

Con. 3214-08.

CO-3272

(REVISED COURSE)

(3 Hours)

[Total Marks : 100

MASTON

N.B.(1) Question No. 1 is compulsory.

- (2) Attempt any **four** questions from the **remaining** questions.
 (3) Assume **suitable** data if **required** and underline the **same**.

1. (a) Explain $\phi = 0$ condition, using a neat labeled Mohr's Circle. 4
- (b) Define consolidation and pre-consolidation pressure. 4
- (c) List the different types of samplers used in cohesive soils. 4
- (d) With a neat labelled diagram explain the three modes of failure in bearing capacity of shallow foundation. 4
- (e) Write the efficiency equation for group of piles in sand. 4
2. Draw a detailed bore log covering field observations, field tests and laboratory tests. 20
 Based on the above explain how you will decide the depth of foundation based on
 (i) Shear criteria and (ii) Settlement criteria.
3. (a) Direct shear test was carried out on samples of compacted sand. The shear box dimensions were 60 mm x 60 mm. The readings are as under : 10

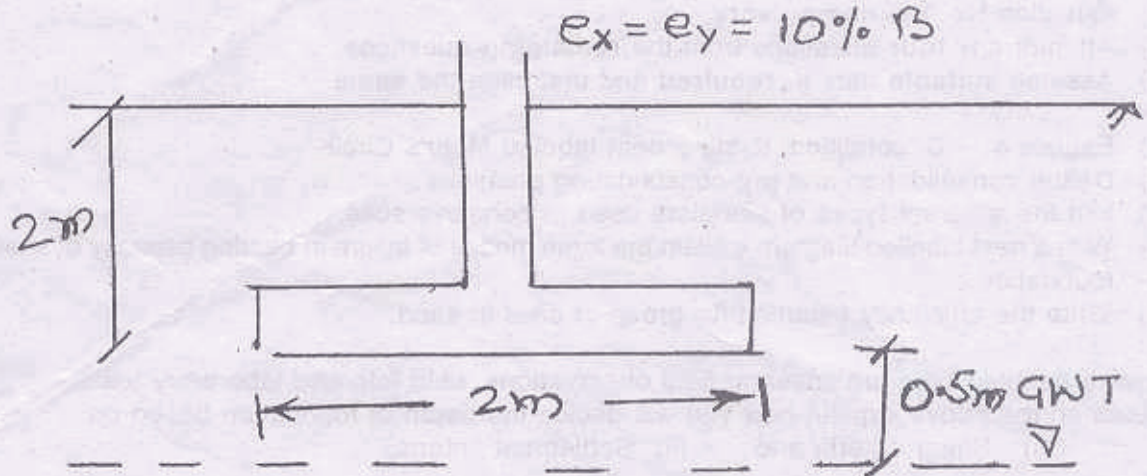
Normal load (N)	Shear load at failure (N)	
	Peak	Ultimate
110	95	65
225	195	135
340	294	200

Determine the angle of shearing resistance in dense and loose condition.

- (b) Write the Skempton's pore pressure equation and discuss the Parameters 'A' and 'B' in the pore pressure equation. 10
4. (a) A line load of 100 kN/m run extends to a long distance. Determine the intensity of vertical stress at a point 2 m below the surface and (i) directly under the line load (ii) at a distance of 2 m perpendicular to the line. Use Boussinesq's theory. 10
- (b) Differentiate between Boussinesq's method and Westerguards method to evaluate stress distribution. 10

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5. (a) Explain how you will determine the bearing capacity of the soil based on plate load test 10
as proposed by IS Code.
- (b) For the foundation given below, find the safe load, for the square footing. 10



$$r = 19.81 \text{ kN/m}^3$$

$$\phi = 30^\circ$$

$$C = 12 \text{ kPa}$$

$$\text{FoS} = 2.5$$

$$N_c = 37.2$$

$$N_q = 22.5$$

$$N_r = 19.7$$

6. (a) Explain what is negative skin friction. What is its effect on factor of safety? How will you reduce the negative skin friction? 10
- (b) The following data refers to a cyclic pile load test carried out on a 300 mm diameter 10 m long pile. 10

Load on pile kN	Total settlement mm	Net settlement of pile top
150	1.45	0.40
200	2.25	0.65
250	2.75	0.80
300	3.60	1.00
400	5.75	1.70
500	10.75	5.25
600	30.00	20.80

Plot the load settlement curve and estimate the allowable load of the pile as per IS 2911 part 4.

7. Draw c/s and plan of stone column for ground improvement. Show clearly triangular pattern, spacing of column. How do you determine load carrying capacity of stone column. 20