(Please write your Exam Roll No.) Exam Roll No. ....

END TERM EXAMINATION

FIFTH SEMESTER [B.TECH.] DECEMBER-JANUARY- 2016

Paper Code: ETCE-309	**Subject: Geotechnical and Foundation Engineering**

Time: 3 Hours **Maximum Marks: 75**

Note: Attempt any five questions including Q.No.1 which is compulsory. Internal choice is indicated.

Q1 Attempt **any ten** questions. **(10x2.5=25)**

(a) What is the purpose of sub surface exploration?

(b) What is bore log?

(c) What is disturbed sample and undisturbed sample?

(d) What is recovery ratio of sample?

(e) List any five factors that affect the sample disturbance?

(f) Define mat foundation.

(g) Define uplift and lateral resistance of pile.

(h) Explain briefly different type of soil failure.

(i) Explain briefly piping in soil.

(j) What do you mean by the term "Geo-synthetics?

(k) Write a note on ground improvement by sand drain method.

Q2 (a) What are the conditions where a well foundation is more suitable than a pile foundations? **(3.5)**

(b) A square footing llocated at a depth of 1.5 m below the ground surface in cohesionless soil carries a column load of 1280 kN. The soil is submerged having an effective weight of 11.5 kN/m³ and angle of shearing resistance of 30°. Find the size if footing for F_s=3 by Terzaghi's theory of general shear failure. **(9)**

OR

Q3 (a) Write the various modes of failure of shallow foundation with neat suitable diagram. **(3.5)**

(b) If the ultimate bearing capacity of a 1 m wide strip footing resting on the surface of sand is 250kN/m², what will the net allowable pressure that a 3x3m square footing resting on the surface can carry with F_s=3. Assume that the soil is cohensionless. Use Terzaghi's theory. **(9)**

Q4 (a) Give the classification of piles. Explain how loads are distributed from the pile to earth with neat diagram. **(5.5)**

(b) A concrete pile 45 cm in diameter and 15m long is driven into homogeneous mass of clay soil of medium consistency. The water table is at the ground surface. The unit cohesion of the soil under undrained condition is 50kN/m² and the adhesion factor=0.75. Compare ultimate bearing capacity and allowable bearing capacity of pile with factor of safety=2.5. **(7)**

OR

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Q5 (a) What do you mean by under reamed pile foundation? Where it is used? **(2.5)**

(b) A group of 9 piles with 3 piles in 3 rows were driven in to soft clay extending from ground level to a great depth. The diameter and the length of the piles were 30 cm and 10m respectively. The unconfined compressive strength of clay is 70kPa. If the piles were place 90 cm center to center, compute the allowable load on the pile group on the basis of shear failure criterion for a factor of safety of 2.5. **(10)**

Q6 (a) Define earth pressure at rest? In designing the lateral resistance of piles, should engineers use earth pressure against piles caps only? Justify your answer. **(5.5)**

(b) List the various earth pressure theories. Explain any one of them with neat diagram. **(7)**

OR

Q7 (a) What is the function of shear key in the design of retaining wall? Explain. **(4.5)**

(b) Write short note on:- **(8)**
(i) Cantilever and anchored sheet pile retaining wall
(ii) Braced excavation

Q8 (a) What is soil stabilization? What are the various advantages of soil improvement techniques? Explain any one method of soil improvement. **(8.5)**

(b) List the difference between chemical stabilization and mechanical stabilization. **(4)**

OR

Q9 (a) What is subsurface contamination? Explain in detail the sources, production and classification of waste. **(8.5)**

(b) Explain failures of foundations due to soil pollutants. **(4)**

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