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Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2013
(2008 Scheme)
08.703 : GEOTECHNICAL ENGINEERING – II (C)

Time : 3 Hours Max. Marks : 100

Instructions : *1) Answer **all** questions in Part **A** and **any one full** question from **each** Module.*
*2) Assume suitable data if **necessary**.*

PART – A

I. 1) What are the assumptions made in the Boussinesq's formula for stress distribution in soil ?

2) With the help of Mohr's diagram, explain Rankine's concept of equilibrium of semi infinite soil masses with plane top surface.

3) Write down Terzagh's general equation for computing ultimate bearing capacity of soil below circular footing. Also write the assumptions made in its derivation.

4) Describe the method of determining the load carrying capacity of piles.

5) Enumerate the various forces which act on a foundation well.

6) What are the harmful effects of differential settlement ? And what are the possible remedial measures.

7) Explain any one boring method used in soil exploration.

8) Explain mass spring model for undamped free vibration. **(8×5=40 Marks)**

PART – B

Answer **any one full** question from **each** Module.

Module – I

II. a) A wall with a smooth vertical back and 9 m high retains a moist cohesionless soil with a horizontal surface. The unit weight of soil is 15 kN/m^3 and has an angle of friction 30°. Determine the total earth pressure at rest and its location. If subsequently, if the water table rises to the ground surface, determine the increase in earth pressure at rest, if γ_{sub} is 9 kN/m^3. 10

P.T.O.

b) A retaining wall 4.5 m high, retains soil with $c = 20\ kN/m^2$, $\phi = 30°$ and $\gamma = 20\ kN/m^3$ with horizontal surface with top of the wall. The fill carries a surcharge of $20\ kN/m^2$. Compute the total passive earth pressure on the wall and its point of application. **10**

III. a) Two columns A and B are situated at 6 m apart. Column A transfers a load of 500 kN and Column B a load of 250 kN. Determine the resultant vertical stress on a horizontal plane 20 m below chi ground surface at a point vertically below point A and B. **10**

b) Describe the method of calculating the stress at a point below the corner of a rectangular load. How is this method used for points other than that below the corner. **10**

Module – II

IV. a) What are the factors affecting bearing capacity of foundations. And briefly explain the different methods for finding bearing capacity of soil. **10**

b) Compute the safe bearing capacity of a continuous footing 1.5 m wide and located at a depth of 1.2 m below ground level. The unit weight of soil is $20\ kN/m^3$, $c = 20\ kN/m^2$ and $\phi = 20°$. Assume a factor of safety of 2.5. Terzagh's bearing capacity factors for $\phi = 20°$ are Ne = 17.7, Nq = 7.4, Nr = 5.0 what is the permissible load per meter run of footing. **10**

V. a) Discuss standard penetration test. What are the various corrections ? What is the importance of the test in geotechnical engineering ? **10**

b) Describe the salient features of sub soil investigation report. **5**

c) Explain soil improvement through installation of vertical drains and pre loading. **5**

Module – III

VI. a) Design a trapezoidal combined footing for two columns 30 cm× 30 cm carrying column loads of 12 MN and 0.90 MN. If the spacing between the two columns is 4m, allowable soil pressure is $200\ kN/m^2$ and length of footing 5m. **10**

b) Discuss any two dynamic formula. What are their limitations ? **5**

c) How will you estimate the group capacity of piles in sand and clay ? **5**

VII. a) Describe the measures for rectification of tilts and shifts. **10**

b) Explain the general criteria for the design of machine foundation. **8**

c) Explain floating foundation. **2**