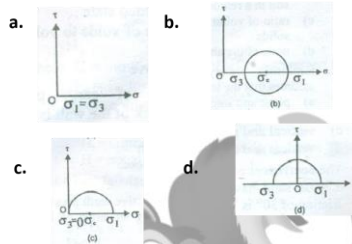
08. When a sample of sand is sheared under undrained condition, then

    a. Volume of dense sand increases and that of loose sand decreases
    b. Volume of dense sand decreases and that of loose sand increases
    c. Volume of both dense sand and loose sand decreases
    d. Volume does not change

09. The ratio of the undisturbed shear strength to the remolded shear strength in cohesive soils under undrained condition is

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

10. During the first stage of triaxial test when the cell pressure is increased from 0.10 N/mm² to 0.26 N/mm² , the pore water pressure increases from 0.07 N/mm² to 0.15 N/mm² Skempton's pore pressure parameter B is

    a. 0.5
    b. - 0.5
    c. 2.0
    d. - 2.0

11. Sensitivity of a soil can be defined as

    a. Percentage of volume change of soil under saturated condition
    b. Ratio of compressive strength of unconfined undisturbed soil to that of soil in a remolded state
    c. Ratio of volume of voids to volume of solids
    d. None of the above

12. Rankine's theory of earth pressure assumes that the back of the well is

    a. Plane and smooth
    b. Plane and rough
    c. Vertical and smooth
    d. Vertical and rough

13. The coefficient of active earth pressure for a loose sand having an angle of internal friction of 30^0 is

    a. 1/3
    b. 3
    c. 1
    d. 1/2

14. The major principal stress in an element of cohesionless soil within the backfill of a retaining wells is

    a. Vertical if the soil is in an active state of plastic equilibrium
    b. Vertical if the soil is in a passive state of plastic equilibrium
    c. Inclined at 45 to the vertical plane
    d. None of the above

15. Passive earth pressure in a soil mass is proportional to

    a. $tan^2 \left(45^0 + \frac{\Phi}{2} \right)$
    b. $\frac{\mu}{(1-\mu)}$
    c. $tan^2 \left(45^0 - \frac{\Phi}{2} \right)$
    d. $cot^2 \left(45^0 + \frac{\Phi}{2} \right)$

Where μ is poisson's ration ϕ is the effective angle of internal friction of soil

16. The effect of cohesion on a soil is to

    a. Reduce both the active earth pressure intensity and passive earth pressure intensity
    b. Increases both the active earth pressure intensity and passive earth pressure intensity
    c. Reduce the active earth pressure in density but to increase the passive earth pressure intensity
    d. Increases the active earth pressure in tensity but to reduce the passive earth pressure intensity.

17. A retaining well 6m high supports a backfill with a surcharge angle of 10^0. The back of the well is inclined to the vertical at a positive batter angle of 5^0 . If the angle of well friction is 7^0 then the sultant active earth pressure will act at a distance of 2 m above the base and inclined to the horizontal at an angle of

    a. 7^0
    b. 10^0
    c. 12^0
    d. 17^0

18. Coefficient of earth pressure at rest is

    a. Less than active earth pressure but greater than passive earth pressure
    b. Greater than active earth pressure but less than passive earth pressure
    c. Greater than both the active earth pressure and passive earth pressure
    d. Less than both the active and passive earth pressures

19. If the top surface of the backfill of a retaining well is inclined to the horizontal at an angle B then the coefficient of passive earth pressure is equal to

a. $\dfrac{cos\beta(cos\beta-\sqrt{cos^2\beta-cos^2\Phi})}{cos\beta+\sqrt{cos^2\beta-cos^2\Phi}}$

b. $\dfrac{cos\beta(cos\beta+\sqrt{cos^2\beta-cos^2\Phi})}{cos\beta-\sqrt{cos^2\beta-cos^2\Phi}}$

c. $\dfrac{cos\beta+\sqrt{cos^2\beta-cos^2\Phi}}{cos\beta(cos\beta-\sqrt{cos^2\beta-cos^2\Phi})}$

d. $\dfrac{cos\beta-\sqrt{cos^2\beta-cos^2\Phi}}{cos\beta(cos\beta+\sqrt{cos^2\beta-cos^2\Phi})}$

Where ϕ is the angle of internal friction of soil

20. The vertical height of an unsupported vertical cut in a cohesive soil is given by

a. $\dfrac{4C}{\gamma}tan\left(45^0+\dfrac{\Phi}{2}\right)$

b. $\dfrac{2C}{\gamma}tan\left(\dfrac{45^0+\Phi}{2}\right)$

c. $\dfrac{4C}{\gamma}cot\left(45^0+\dfrac{\Phi}{2}\right)$

d. $\dfrac{2C}{\gamma}cot\left(45^0+\dfrac{\Phi}{2}\right)$

Where C = unit cohesion
ϕ = angle of internal friction
γ = unit weight of soil

21. Total lateral earth pressure is proportional to

a. Depth of soil
b. Square of depth of soil
c. Angle of internal friction of soil
d. None of the above

22. Cohesive soils are

a. Good for backfill because of low lateral pressure
b. Good for backfill because of high shear strength
c. Poor for backfill because of large lateral pressure
d. None of the above

23. Which of the following earth pressure theories is directly applicable to bulk heads

a. Rankine's theory
b. Coulomb's theory
c. Both
d. None of the above

24. Taylor's stability number is equal to

a. $\dfrac{C}{F_cH}$

b. $\dfrac{C}{F_c\gamma H_c}$

c. $\dfrac{C}{\gamma H}$

d. $\dfrac{C}{\gamma H_c}$

Where C = unit cohesion
F_c = factor of safety with respect to cohesion
γ = unit weight of soil
H_c = critical height
H = actual height

25. For a base failure, the depth factor D_f is

a. Zero
b. 1
c. $0 < D_f < 1$
d. $D_f > 1$

26. Base failure of a finite slope

a. Occurs when soil below the level of toe is strong
b. Occurs when there is a relatively weak zone in upper part of the slope
c. Occurs when the soil below the toe is relatively soft and weak
d. Is a most common failure and occurs in relatively steep slope

27. Bishop's method of stability analysis

a. Is more conservative
b. Neglects the effect of forces acting on the sides of the slices
c. Assumes the slip surface as an arc of a circle
d. Al of the above

28. Allowable bearing pressure for a foundation depends upon

a. Allowable settlement only
b. Ultimate bearing capacity of soil only
c. Both allowable settlement and ultimate bearing capacity
d. None of the above

29. According to rankine's analysis minimum depth of foundation is equal to

a. $\dfrac{q}{\gamma}\left(\dfrac{1+sin\Phi}{1-sin\Phi}\right)^2$

b. $\dfrac{q}{\gamma}\left(\dfrac{1-sin\Phi}{1sin\Phi}\right)^2$

c. $\dfrac{q}{\gamma}\left(\dfrac{1+sin\Phi}{1-sin\Phi}\right)$

d. $\dfrac{q}{\gamma}\left(\dfrac{1-sin\Phi}{1+sin\Phi}\right)$

Where q = intensity of loading
γ = unit weight of soil
ϕ = angle of internal friction

30. According to terzaghi's theory the ultimate bearing capacity at ground surface for a purely cohesive soil and for a smooth base of a strip footing is

a. 2.57 C
b. 5.14 C
c. 5.7 C
d. 6.2 C

where C = unit cohesion of soil