B.Tech. CIVIL ENGINEERING (BTCLEVI)

Term-End Examination

00956

June, 2015

BICEE-022 : ADVANCED DESIGN OF FOUNDATION

Time : 3 hours   *Maximum Marks : 70*

Note : Attempt any five questions. All questions carry equal marks. Use of scientific calculator is permitted. Assume suitable data, if required.

1. Describe the deflection for semi-infinite beam with concentrated load on Winkler foundation.   *14*

2. (a) In a block test according to IS : 5249 – 1977, a resonant frequency of 18 cps was observed in vertical vibrations. Determine the coefficient of elastic uniform compression.   *7*

    (b) A machine weighing 90 kN is to be supported on a block of size 3 m × 4 m × 2 m. Determine its natural frequency in vertical vibration.   *7*

3. Compute the safe bearing capacity of a square footing 1·5 m × 1·5 m, located at a depth of 1 m below the ground level in a soil of average density 20 kN/m^3. $\phi = 20°$, $N_c = 17·7$, $N_q = 7·4$, $N_\gamma = 5·0$. Assume a suitable factor of safety and that the water table is very deep. Also compute the reduction in safe bearing capacity of the footing, if the water table rises to the ground level. *14*

4. What is a coffer dam ? Name the different types of coffer dams along with diagrams and discuss their relative advantages and disadvantages. *14*

5. What do you mean by degrees of freedom ? Describe natural frequency of foundation soil system using Barkan's approach. *14*

6. Discuss the various classifications of sheet piles. Derive the expression for design of anchored bulkhead by fixed earth-support method driven in granular soil. *14*

7. For the cantilever sheet pile wall, compute the depth of embedment of sheet piles. Refer Figure 1.   14
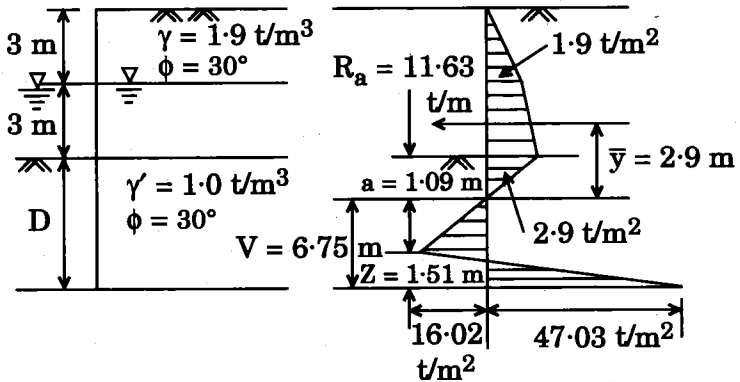

Figure 1

8. What is shell foundation ? Write the different types of shell foundations along with diagrams. Write the behaviour of shell foundation during an earthquake.   14