**PRESIDENCY UNIVERSITY
BENGALURU**

SCHOOL OF ENGINEERING
END TERM EXAMINATION - JAN 2023

Semester : Semester V - 2020
Course Code : CIV3027
Course Name : Sem V - CIV3027 - Foundation Engineering
Program : B.Tech. Civil Engineering

Date : 11-JAN-2023
Time : 9.30AM - 12.30PM
Max Marks : 100
Weightage : 50%

Instructions:
(i) Read all questions carefully and answer accordingly.
(ii) Question paper consists of 3 parts.
(iii) Scientific and non-programmable calculator are permitted.

PART A

ANSWER ALL THE FIFTEEN QUESTIONS   **15 X 2 = 30M**

1. Newmarks Influence Chart derived based on the uniformly loaded
   a) Circular Footing   (CO1) [Knowledge]
   b) Square footing
   c) Rectangle footing
   d) None of these

2. Boussinesq's Formula for Line Loads can be used to estimate vertical stress in the following type of footing/s
   a) Isolated footing   (CO1) [Knowledge]
   b) Strip footing
   c) Both a and b
   d) None of these

3. Select the type of slip/s in compound failure of slope
   a) Rotational slip   (CO1) [Knowledge]
   b) translational slip
   c) Both rotational and translational
   d) None of the above

4. All man made slopes are

    a) Infinite   (CO1) [Knowledge]

    b) Finite

    c) Both a & b

    d) None of these

5. In the active state of earth pressure, retaining wall move

    a) away from backfill   (CO2) [Knowledge]

    b) towards the backfill

    c) either away or towards

    d) None of the above

6. In the stability analysis of retaining wall, factor of safety against sliding depends on

    a) Moments   (CO2) [Knowledge]

    b) Forces

    c) Both A & B

    d) None of the above

7. Presence of water within the backfill causes the active earth pressure to

    a) Decrese   (CO2) [Knowledge]

    b) Increase

    c) Disappear

    d) None of the above

8. The gravity retaining walls are economical upto a height of

    a) 3m   (CO2) [Knowledge]

    b) 20 m

    c) 14m

    d) 8m

9. Ultimate bearing capacity is the function of

    a) Cohesion   (CO3) [Knowledge]

    b) Unitweight of soil

    c) Depth of foundation

    d) All of the above

10. Tensile cracks occur in

    a) Sand   (CO3) [Knowledge]

    b) silt

    c) clay

    d) Gravel

11. The purpose of subsurface exploration is not to obtain

    a) Bearing capacity of soil   (CO3) [Knowledge]

    b) Settlement

    c) Rainfall data

    d) Ground water table

12. Pile group resist the load by means of
    a) Friction   (CO3) [Knowledge]
    b) End bearing
    c) both a & b
    d) None of these

13. All the manmade slopes are
    a) Infinte slopes   (CO1) [Knowledge]
    b) Finite Slopes
    c) Both a and b
    d) None of these

14. For a particular soil, coefficent of earth pressure at rest, active state and passive state was calculated.Which combination is possible for earth pressure coefficent?
    a) Ko- 0.2, Ka- 0.3, Kp-0.4   (CO2) [Knowledge]
    b) Ko- 0.4, Ka- 0.3, Kp-0.4
    c) Ko- 0.3, Ka- 0.2, Kp-0.4
    d) Ko- 0.2, Ka- 0.2, Kp-0.2

15. For designing retaining walls the type of earth pressure is used
    a) At rest pressure   (CO2) [Knowledge]
    b) passive pressure
    c) active pressure
    d) none of these

PART B

ANSWER ALL THE FIVE QUESTIONS   5 X 8 = 40M

16. Slope stability is the process of calculating and assessing how much stress a particular slope can manage before failing. Explain the different safety factors used in the slope stability analysis.

    (CO1) [Comprehension]

17. A group of 9 piles arranged in square pattern was driven into soft clay extending to a large depth. The diameter and length of piles were 30cm and 9m, respectively. If the cohesion of clay is 4500 kg/m2 and the pile spacing is 100 cm centre to centre, what is the safe load capacity of pile group? Assume factor of safety of 2.5 and adhesion factor 0.75.

    (CO3) [Comprehension]

18. A pile foundation is defined as a series of columns constructed or inserted into the ground to transmit loads to a lower level of subsoil. Discuss the classification of piles based on load transfer mechanism and pile materials.

    (CO3) [Comprehension]

19. A circular footing 2.2 m is built in a homogeneous bed of sand of unit weight (γ) 19 kN/Cum. and having an angle of shearing resistance of $36°$. The depth of the base of footing is 1.3 m below the ground surface. Calculate the safe load that can be carried by a footing with a factor of safety of 3 against complete shear failure. Use Terzaghi's analysis. Nc= 65.4, Nq= 49.4, Nγ=54, Sc=1.3, Sγ=0.6.

    (CO3) [Comprehension]

20. Sub-Soil explorations are done for obtaining the information about subsurface conditions at the site proposed for construction. Discuss the content of soil exploration report.

    (CO3) [Comprehension]

PART C

ANSWER ALL THE TWO QUESTIONS   **2 X 15 = 30M**

21. Foundations are constructed to transfer the load from superstructure to soil safely. Consider a strip footing failure below the load carrying wall near Rajanukunte. What are the failure zones will develop according to Terzaghi's theory ? Write with neat sketch. Also explain the general and punching shear failure cases for the given footing.

(CO3) [Application]

22. A rigid retaining wall near 'N' Block, PRESIDENCY UNIVERSITY is 6 m high supports a backfill of cohesionless soil with $\varphi = 35°$. The backfill is dry and has a unit weight of 18 kN/Cum. The surchrge of 100 kN/sq.m is acting on the backfill. Determine (i) Rankine's active earth pressure per meter length of the wall and location of resultant force, (ii) Rankine's passive earth pressure per meter length of the wall and location of resultant force.

(CO2) [Application]

* * * * *