(Following Paper ID and Roll No. to be filled in your Answer Books)

Paper ID : 100661 Roll No. | | | | | | | | | | |

B.TECH.

Theory Examination (Semester-VI) 2015-16

ADVANCE FOUNDATION OF DESIGN

Time : 3 Hours *Max. Marks : 100*

Note: Attempt *all the Sections*. If required any missing data; then choose suitably.

Section-A

Q1. Attempt all parts. All parts carry equal marks. Write answer of each part in short. (2×10 = 20)

(a) How the seismic refraction method is better than the seismic reflection method?

(b) Describe briefly the 'Newmark's influence chart'.

(c) Write the Hansen's bearing capacity equation along with their correction factors.

(d) Discuss in brief, the different types of shallow foundation settlements.

(e) Briefly classify the pile according to their method of installation.

(f). Define 'Negative Skin Friction'.

(g) What are the difficulties faced with soft clay?

(h) Draw a neat sketch of well foundation.

(i) What is a stability number? What are the uses of stability charts?

(j) Discuss the main criteria for design of rotary type of machines.

Section-B

Q2. Attempt any five questions from this section. **(10×5=50)**

(a) List various geophysical methods used for the soil investigation. Explain the soil resistivity method in detail. Write also their relative advantages and disadvantages.

(b) Discuss the various types of bearing capacity failure occurs in soil. What are the assumptions made in Terzaghi's analysis of bearing capacity of a continuous footing? Write in brief.

A square footing of 3.0m × 3.0m size has been founded at 1.2m below the ground level in a cohesive soil having a bulk density of 1.8 t/m^3 and an unconfined compressive strength of 5.5 t/m^2. Determine the safe bearing capacity of the footing for a factor of safety of 2.5 by Skempton's method.

(c) 'For L/B = 6.0'; Explain all the steps, which will you follow for determining the settlement in the cohesion less soil by using the Schmertmann approach.

(d) A group of 16 piles, each having a diameter of 350 mm and 10 m long, are arranged in 4 rows at a spacing 1.0 m centre to centre. The capacity of each pile is 360 kN. Determine the group capacity of the piles.

(e) Explain with a neat sketch; which type of foundation you will use for the case of expansive soils? Write also the expressions for finding the capacity of piles for single bulb and double bulb under reamed piles.

(f) Write about the various types of shifts taken place in the well foundation. How these shifts can prevent?

(g) Enumerate the step by step method for design of foundation for impact type machine as per Indian Standard Code of practice IS: 2974 (Part II).

(h) Discuss different types of slope failures. Stability analysis by Swedish method of slices following values per running metre for a 10m high embankment.

Total shearing force = 480 kN

Total normal force = 1950 kN

Total neutral force = 250 kN

Length of arc = 22 m

If the properties of soil are $c = 24\ kN/m^2$ and $\phi = 6°$, calculate the factor of safety with respect to shear strength.

Section-C

Note: Attempt any two questions from this section.

(15×2=30)

Q3. How will you determine the vertical stress intensity at any depth by using the Newmark influence Chart method?

Draw a Newmark's influence chart on the basis of Boussinesq's equation, for an influence factor of 0.005. While drawing the chart, take arbitrarily the value of 'z' is 2.5 cm.

Q4. A rectangular footing of 2.5 m × 4.0 m size is to be constructed at 1.8 m below the ground level in a c – φ soil having the following properties: C = 1.0 t/m^2, φ = 20° and y = 1.75 t/m^3.

The footing has to carry a gross vertical load of 80 t, inclusive of its self - weight. In addition, the column is subjected to a horizontal load of 10 t applied at a height of 3.3 m above the base of footing. Determine the factor of safety of the footing against shear failure as per IS: 6403 – 1981.

Q5. A machine weighing 15 kN is provided with a foundation block with a base area of 2.5 m^2 and a weight of 25 kN. The coefficient of elastic uniform compression for the subsoil and damping ratio are respectively 2.5 kg/cm^3 and 0.15. Determine;

i. The natural frequency of the system

ii. The maximum amplitude of the system

iii. The maximum force transmitted to the soil if the force of excitation is vertical and given by

$F = 0.006\ \omega^2 \sin \omega t$ (kgf)