

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST-3 EXAMINATION- MAY -2018
B.Tech VI Semester

COURSE CODE: 10B11CE612

MAX. MARKS: 35

COURSE NAME: FOUNDATION ENGINEERING

COURSE CREDITS: 04

MAX. TIME: 2 HR

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means. Assume suitable data if required. Answer in sequence.

1. An earth retaining structure is 10 m tall with vertical back and horizontal fill up to the top and loaded with an additional surcharge of 14 kN/m^2 . The top 3m depth of the cohesionless backfill is dry and rest is saturated under GWT. The soil properties are $G=2.65$, $e=0.65$ and $\phi=30^\circ$. Construct neat earth pressure diagrams with related pressure intensities and calculate the resultant thrust acting on the wall and its point of action. [8]
2. (a) A square footing is required to carry a net load of 1200 kN. The depth of the foundation is 2 m and the tolerable settlement is 40 mm. The soil is sandy with $N=12$. Taking the factor of safety as 3, determine the size of the footing using Teng's method. Assume water table to be very deep. [3]
(b) Briefly explain the phenomenon of negative skin friction. [2]
3. Determine the safe load that can be carried by a pile having gross weight of 1.5 t, using ENR formula and modified Hiley's formula. Assume same energy loss constant in both cases. Given:
 1. Weight of hammer = 2.0 t
 2. Height of free fall = 91 cm
 3. Hammer efficiency = 75%
 4. Average penetration under the last 5 blows = 10 mm
 5. Length of pile = 22 m
 6. Diameter of pile = 300 mm
 7. Coefficient of restitution = 0.55[5]
4. 200 mm diameter 8 m long piles are used as foundation for a column in a uniform deposit of medium clay with UCS of 100 kN/m^2 and adhesion factor 0.9. 9 piles are arranged in a square pattern in pile group. Assuming group efficiency of unity, determine the spacing between the piles. Neglect end bearing resistance of piles. [5]
5. A 6x7 pile group has the following details: Diameter of each pile=200mm, c/c spacing=600 mm, capacity of a single pile=400kN. Determine the efficiency and capacity of free standing pile group. [4]
6. Explain the following with their working principle and associated calculations: [4x2]
 - (a) Menard's pressuremeter test
 - (b) Cyclic pile load test