

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- 2025

B.Tech-IV Semester (CE)

COURSE CODE (CREDITS): 18B11CE411 (3)

MAX. MARKS: 35

COURSE NAME: GEOTECHNICAL ENGINEERING

COURSE INSTRUCTOR: DR.NIRAJ SINGH PARIHAR

MAX. TIME: 2 Hrs

Note: (a) All questions are compulsory.

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems.

Q.No	Question	CO	Marks
Q1	The void ratio and specific gravity of a sample of clay are 0.73 and 2.7 respectively. If the voids are 92% saturated, calculate the bulk density, dry density and the water content. Keeping the void ratio as same, determine the water content for complete saturation of soil sample.	CO1	7
Q2	The liquid limit, plastic limit and shrinkage limit of the soil are reported as 60%, 30% and 20% respectively. If the soil sample at liquid limit has a volume of 40 cc and its volume measured at shrinkage limit was 23.5 cc, determine the specific gravity of solids, shrinkage ratio and the volumetric shrinkage.	CO2	7
Q3	In a consolidation test, the void ratio of the specimen which was 1.068 under the effective pressure of 214 kN/m^2 , changed to 0.994 when the pressure was increased to 429 kN/m^2 . Calculate the coefficient of compressibility, compression index and the coefficient of volume compressibility. Find the settlement of foundation resting on above type of clay if the thickness of layer is 8 m and the increase in pressure is 10 kN/m^2 .	CO3	8
Q4	Determine the ratio of average permeability in horizontal and vertical directions for a soil deposit consisting of 3 horizontal layers if both the thickness and the permeability of three layers are in the ratio of 1:2:4 (increasing downwards).	CO2	4
Q5	The depth of water in a well is 3 m. Below the bottom of the well lies a layer of sand of 5 m thickness overlying a clay deposit. If the saturated unit weight of sand and clay layer are 19.5 kN/m^3 and 20.6 kN/m^3 , draw the variation for total, effective and pore pressure up to 7 m below the bed.	CO2,5	4
Q6	An undisturbed soil sample 30 mm thick got 50% consolidated in 20 min in the laboratory with drainage allowed at the top and bottom. If the clay layer from which the sample was obtained is 3 m thick in field conditions, estimate the time it will take to consolidate 50% with two way drainage condition.	CO4	5