

Total No. of Questions : 8]

[Total No. of Printed Pages : 2

[2]

Roll No .....

**MVCT/MVCP-302(B)****M.E./M.Tech., III Semester**

Examination, November 2018

**Advanced Foundation Engineering**

(Elective - II)

Time : Three Hours

Maximum Marks: 70

- Note: i) Attempt any five questions.  
 ii) All questions carry equal marks.  
 iii) Assume suitable data suitably.

1. a) What are the assumptions made in the derivation of Terzaghi's bearing capacity theory? Write the equation for the ultimate bearing capacity. 6  
 b) Determine the ultimate bearing capacity of a square footing  $2\text{m} \times 2\text{m}$  in a soil with unit weight of  $18 \text{ KN/m}^3$ ,  $\phi = 20^\circ$ ,  $C = 20 \text{ KN/m}^2$ . Take depth of foundation  $1.50\text{m}$ . Use Hansen's equation. 8
2. a) Discuss the various types of pile foundation and also write the uses of pile foundation. 7  
 b) Describe the group capacity of piles of sand and clay? 7
3. a) A group of 9 piles with 3 piles in a row was driven into soft clay extending from ground level to a great depth. The diameter and length of the piles were  $30\text{cm}$  and  $10\text{m}$  respectively. The unconfined compressive strength of the clay is  $70 \text{ kpa}$ . If the piles were placed  $90\text{cm}$  centre to centre. Compute the allowable load on the pile group on the basis of a shear failure criterion for  $FS = 2.5$ . 7

- b) What is Negative skin friction? Explain the pile load test? 7
4. a) What is the role of Geosynthetics? Describe the basic concept and mechanisms of reinforced earth. 7  
 b) Differentiate between Geosynthetics Engineering and Geotechnical Engineering? 7
5. a) Explain the stability analysis of well foundation. 7  
 b) A circular well of  $6\text{m}$  external diameter and  $4\text{m}$  internal diameter embedded to a depth of  $15\text{m}$  below the maximum scour level in a sandy soil deposit. The well is subjected to a horizontal force of  $800\text{K}$  acting at a height of  $8\text{m}$  above the scour level. Determine the allowable total equivalent resisting force due to earth pressure, assuming 7  
     i) The rotation is about a point above the base.  
     ii) The rotation is at the base, take  $\gamma_{\text{sat}} = 20 \text{ KN/m}^3$ ,  $\phi = 30^\circ$ , Factor of safety for passive resistance = 2. Use Terzaghi's analysis.
6. a) Discuss sinking of well foundation? 6  
 b) Explain the component of bridge substructures? 8
7. a) Define Marine structures? Describe the types of marine structures? 8  
 b) What is piled wharf structure breakwaters? 6
8. a) Find the net allowable bearing load per meter length of long wall footing of  $2.5\text{m}$  wide founded on stiff saturated clay at a depth of  $1.2\text{m}$ . The unit weight of the clay is  $18 \text{ KN/m}^3$ , and the shear strength is  $120 \text{ KN/m}^2$ . Assume the load to be applied rapidly such that un-drained conditions  $\phi = 0^\circ$ . Use  $F_s = 3$  and Skempton's method. 7  
 b) Discuss about 7  
     i) Balla's theory      ii) Hansen's theory

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