1430

Geotechnical Engineering - II
(1080)

P. Pages : 3

Time : Three Hours   **Max. Marks : 100**

Instructions to Candidates :
1. Do not write anything on question paper except Seat No.
2. Answersheet should be written with blue ink only. Graph or diagram should be drawn with the same pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. Answer **any two** question from each unit.
5. Attempt complete question at one place only.
6. Use of non-programmable calculator is allowed.

UNIT - I

1. a) What are the objectives of soil investigations ?   **5**

   b) Define :   **5**

   i) Area ratio

   ii) Density index.

   iii) Significant depth.

   iv) Undisturbed sample.

   v) Recovery ratio.

2. A foundation in a loose sand is 4 m wide, 6m long and 1.5m deep. The soil weighs 16 kN/m^3 and has an angle of internal friction 32°. Compute the safe bearing capacity adopting a factor of safety of 2.   **10**

3. Differentiate between.

   i) General shear failure & local shear failure.   **5**

   ii) Representative sample & undisturbed sample.   **5**

UNIT - II

4. Explain causes of settlement.   **10**

5. The plan of a proposed spoil heap is shown in the fig. The heap will stand on a thick deposit of soft clay with E value 15 MN/m^2. The uniform pressure on the soil may be assumed as 150 kN/m^2. Estimate the immediate settlement under the point marked x at the surface of soil $\mu = 0.5$. **10**

L / B	Center	Corner	Avg.
1	1.12	0.56	0.95
2	1.53	0.77	1.31

If value table
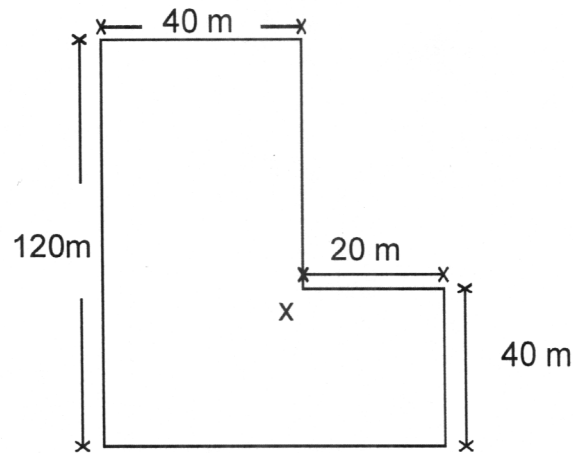
6. Explain

i) Pressure bulb. **5**

ii) Contact pressure. **5**

UNIT - III

7. A plate load test was carried out on a ground having a uniform sand stratum upto sufficient depth. The size of the plate used was 0.3 m x 0.3 m. **10**

Load (kN)	4.5	9	18	27	36	45	54
Settlement (mm)	0.75	1.25	2.0	3.5	5.38	7.75	10.75

Plot the load settlement curve. Also determine the bearing capacity and load that can carry by a column footing of size 1.2m x 1.2m is this soil for an allowable settlement of 2 cm.

8.   A building is to be supported on a RCC raft foundation of dimensions 12 m x 18 m. The subsoil is clay which has an average unconfined compressive strength of 15 kN/m^2. The pressure on the soil due to the weight of the building and the loads it will carry is expected to be 130 kN/m^2 at the base of the raft. If the unit weight of the excavated soil is 18 kN/m^3 determine the depth at which the bottom of raft should be placed to provide a factor of safety of 3 against shear failure.   **10**

9.   Explain :

    i)   Allowable soil Pr.   **5**

    ii)   Factors affecting allowable soil pr.   **5**

UNIT - IV

10.   Explain Pile load test.   **10**

11.   Explain under reamed pile.   **10**

12.   Explain :

    i)   Bearing capacity of piles in groups.   **5**

    ii)   Negative skin friction.   **5**

UNIT - V

13.   Forces acting on well foundation, Explain.   **10**

14.   A 30 kN vertical compressor foundation system is operated at 40 Hz. The foundation soil is medium stiff clay having coefficient of Elastic uniform compression = 40000 kN/m^3. Determine the natural frequency and the magnification factor. Assume the weight of foundation to be 0.25 times the weight of the machine. The base area of foundation block is 3m^2 Take demping factor = 0.   **10**

15.   Determine the depth of excavation in a soft clay layer underlying a layer of sandy silt, $(v = 18 kN/m^3)$ of 3 m depth if sheet pile is used for excavation. The clay has $\gamma = 20 kN/m^3$. $C = 25 kN/m^2$, $\phi = 0$. Assume $F_5 = 1.2$.   **10**

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