

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST - 2 EXAMINATION- 2016

B.Tech. VI Semester

COURSE CODE: 10B11CE612

MAX. MARKS: 25

COURSE NAME: FOUNDATION ENGINEERING

COURSE CREDITS: 03

MAX. TIME: 1Hr 30 Min

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means. Assume necessary values as per IS code.

1. A rectangular footing of 2.4 m x 3.5 m size is to be constructed at 1.5 m below G.L. in a $c - \phi$ soil having the following properties: $\gamma = 1.75 \text{ t/m}^3$, $\phi = 20^\circ$, $c = 1.0 \text{ t/m}^2$. The footing has to carry a gross vertical load of 70 t, inclusive of its self-weight. In addition, the column is subjected to a horizontal load of 11 t applied at a height of 3.3 m above the base of the footing. Determine the factor of safety of the footing against shear failure as per IS: 6403 - 1981. For $\phi = 20^\circ$, $N_c = 14.83$, $N_q = 6.40$, $N_\gamma = 5.39$. [5]
2. A concrete strip footing rectangular in cross-section is located at ground level and extends 1.2 m below the ground level. It carries a UDL of 15000 kg/m. the soil profile consists of homogeneous clay 6m thick overlying rock. The clay properties are as under: saturated unit bulk weight = 1750 kg/m³; Shear strength (undrained) = 8500 kg/m²; compressibility = $1 \times 10^{-4} \text{ m}^2/100 \text{ kg}$. Determine:
 - a) Width of footing for factor of safety, $F = 2$
 - b) Ultimate consolidation settlement for $F = 2$
 Assume bulk unit weight of concrete = 2500 kg/m³. Neglect the spread of load beneath the footing and any side cohesion on the foundation. [5]
3. Two plate load tests were conducted at the level of a prototype foundation in a cohesionless soil close to each other. The following data are given:

Size of plate	Load applied	Settlement recorded
0.3 x 0.3 m	30 kN	25 mm
0.6 x 0.6 m	90 kN	25 mm

If the footing is to carry a load of 1000 kN, determine the required size of the footing for the same settlement of 25 mm. [5]