

No. of Printed Pages : 3

ET-501(B)

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

Term-End Examination, 2019

ET-501(B) : FOUNDATION ENGINEERING

Time : 3 Hours]

[Maximum Marks : 70

Note : Attempt any five questions. All questions carry equal marks. Use of Scientific Calculator is permitted.

1. (a) Discuss the depth of exploration to be used for different types of civil engineering structures. [7]
- (b) Describe the principles on which seismic refraction studies for surface explorations are based. [7]
2. (a) Explain the various modes of Failures of Shallow Foundations. [7]
- (b) A strip footing of 2.5m width is at a depth of 2.0 m in a stiff clay of saturated unit weight 20 kN/m³ and $\phi_u = 0$. For a factor of safety of 3 w.r.t. shear

failure, what safe load would be carried by the footing ? Use Ferzaghi's bearing capacity equation. Take $N_c = 5.7$ and $C_u = 140 \text{ k N/m}^2$. [7]

3. (a) What do you mean by combined RCC footing ? Explain its features. [7]
- (b) Calculate the eccentricity of a vertical load acting on a rectangular footing of size $B \times L$ for $\frac{q_1}{q_2} = 4$.
Where q_1 = maximum pressure at the base of the footing and q_2 = minimum pressure at the base of the footing. [7]
4. (a) Explain the effect of footing size on stress zone. [7]
- (b) What is Settlement of Foundations ? Explain different types of settlement. [7]
5. (a) Discuss the effect of Wall Movement on earth pressure. [7]
- (b) A retaining wall 6.0m high retains a clay backfill having following geotechnical properties : $C = 20 \text{ kN/m}^2$, $\phi = 15^\circ$ & $r = 18 \text{ kN/m}^3$.

Assume that the wall is smooth and the back vertical. It is expected that tension cracks may develop to the full theoretical depth. Calculate the total active force acting on the wall. [7]

6. (a) Discuss the general principles of Foundation Design. [7]

(b) Explain the design procedure for a Well Foundation. [7]

7. (a) Describe "Negative Skin Friction". Also explain the reason for it to come into play. [7]

(b) A square pile of section 60 cm × 60 cm and 12m long penetrates a deposit of clay with cohesion (C) as 40 kN/m². Taking $m = 0.7$, determine the load carried by the pile by the skin friction. [7]

8. Write short notes on the following : [4×3½]

(a) Effect of water table on bearing capacity of soil

(b) Coulomb theory of Earth Pressure

(c) Standard Penetration Test

(d) Efficiency of Pile