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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(CE) (2011 Onwards) (Sem.-6)

FOUNDATION ENGINEERING

Subject Code : BTCE-603

Paper ID : [A2290]

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students has to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students has to attempt any TWO questions.
4. Use of IS Code 1893 : 2002 is allowed.

SECTION-A**1. Write briefly :**

- a) Calculate depth of soil exploration for a 15 storey heavy steel building.
- b) Differentiate between disturbed and undisturbed soil samples.
- c) Write advantages of Coulomb's theory.
- d) How water correction factor is applied to bearing capacity?
- e) What are Newmark's charts?
- f) List causes of settlement of structures.
- g) What are Isobars?
- h) Mention necessity of pile foundations.
- i) Discuss significance of undreamed pile.
- j) What is pneumatic caisson?

SECTION-B

2. Define significant depth of soil exploration? Give values for depth of soil exploration and number of bore holes for Multi storey buildings, closely spaced footings and Highway in filling and cutting.
3. A retaining wall, 7.5 m high, retains a cohesionless backfill. The top 3 m of the fill has a unit weight of 18 kN/m^3 and angle of shearing resistance of 30° and the rest has unit weight of 24 kN/m^3 and angle of shearing resistance of 20° . Determine the pressure distribution on the wall. Find also the point of application of the lateral earth pressure.
4. A load of 1200 kN acts as a point load at the surface of a soil mass. Estimate the stresses at a point 7 m below and 4 m away from the point of action of load by Boussinesq's formula. Compare the value with the result from Westergaard's theory.
5. Write note on floating foundations.
6. Differentiate between Drilled pier and cassion.

SECTION-C

7. What are various methods of soil exploration? Explain any indirect method with figure and limitations. 10
8. (a) Give factors affecting depth of foundation. 3
 - (b) A foundation, 2.0 m square is installed 1.2 m below the surface of uniform sandy gravel having a density of 19 kN/m^3 above the water table and a submerged density of 10 kN/m^3 below the water table. The strength parameters with respect to effective stress are $c'=0$ and $\phi=30^\circ$. Find the gross ultimate bearing capacity for the following conditions :
 - i) Water table is well below the base of the foundation
 - ii) Water table rises to the level of the base of the foundation and
 - iii) The water table rises to ground level. For ($\phi= 30^\circ$, Terzaghi gives $N_q= 22$ and $N_r= 20$) 7
9. (a) A concrete pile, 400 mm in diameter, 9 m long, is driven through a 6 m thick layer of silty sand ($\phi = 20^\circ$ and $\gamma= 17 \text{ kN/m}^3$) overlying a dense layer of sand ($\phi = 35^\circ$ and $\gamma= 19.5 \text{ kN/m}^3$). If the water table is at-the ground surface. Estimate the safe load (F.O.S= 3). Take $K= 1.0$ and $\delta = 0.75\phi$ 7
 - (b) What are better piles and where are these used? 3