

Roll No.

Total No. of Pages : 02

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B.Tech. (Civil Engg.) / (Civil) (PIT) (Sem.-6)

FOUNDATION ENGINEERING

Subject Code : PECE-602-A-18

M.Code : 79394

Date of Examination : 05-07-22

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Write briefly :

- a) List the factors that affect the depth and spacing of soil exploration.
- b) Where will you suggest use of Auger samplers and Piston samplers?
- c) For a point load of 350 kN, what will be stress at a depth of 10m directly below the applied load?
- d) Write limitations of Plate load test.
- e) Calculate Depth of Tension crack for a clayey soil, having cohesion as 30 kN per sqm and unit wt. as 15kN per cubic meter.
- f) For a unit wt of soil 18 kN/m^3 and angle of internal friction as 30 degree, the load of the structure is 250kN/sqm calculate minimum depth of foundation by Rankine's Analysis.
- g) How will you identify that failure is General or Local shear?
- h) How Test pile is different from Working Pile?
- i) Mention limitations of Dynamic formulae.
- j) Define Tilts and Shifts for wells and mention their acceptable values, as per IRC.

SECTION-B

2. Indirect testing is an important component of site investigation lists the conditions favoring for selection.
3. A smooth vertical wall 4m height retains a soil with $C = 25\text{kN/m}^2$ and unit wt equal to 18kN/m^3 , $\phi = 20^\circ$. If the retaining wall is caused to move towards the soil sufficiently to mobilize passive resistance, draw the pressure distribution and point of application of total passive pressure.
4. A load of 400T is being taken by a column footing of 4.5 m side. The footing rests on silty sand which has a poisson's ratio of 0.28. For evaluating, the Modulus of elasticity for the soil sample was subjected to a load of 5.5kg/sq.cm and strain noted was 0.31%. Work out settlement at center and edge of the footing. Assume the influence factor at centre 1.15 and 0.5 for corner.
5. Using modified Hiley's formula, determine the safe load that can be carried by a pile. The gross weight of the pile is 2500kg, weight of hammer 3500kg, height of fall 90 cm, hammer efficiency 78%, average penetration under the last 5 blows is 10 mm, coefficient of restitution is 0.55 and the factor of safety is 2.5. assume $C = 2.5$ and $e = 0.5$.
6. Why Cyclic Pile test is conducted in the field?

SECTION-C

7. A rectangular footing has a size of 2.0 m \times 4 m has to transmit the load of a column at a depth of 1.5m. Calculate the safe load which the footing can carry at a factor of safety of 3 against shear failure. Use IS code method. The soil has following properties: Porosity, $n = 45\%$; Specific Gravity, $G = 2.65$; water content, $w = 18\%$; Cohesion, $c = 12\text{kN/m}^2$; Angle of shearing resistance $\phi = 32^\circ$; For $\phi = 32^\circ$, $N_c = 36$; $N_q = 23$ and $N_r = 30$. Compare it with Terzaghi's theory also.
8. A retaining wall 10 m high with a vertical back supports a sloping fill angle of 20 degree weighing 18.60 kN/m^3 and having $\phi = 30$ Degree, $\delta = 20^\circ$ and $c = 0$. Determine the total active thrust on the wall weighing by Culmann's graphical method and: verify with any theory.
9. a) Explain Group action of Piles and write expression for finding efficiency.
b) Find the normal scour depth for a well foundation, if the discharge in the river is 450 cubic meters per second, the mean size particle is 0.87mm. Calculate maximum scour depth if the well is to be located, at severe bend.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.