

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

MAKE UP TEST - 2 EXAMINATION- 2016

B.Tech. VI Semester

COURSE CODE: 10B11CE612

MAX. MARKS: 25

COURSE NAME: FOUNDATION ENGINEERING

COURSE CREDITS: 04

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 suitable values if required and not provided.

1. A square column foundation is to be designed for a gross allowable total load of 250 kN. If the load is inclined at an angle of 15 degrees to the vertical, determine the width of the foundation. Take a factor of safety of 3. Given: $\gamma = 19 \text{ kN/m}^3$, $\phi' = 35^\circ$ and $c' = 5 \text{ kN/m}^2$. The depth of foundation is 1 m. [5]
2. Explain Meyerhof's bearing capacity theory with figure and the relevant equations. [5]
3. Derive the expression for ultimate bearing capacity of footing resting on a stratified deposit of soil with proper explanation. [5]
4. A trapezoidal footing is to be produced to support two square columns of 30 cm and 50 cm sides respectively. Columns are 6m apart and the safe bearing capacity of the soil is 400 kN/m^2 . The bigger column carries 5000 kN and the smaller 3000 kN. Design a suitable size of the footing so that it does not extend beyond the faces of the columns. [5]
5. A footing 2 m x 2 m in plan is founded at 1 m depth below G.L. in sand having $\phi = 36^\circ$. Compute the allowable load at the base of the footing, if
 - a) Factor of safety against shear is 3. [1]
 - b) The maximum settlement of footing is not to exceed 50 mm. [2]
- c) The water table is 1 m below G.L. The allowable soil pressure for 50 mm settlement with water table at a very great depth is 50 t/m^2 . Saturated and dry unit weight of sand 2 t/m^3 and 1.6 t/m^3 . Given $\phi = 36^\circ$, $N_c = 50$, $N_q = 42$ and $N_\gamma = 46$. If the load on the footing is eccentric with $e_x = e_y = 0.25 \text{ m}$, what will be the allowable load? Take soil above the water table as dry. [2]