



Reg. No. :

Name :

Seventh Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08.703 : GEOTECHNICAL ENGINEERING – II(C)

Time : 3 Hours

Max. Marks : 100

PART – A

- I. 1) Explain briefly how a Newmark's chart with influence coefficient 0.005 can be constructed.
- 2) Explain the term "active earth pressure". Give any two practical examples.
- 3) Determine the depth of tension crack and the critical height of an unsupported vertical cut in a backfill with cohesion $c = 15 \text{ kPa}$, coefficient of active earth pressure = 0.25 and unit weight = 20 kN/m^3 .
- 4) Differentiate between net safe bearing capacity and allowable bearing capacity.
- 5) Discuss briefly the guidelines for choosing the spacing of borings in a soil exploration programme.
- 6) What are the limitations of dynamic formulae ?
- 7) What are the elements of a well foundation ?
- 8) Write a note on ENR formula for pile capacity determination. **(8×5=40 Marks)**

P.T.O.



PART – B

Module – I

- II. a) The co-ordinates (in metres) of the corners of a rectangular footing, subjected to a uniform pressure of 300 kPa are (3, 2), (6, 2), (6, 6) and (3, 6). A point Q lying on the plane of the footing has co-ordinates (0, 0). Determine the vertical stress at 5m depth below the point Q using the following data :

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Value of m	Influence Coefficient				
	$n = 0.4$	0.6	0.8	1.0	1.2
0.4	0.0602	0.0801	0.0931	0.1035	0.1063
0.6	0.0801	0.1069	0.1247	0.1361	0.1431
0.8	0.0931	0.1247	0.1461	0.1537	0.1684
1.0	0.1035	0.1361	0.1537	0.1750	0.1761
1.2	0.1063	0.1431	0.1684	0.1761	0.1803

- b) A circular footing of 2 m width carries a uniform pressure of 100 kPa. Determine the depth at which the vertical stress due to applied loading reduces to 20 kPa.

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OR

- III. Compute the total lateral earth pressure exerted by a layered backfill of height 6 m, if the wall has a tendency to move towards backfill. The upper layer of thickness 5 m has : angle of internal friction 32° , unit weight = 18 kN/m^3 , while the lower layer has : angle of internal friction = 28° , cohesion = 18 kPa, saturated unit weight = 19 kN/m^3 . The backfill also supports a uniform surcharge of intensity 8 kN/m^2 . Water table is at a depth of 5 m below the surface of the backfill.

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Module – II

- IV. A load of 900 kN is to be carried by a circular footing resting at a depth of 2 m below ground level over a sandy clay having $c = 6 \text{ kPa}$ and $\gamma = 20 \text{ kN/m}^3$. Using Terzaghi's analysis, determine the required size of the footing. Assume $N_c = 12$, $N_q = 6$, $N_r = 3$ and a factor of safety of 3.

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OR



- V. a) Describe "Auger Boring" method of soil exploration (with a neat sketch) with particular reference to the mode of operation, applicable soil types and limitations. 14
- b) Write a note on soil improvement using preloading. 6

Module – III

- VI. a) A concrete pile 0.4 m diameter and 10 m long is driven into a 8 m thick layer of loose sand ($\phi = 30^\circ$, $N_q = 22.5$, $N_r = 19.7$, $\gamma_{sat} = 17 \text{ kN/m}^3$) overlying a dense layer of sand ($\phi = 35^\circ$, $N_q = 41.4$, $N_r = 42.4$, $\gamma_{sat} = 19.5 \text{ kN/m}^3$). If water table is at the ground surface, estimate the safe load. Take $k = 1.4$, $\delta = 0.6\phi$ for both layers. 14
- b) Explain the term "Negative skin friction". 6

OR

- VII. a) Discuss the various methods of rectification of tilts and shifts of well foundation. 14
- b) Write a note on mass spring model for undamped free vibrations. 6
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