JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- 2025

B.Tech-V Semester (CE)

COURSE CODE (CREDITS): 18B11CE514 (3) MAX. MARKS: 35

COURSE NAME: FOUNDATION ENGINEERING

COURSE INSTRUCTORS: DR. NIRAJ SINGH PARIHAR MAX. TIME: 2 Hours

Note: *(a) All questions are compulsory.*
(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems.
(c) Use of calculator is permitted.

Q.No	Question	CO	Marks
Q1	A vertical excavation was made in a clay deposit having unit weight of 20 kN/m^3, which caved in after 4 metres of digging into the soil. Determine the value of cohesion of the soil assuming no internal friction in the soil. What would be the expected change in cohesion value if internal friction angle is also considered?	CO1	**3**
Q2	Determine the ultimate bearing capacity of a strip footing 1.5 m wide resting on a saturated clay (c_u=30 kN/m^2, φ_u=0 and γ_{sat}=20 kN/m^2) 2 m below the ground level with water table at the same level. Also calculate the percentage reduction in bearing capacity if the water table rises by 1m. Use Terzaghi's analysis.	CO2,3	**6**
Q3	A plate load test was conducted in a c-φ soil with two different size plates and the following results were noted: Load (kN) | Size of plate | Settlement (mm) 40 | 0.3 m x 0.3 m | 25 100 | 0.6 m x 0.6 m | 25 Find the size of square footing to carry a load of 800 kN at the same specified settlement of 25 mm.	CO3,5	**6**
Q4	A reinforced concrete pile weighing 30 kN (inclusive of helmet and dolly) is driven by a drop hammer weighing 40 kN and having an effective fall of 0.8 m. The average set per blow is 1.4 cm. The total temporary elastic compression is 1.8 cm. Assuming the coefficient of restitution as 0.25 and a factor of safety as 2, determine the allowable load on the pile.	CO1,4	**5**

Q5	A group of 16 piles, each 10 m long were driven in a clay and arranged in a square pattern. The diameter of each pile is 45 cm and their centre to centre spacing is kept as 1.5 m. Neglecting the tip resistance and assuming c=50 kN/m^2, predict whether pile will fail by individual action or group action. Take m=0.7 for shear mobilization around each individual pile.	CO4	**5**
Q.6	Write short notes on the following: a. Settlement estimation of pile group through equivalent raft method b. Negative skin friction on piles	CO4	**10**