ET-501(B)

B.Tech. Civil (Construction Management) / B.Tech. Civil (Water Resources Engineering)

Term-End Examination

00197

December, 2017

ET-501(B) : FOUNDATION ENGINEERING

Time : 3 hours   *Maximum Marks : 70*

Note : *Attempt any **five** questions. All questions carry equal marks. Support your answers with neat sketches.*

1. (a)   Explain various methods of site exploration by boring.   7

    (b)   Describe the principles on which electrical resistivity studies for subsurface exploration are based.   7

2. (a)   Describe the various modes of failure of shallow foundations.   7

    (b)   A strip footing of width 3·0 m is to be founded at a depth of 2·0 m in a well drained sand stratum having the following properties :

    $\phi' = 40$, $c = 0$, $r = 20$ kN/m^3, $N_c = 95·7$, $N_q = 81·3$ and $N_r = 100·4$

    Determine the ultimate bearing capacity using Terzaghi's bearing capacity equation for general shear failure.   7

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3. (a) Explain the circumstances under which a combined RCC footing is adopted. Explain the features of such a foundation. 7

(b) Calculate the eccentricity of a vertical load acting on a footing of size $B \times L$ for $\dfrac{q_1}{q_2} = 3$

where

q_1 = maximum pressure at the base of the footing,

q_2 = minimum pressure at the base of the footing. 7

4. (a) Discuss the various causes for settlement of foundations. 7

(b) Explain the effect of footing size on stress zone. 7

5. (a) Name the various types of earth retaining structures and explain any two of them. 7

(b) A retaining wall 6·0 m high is pushed against a cohesionless backfill. The surface is horizontal. The angle of shearing resistance of soil is 30° and its unit weight is 15 kN/m^3. Calculate the total Rankine passive resistance. 7

6. (a) Explain the need and function of a foundation. 7

(b) Describe the design procedure for a well foundation. 7

7. (a) What is Negative Skin Friction ? Under what circumstances does it come into play ? 7

(b) A wooden pile is being driven with a drop hammer weighing 30 kN and having a free fall of 1·4 m. The penetration in the last blow is 10 mm. Determine the load carrying capacity of the pile according to the Engineering News Formula. 7

8. Differentiate between the following : $4 \times 3\dfrac{1}{2} = 14$

(a) Open and Piston drive samples

(b) Shallow and Deep foundations

(c) Net safe bearing capacity and Allowable bearing pressure

(d) Active and Passive earth pressures

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