Code No. : **5044**

FACULTY OF ENGINEERING
B.E. 4/4 (Civil) I Sem. (Main) Examination, December 2011
FOUNDATION ENGINEERING

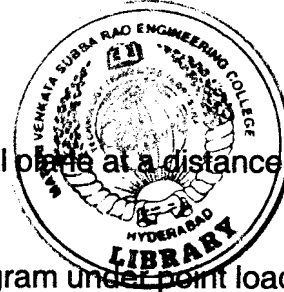Time: 3 Hours]

[Max. Marks: 75

Note : *Answer **all** questions from Part **A**. Answer **any five** questions from Part **B**.*

PART – A
(25 Marks)

1. Sketch the vertical pressure distribution on vertical plane at a distance 'r' from a point load Q.   2

2. Define pressure bulb and draw pressure bulb diagram under point load.   3

3. Explain the safe and allowable bearing capacities of a foundation. Which of these is more comprehensive ?   2

4. Show the zones of plastic equilibrium considered in Terzaghi's analysis. State which of these zones is considered to act as part of footing.   3

5. What is the effect of negative skin friction on load carrying capacity of piles ?   2

6. Define standard penetration value 'N' and state the corrections to be applied on 'N'.   3

7. Discuss the purpose of dewatering.   3

8. Sketch the cellular and diaphragm type coffer dams.   2

9. To call a sample undisturbed, which properties of the soil are to be protected ?   2

10. What is meant by amplitude and frequency in machine foundation ?   3

PART – B
(50 Marks)

11. a) Derive the vertical stress equation under circular area subjected to uniformly distributed load.   5

    b) A circular ring type foundation having an outer diameter of 8 m and an inner diameter of 4 m is subjected to a uniformly distributed load of 750 kN/m^2 all over the surface. Compute the intensity of stress 2 m below the centre of the foundation.   5

12. a) Derive the Terzaghi's general bearing capacity equation for shallow foundations with assumptions.

    6

   b) Determine safe bearing capacity of a 1.2 m dia circular footing located at a depth of 1.0 m below ground level in a C-ϕ soil having C = 30 kN/m², ϕ =27° and r = 18 kN/m³. Take F.S. = 2.5 and assume water table is present at foundation level. Consider $N_c' = 32$, $N_q' = 18$ and $N_r' = 16$.

13. a) Write a detailed note on plate load test. State its limitations.

   b) A soft saturated compressible clay layer of 6 m thick is undergoing consolidation because of an increment in effective stress from 200 kN/m² to 300 kN/m² due to the construction of foundation on this layer. The properties of clay layer are W_{sat} = 45%, W_L (L.L) = 60%, G = 265 and r = 21 kN/m³. Determine the total consolidation settlement of the foundation.

14. a) Explain the procedure for separation of point bearing and skin friction resistance of piles.

    5

   b) A pre cast concrete pile is driven with a 35 kN drop hammer with a free fall of 1.8 m. The average penetration for the last few blows is 6 mm per blow. Estimate the allowable load on the pile using the Engineering News formula.

    5

15. a) Discuss the construction procedure of open Caisson.

    5

   b) Explain the method of dewatering by well point system.

    5

16. a) Explain the application of grouting in ground improvement.

   b) Explain the chemical stabilization in soils.

17. Write short notes on :

   a) New marks chart

   b) Limitation of dynamic formula

   c) Local and general shear failure.