KATIHAR ENGINEERING COLLEGE

Code: 011722

B.Tech 7th semester Mid Term Exam

Foundation Engineering

Time: 2 hours **Full Marks: 20**

Instructor: Prof. Rashid Mustafa

Instructions: Answer any five question in which question number 1 is compulsory

The marks are indicated in the right- hand margin

1. Choose and write the correct option **1x4= 04**

(i) Bearing capacity of soil strata supporting a footing of size 3m x 3m will not be affected by the presence of ground water table located at a depth which is

(a) 1.0 m below the base of footing (b) 1.5 m below the base of footing

(c) 2.5 m below the base of footing (d) 3.0 m below the base of footing

(ii) Two circular footings of diameter D_1 and D_2 are resting on the surface of purely cohesive soil. The ratio $D_1/D_2 = 2$. If the ultimate load carrying capacity of the footing of diameter D_1 is 200kN/m^2, then the ultimate bearing capacity (kN/m^2) of the footing of diameter D_2 will be

(a) 100 (b) 200 (c) 400 (d) 517

(iii) A soil sampler has inner and outer radii of 25 mm and 30 mm respectively. The area ratio of the sampler is

(a) 24% (b) 34% (c) 54% (d) 44%

(iv) A single pile, 50 cm in diameter and 16 m long, is driven in clay having an average unconfined compressive strength of 100 kN/m^2. The ultimate load carrying capacity of the pile, neglecting end bearing if any, and assuming shear mobilization of 0.75 around the pile, is nearly

(a) 840 kN (b) 900 kN (c) 940 kN (d) 1000 kN

2. A footing 3m x 2m in size transmits a pressure of 140 kN/m^2 on a soil having E = 5 x 10^4 kN/m^2 and ν = 0.50. Find the immediate settlement (in mm) for the footing at the centre. Assuming it to be (i) Flexible footing (ii) Rigid footing

For L/B = 1.5, Influence factor = 1.36 for flexible and 1.06 for rigid footing **04**

3. A group of 16 piles arranged in a square pattern is to be proportioned in a deposit of soft saturated clay. Assuming the piles to be square with side 300 mm and 12 m long, work out the spacing of piles for 100% efficiency of the pile group. Take mobilization factor as 0.8 and consider both point bearing and skin friction. **04**

4. A 2 m wide strip footing at a depth of 1.5 m below the ground level in a homogeneous bed of sand having unit weight= 18.5 kN/m^3 and angle of internal friction = 36^0. Using Terzaghi's theory, determine the safe bearing capacity of the footing. The water table is at 1.0 m below the ground surface and for $\Phi = 36^0$, $N_c = 60$, $N_q = 42$ and $N_y = 47$ **04**

5. (a) What are the various correction in standard penetration test.
(b) Differentiate between general shear failure and local shear failure. **04**

6. Explain in detail the standard penetration test with sketches. **04**

7. Write short notes on any four of the following:
(a) Negative skin friction
(b) Differential free swell test
(c) Efficiency of pile group
(d) Recovery ratio and internal clearance
(e) Under-reamed pile
(f) Advantages of plate load test **04**

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Note: Solution of Mid Term Exam (Foundation Engineering) will be uploaded on the college website **www.keck.ac.in**