

Code: 19CE4501B

**III B.Tech - I Semester – Regular Examinations  
JANUARY 2022****FOUNDATION ENGINEERING  
(CIVIL ENGINEERING)**

Duration: 3 hours

Max. Marks: 70

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- Note: 1. This question paper contains two Parts A and B.  
2. Part-A contains 5 short answer questions. Each Question carries 2 Marks.  
3. Part-B contains 5 essay questions with an internal choice from each unit. Each question carries 12 marks.  
4. All parts of Question paper must be answered in one place
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**PART – A**

1. a) What are the main objectives of soil exploration?
- b) What is raft foundation? When is it preferred?
- c) Name the different shapes of well foundations?
- d) What are the types of earth pressures based on wall movement?
- e) What are the different methods used for analysis of finite slope?

**PART – B****UNIT – I**

2. a) Write a short note on 8 M
  - i) Cone penetration test
  - ii) Dutch cone test
- b) The external dia of sampling tube is 75 mm. if the area ratio required is 10%, determine the thickness of sampling tube. 4 M

**OR**

3. a) What is depth of exploration? Explain it neatly for some soil structures. 6 M
- b) A seismic refraction test was conducted on a site soil and the following data was observed 6 M
- i) Plot time travel data and determine the seismic velocity for the surface and underlying layer.
- ii) Determine thickness of upper layer

Distance from impact point to geophone (m)	20	40	60	80	100	120
Time receive waves (s)	0.023	0.046	0.095	0.11	0.12	0.13

**UNIT – II**

4. a) Explain about the types of bearing capacity failures? 3 M
- b) A footing size of 1.5 m is rests at a depth of 1.2 m from the ground surface. The properties of foundation soil are  $\phi = 20^\circ$ ,  $\gamma = 18 \text{ kN/m}^3$ ,  $C = 15 \text{ kN/m}^2$ . Compute the safe bearing capacity for the footing when its type is
- i) Continuous      ii) Square      iii) Circular
- Assume the water table is at a great depth and the failure is General Shear Failure. Consider  $N_c = 7.7$ ,  $N_q = 7.4$ ,  $N_\gamma = 5.0$  and F.S as 3.

OR

- a) What are the factors affecting the bearing capacity of soils? 5 M
5. b) A 1.5m square footing is founded at depth of 1.5m in soil for which the corrected N value is 28. The water 7 M

table is at a depth of 2.4m. Determine the net allowable bearing pressure for a permissible settlement of 35mm. Take F.S of 2.5 against shear failure.

### UNIT-III

6. a) Explain about the Feld's rule to estimate the pile capacity? 5 M
- b) A RCC pile of 18 m overall length is driven into a deep stratum of soft clay having an UCS of  $35 \text{ kN/m}^2$ . The diameter of the pile is 30 cm. Determine the safe load that can be carried by the pile with a F.S of 3.0. 7 M

OR

7. a) What is the need of well foundation? Explain the various components in well foundation? 6 M
- b) What is shift and tilt? Explain about the remedial measures to rectify them? 6 M

### UNIT – IV

8. a) Differentiate Rankin's and Coulomb's theories of earth pressure. 5 M
- b) A retaining wall of height 8 m, retains a cohesion less soils of backfill. The top 3m of fill has a unit weight of  $18 \text{ kN/m}^3$  and  $\phi = 35^\circ$ , and the rest has a unit weight of  $22 \text{ kN/m}^3$  and  $\phi = 25^\circ$ . Determine the pressure distribution on wall. Assume water table at 3m depth. 7 M

OR

9. a) Explain about the various types of coffer dams with neat sketches? 5 M
- b) A retaining wall 6m height supports earth with its space vertical. The earth is cohesion less with specific gravity of 2.62,  $\phi = 35^\circ$ , Porosity (n) = 39.5%. Earth pressure is

horizontal and level with the top of the wall. Determine the earth crust and line of action, if the earth is water lagged to a level of 2.5 m below the top of the surface?

**UNIT – V**

10. a) Explain the method of slices for stability analysis of slopes. How can steady seepage be accounted for in this method? 6 M
- b) The unit weight of soil of slope  $30^\circ$  is  $17.5 \text{ kN/m}^3$ . The shear parameters  $c$  and  $\phi$  for soil are  $10 \text{ kN/m}^2$  and  $20^\circ$  respectively. Given the height of the slope is 12 m and the stability number from the chart is 0.025. Compute its factor of safety. 6 M

OR

11. a) Explain the friction circle method for stability analysis of slopes. 5 M
- b) Find the critical height of the slope of infinite extent having slope angle of  $30^\circ$ . The slope is made of stiff clay having  $C = 20 \text{ kN/m}^2$ ,  $\phi = 20^\circ$ , void ratio = 0.7 and specific gravity is 2.7. 7 M
- Consider for the following conditions
- i) dry
  - ii) submerged
  - iii) seepage parallel to the slope