

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- October -2023

COURSE CODE (CREDITS): 18B11CE514

MAX. MARKS: 25

COURSE NAME: Foundation Engineering

COURSE INSTRUCTORS: Ashok Kumar Gupta

MAX. TIME: 1 Hour 30 Minutes

Note: All questions are compulsory. Marks are indicated against each question in brackets.

1. Determine the ultimate bearing capacity of a continuous footing, 1.5 m wide, with its base at a depth of 1m, resting on a dry sand stratum. Dry unit weight of soil is 17 kN/m^3 , angle of internal friction is 38° . Use Terzaghi's equation. (5)
2. A column carries a load of 750 kN, has to be supported by a square footing with its base at 1.5m depth. What is required size of the foundation which will provide a FoS of 3 against shear failure? Assume angle of internal friction as 30° , natural unit weight of soil is 18 kN/m^3 , $c' = 10 \text{ kN/m}^2$, effective unit weight of soil is 10 t/m^3 and water table is at 1.5m depth. Use Terzaghi's equation. (5)
3. List the conditions under which auger cast in situ piles are adopted in preference to bored cast in situ piles. Draw diagrams of both the types of deep foundations. (5)
4. What type of piles will be appropriate for supporting a heavy structure on an undulating bedrock surface located at 20 to 30 m depth below the ground surface? Draw neat diagram of the proposed deep foundation. (5)
5. What type of pile foundation is suitable for foundations of bridge piers of a river in north India where the soil is silty sand and depth of scour is 30 m below the river bed level during monsoon season? Draw a sketch. (5)

Table 15.1 Terzaghi's Bearing Capacity Factors

0	5.7	1.0	0.0	34	52.6	36.5	30.0
5	7.3	1.6	0.5	35	57.8	41.4	42.4
10	9.6	2.7	1.2	40	95.7	81.3	100.4
15	12.9	4.4	2.5	45	172.3	173.3	297.5
20	17.7	7.4	5.0	48	258.3	287.9	780.1
25	25.1	12.7	9.7	50	347.5	415.1	1153.2
30	37.2	22.5	19.7				