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10CV64

Sixth Semester B.E. Degree Examination, Feb./Mar. 2022

**Geotechnical Engineering – II**

Time: 3 hrs.

Max. Marks:100

*Note: Answer any FIVE full questions, selecting at least TWO questions from each part.*

**PART – A**

- 1 a. Determine the area ratios for the following soil sampling and comment on the nature of samples obtained in each of the samplers:  
(i) Core cutter 165 mmOD 150 mmID  
(ii) Split barrel 51 mmOD 35 mmID  
(iii) Seamless tube 51 mmOD 48 mmID (10 Marks)  
b. With neat sketches, describe Single and Multi Stage Dewatering Technique by well point systems. (10 Marks)
- 2 a. An elevated structure with a total weight of 10,000 kN is supported on a tower with 4 legs. The legs rest on piers located at the corners of a square 6 m on a side. What is the vertical stress increment due to this loading at a point 7 m beneath the centre of the structure? (10 Marks)  
b. A concentrated load of 2000 kN is applied at the ground surface. Determine the vertical stress at a point 'P' which is 6 m directly below the load. Also calculate the vertical stress at a point R which is at a depth of 6m but at a horizontal distance of 5 m from the axis of the load. (10 Marks)
- 3 a. Define the statement of Laplace's equation and also write the assumptions made in the Laplace equation. (08 Marks)  
b. With neat sketch, describe graphical method of flownet construction beneath a Weir/Barrage. (12 Marks)
- 4 a. Define Active and Passive Earth Pressure conditions along with earth pressure at rest. (08 Marks)  
b. Describe graphical solutions of active earth pressure for cohesionless soil by Culmann's or Rebhann's method. (12 Marks)

**PART – B**

- 5 a. What are the different types of slopes and what are the different types of failure of slope along with causes of failure of slopes? (10 Marks)  
b. Describe stability of finite slope by method of slices. (10 Marks)
- 6 a. Determine the allowable gross load and the net allowable load for a square footing of 2m side and with a depth of foundation of 1.0 m. Use Terzaghi's theory and assume local shear failure. Take a factor of safety of 3.0. The soil at the site has  $\gamma = 18 \text{ kN/m}^3$ ,  $C' = 15 \text{ kN/m}^2$  and  $\phi' = 25^\circ$ . Take  $N'_c = 14.8$  and  $N'_q = 5.6$  and  $N'_\gamma = 3.2$ ,  $C'_m = 2/3$ ,  $C' = 10 \text{ kN/m}^2$ . (10 Marks)  
b. With neat sketches, explain the procedure of plate load test. (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

- 7 a. Define:
- (i) Immediate settlement
  - (ii) Primary consolidation settlement
  - (iii) Secondary consolidation settlement
  - (iv) Uniform settlement
  - (v) Differential settlement
- (10 Marks)
- b. A saturated clay 8m thick underlies a proposed new building. The existing overburden pressure at the centre of clay length is 300 KPa and load due to a new building increases the pressure by 200 KPa. The liquid limit of the soil is 75%. Water content of soil is 50% and the specific gravity of soil is 2.7. Estimate consolidation settlement. (10 Marks)
- 8 a. Define shallow and deep foundation along with what are the different type of pile foundation? (10 Marks)
- b. Describe pile load capacity and mention the parts of pile. (10 Marks)

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