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No.

Total No. of Pages : 3

T.E. (Civil) (Semester - VI) Examination, November - 2014
GEOTECHNICAL ENGINEERING - II (Revised)
Sub. Code : 45543

Day and Date : Thursday, 27 - 11 - 2014

Total Marks : 100

Time : 2.30 p.m. to 5.30 p.m.

Instructions :

1) Question No.1 from Section - I and Question No. 5 from Section - II are compulsory. Attempt any two questions from the remaining in each section.

2) Figures to the right indicate full marks.

3) Make assumptions wherever necessary.

4) Use of non-programmable calculator is allowed.

SECTION - I

Q1) All questions are compulsory : $[3 \times 6 = 18]$

a) List the various methods of site exploration by boring. Explain any one.

b) Derive expression of factor of safety of an infinite slope in cohesion less soil.

c) How the effect of eccentricity of loading is taken into account for bearing capacity analysis as per IS code?

Q2) a) Explain the following terms : [8]

i) RQD and core recovery

ii) Taylor's Stability Number

P.T.O.

b) An embankment is constructed in purely cohesive soil having $C_u = 55$ kN / m² and unit weight of soil is 18 KN/m³. For slope stability analysis a failure arc with following details was selected, Radius of slip circle = 15.2 Mt., Angle subtended by the failure arc at the center = 128°. Area of failure wedge section = 136sq. Mt., Location of CG of failure wedge = 4.2 Mt. horizontally away from center of slip circle. Calculate factor of safety of this trial failure circle. **[8]**

Q3) a) Explain the general shear failure and local shear failure. **[6]**

b) A plate load test was conducted at depth of 3 m. on sandy soil using a square plate of 75 cm. The Sandy soil strata is uniform in nature and extends up to large depth. Determine settlement of foundation size 2.5 m. × 3.5 m. Carrying a load of 1200 kN located at a depth of 3.00 m. Following is the data obtained from the test. **[10]**

Load intensity (kN / sq.mt.)	50	100	150	200	250	300	350	400
Settlement (mm)	3.2	4.0	6.8	10.0	16.3	23.8	34.0	45.2

Q4) a) Explain the terms : **[8]**
   i) Equation for calculating consolidation settlement in sandy soil.
   ii) Elastic immediate settlement.

b) A long natural slope of cohesion less soil is inclined at 12° to the horizontal and angle of internal friction = 30°. Determine the factor of safety of the slope. If the slope is completely submerged, what will be the change in the factor of safety? **[8]**

SECTION - II

Q5) All questions are compulsory : **[4 × 5 = 20]**
   a) Where Raft foundation is it needed? Enlist its type.
   b) Explain with neat sketch under reamed pile.
   c) Discuss the importance of Caisson foundations.
   d) Name the techniques used in ground improvement and explain any one in short.

Q6) a) Describe the procedure of selecting different types of shallow foundations under different situations and soils. **[6]**

b) Explain the various factors to be considered in deciding the location and depth of shallow foundation. **[5]**

c) Discuss floating foundation. **[4]**

Q7) a) Discuss the various method of classification of piles. **[6]**

b) Find the ultimate load and the allowable load for a RCC pile driven by 35 kN single acting steam hammer into medium dense sand to a final set of 5 mm per flow. It is given that **[9]**

   i)   Stroke of hammer = 1.360 m,

   ii) Weight of pile and dolly = 90 kN,

   iii) Coefficient of restitution = 0.45,

   iv) Hammer efficiency = 0.90,

   v)   Total elastic compression of soil, pile and dolly = 20 mm, and

   vi) Factor of safety = 2.5.

   Use Hiley's formula.

Q8) a) Discuss difficulties in well sinking and remedial measures. **[6]**

b) Write note on braced cofferdam. **[5]**

c) Write note on precast bored pile. **[4]**

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