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 3m×3m 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 $5t/m^2$ and an effective unit weight of $1.6t/m^3$, 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 : $\gamma = 16.8\ kN/m^3$, c = 12 kPa and $\emptyset = 20°$. Assume a local share failure and adopt a factor of safety of 3. Given Terzaghi's bearing capacity factor for $\emptyset = 20°$:

   $N'c = 11.8,\ N'q = 3.8,\ N'\gamma = 1.3$ 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