

Total Number of printed pages = 3

19/6th Sem/UCE 604

2022

FOUNDATION ENGINEERING

Full Marks – 100

Time – Three hours

The figures in the margin indicate full marks
for the questions.

Answer *all* questions.

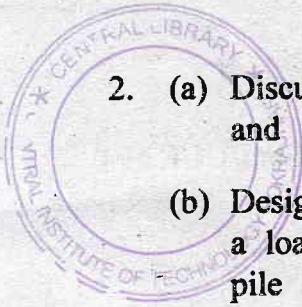
1. (a) Sketch a complete well foundation for a bridge pier. What are the criteria for the selection of depth of well foundation?

5+3=8

- (b) A square footing $3\text{m} \times 3\text{m}$ has to carry a uniformly distributed load of 150 kN/m^2 . Plot the vertical stress intensity due to this load on a horizontal plane at a depth of 2.5m below the base of footing at an interval of each 1m from the line of application of load up to 5m on each side.

12

[Turn over



2. (a) Discuss the different types of soil samples and soil samplers. 3+5=8

(b) Design a group of concrete pile to support a load of 250t inclusive of the weight of pile cap. The subsoil consist of clay extending to a great depth having an UCS of 5t/m² and an effective unit weight of 1.6t/m³, FOS = 2.5 and adhesion factor = 0.9. 12

3. (a) Describe the plate load test. What are its limitations? 7+3=10

(b) Describe about bore log by preparing one sample bore log. 6

(c) Explain about the efficiency of a pile group. 4

4. (a) Determine the gross load that can be carried by a square footing of width 2.2m. The footing is to be founded at a depth of 1.2m below the ground level. The properties of the soil are : $\gamma = 16.8 \text{ kN/m}^3$, $c = 12 \text{ kPa}$ and $\phi = 20^\circ$. Assume a local share failure and adopt a factor of safety of 3. Given Terzaghi's bearing capacity factor for $\phi = 20^\circ$:

$$N_c = 11.8, N_q = 3.8, N_\gamma = 1.3 \quad 10$$

(b) What are stone columns? Discuss the different methods of installation of stone columns and indicate their relative merits and demerits. 10

5. (a) Write short notes on the following:

5×2=10

(i) Wash boring

(ii) Cement stabilization of soil.

(b) Describe the different bearing capacity failures with neat sketches. 10

