Soil Mechanics II Exit Model Exam

Choose the best answer from the given alternatives.

1. If the entire semi-infinite soil mass is loaded with a load intensity of q at the surface, the vertical stress at any depth is equal to
    A. q
    B. zero
    C. $0.5q$
    D. Infinity
2. Select the incorrect statement.
    A. Unconfined compression test can be carried out on all types of soils.
    B. In a direct shear box test, the plane of shear failure is predetermined.
    C. Better control is achieved on the drainage of the soil in a triaxial compression test.
    D. Stress distribution on the failure plane in the case of triaxial compression test is uniform
3. If the angle of internal friction (F) = 30° for a soil, the angle of failure plane relative to the major principal plane in a triaxial test will be:
    A. 60°
    B. 30°
    C. 45°
    D. 67.6°
4. Basement walls are generally designed for
    A. Active pressure
    B. Passive pressure
    C. At rest pressure
    D. Lateral pressure
5. Two footings one circular and other square are founded on a purely cohesive soil. The diameter of circular footing is the same as the length of side of the square footing then the ration of ultimate bearing pressure of circular to square is
    A. 0.75
    B. 1.33
    C. 1.0
    D. 0.785
6. 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. Unconsolidated drained test
D. Unconsolidated undrained test

7. Rankine's theory of earth pressure assumes that the back of the wall is
   A. Plane and smooth
   B. Plane and rough
   C. Vertical and smooth
   D. Vertical and rough
8. The major principal stress in an element of cohesionless soil within the backfill of a retaining wall 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
9. The effect of cohesion on a soil is to
   A. Reduce both the active earth pressure intensity and passive earth pressure intensity.
   B. Increase both the active earth pressure intensity and passive earth pressure intensity.
   C. Reduce the active earth pressure intensity but to increase the passive earth pressure intensity.
   D. Increase the active earth pressure intensity but to reduce the passive earth pressure intensity.
10. A concentrated load of 10t is applied on a ground surface, the vertical stress induced at a depth of 2 m and radial distance of 1.5 m is
    A. 0.212 t/m^2
    B. 0.391 t/m^2
    C. 0.128 t/m^2
    D. Zero
11. A retaining wall 6m high supports a backfill with a surcharge angle of 10°. The back of the wall is inclined to the vertical at a positive batter angle of 5°. If the angle of wall friction is 7°, then the resultant 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°

B. 10°
C. 12°
D. 17°

12. 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
13. Bishop's method of slope 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. All of the above
14. 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 above
15. The rise of water table below the foundation influences the bearing capacity of soil mainly by reducing
    A. Cohesion and effective angle of shearing resistance
    B. Cohesion and effective unit weight of soil
    C. Effective unit weight of soil and effective angle of shearing resistance
    D. Effective angle of shearing resistance
16. The stress developed at a point in the soil exactly below a point loaded at the surface is
    A. Proportional to the depth of point
    B. Proportional to the square of the depth of point
    C. Inversely proportional to the depth of point
    D. Inversely proportional to the square of the depth of point
17. Select the incorrect statement.
    A. Bearing capacity of a soil depends upon the amount and direction of load.
    B. Bearing capacity of a soil depends on the type of soil.
    C. Bearing capacity of a soil depends upon shape and size of footing.
    D. Bearing capacity of a soil is independent of rate of loading.

18. A 300 mm square bearing plate settles by 15 mm in a plate load test on a cohesive soil when the intensity of loading is 0.2 N/mm^2. The settlement of a prototype shallow footing 1 m square under the same intensity of loading is
    A. 15 mm
    B. 30 mm
    C. 50 mm
    D. 167 mm
19. In the construction of Newmark's chart, if the number of annular areas selected is ten and each annular area is divided into ten sectors, the influence value of chart is
    A. 0.05
    B. 0.005
    C. 0.01
    D. 0.001
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. The major principal stress in an element of cohesion-less soil within the backfill of a retaining wall 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
22. Factor of safety against sliding of a slope, is the ratio of
    A. Actual cohesion to that required to maintain stability of slope
    B. Shear strength to shear stress along the surface
    C. Neither (A) nor (B)
    D. Both (A) and (B)
23. The shearing force acting along the slice of a curved surface of slippage, causes the soil to slide
    A. Down at the center
    B. Down at the toe
    C. Upward at the center
    D. None of these

24. The method of the slices is applicable to
    A. Homogenous soils
    B. Stratified soils
    C. Saturated soils
    D. Non-uniform slopes
25. The intensity of active earth pressure at a depth of 10 meters in dry cohesionless sand with an angle of internal friction of 30° and with a weight of 1.8 t/m^3, is
    A. 4 t/m^2
    B. 5 t/m^2
    C. 6 t/m^2
    D. 7 t/m^2
26. In active state of plastic equilibrium in a non-cohesive soil with horizontal ground surface
    A. Major principal stress is horizontal
    B. Minor principal stress is vertical
    C. Major principal stress is vertical
    D. Minor and major principal stresses are equally inclined to horizontal
27. Which one of the following statements is true for Mohr-Coulomb envelope?
    A. Coulomb suggests that the straight line adequately represents the relationship between shear strength and normal stress.
    B. The generalized Mohr theory suggests that, though the shear stress depends on the normal stress, the relation is not linear.
    C. Coulomb and Mohr suggest that a definite relationship exists among the principal stress and the angle of internal friction.
    D. All the above
28. If drainage is permitted throughout the test, during the application of both normal, and shear stresses so that full consolidation occurs and no excess pore pressure is set up at any stage of the test, is known as
    A. Quick test
    B. Drained test
    C. Consolidated undrained test
    D. None of these
29. According to Coulomb's wedge theory, the active earth pressure slides the wedge
    A. Down and outwards on a slip surface
    B. Up and inwards on a slip surface
    C. Horizontal upward and parallel to base
    D. Horizontal inward and parallel to base

30. In the triaxial compression test, the application of additional axial 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

Answer Key

1	A	16	D
2	A	17	A
3	A	18	C
4	C	19	C
5	C	20	D
6	B	21	A
7	C	22	D
8	A	23	A
9	C	24	A
10	B	25	C
11	C	26	C
12	B	27	D
13	C	28	B
14	C	29	A
15	B	30	D