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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)**



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- 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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