**20CE405**

**Hall Ticket Number:**

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| **II/IV B.Tech (Regular\Supplementary) DEGREE EXAMINATION** | | | |
| **July/August, 2023** | **Civil Engineering** | | |
| **Fourth Semester** | **Soil Mechanics** | | |
| **Time:** Three Hours | | **Maximum:**70 Marks | |
| ***Answer question 1 compulsory.*** | | | **(14X1 = 14Marks)** |
| ***Answer one question from each unit.*** | | | **(4X14=56 Marks)** |
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|  |  |  | CO | BL | M |
| 1 | a) | What do you mean by plasticity Index? | CO1 | L2 | 1 |
|  | b) | What do the symbols SW, SP, CH and CI indicate in Indian standard classification of soils? | CO1 | L2 | 1 |
|  | c) | Define degree of saturation and water content of soil. | CO1 | L2 | 1 |
|  | d) | Explain capillary action in soils. | CO2 | L2 | 1 |
|  | e) | Define Darcy’s law? | CO2 | L2 | 1 |
|  | f) | Explain the concept of Effective stress. | CO2 | L2 | 1 |
|  | g) | What do you mean by an Isobar? | CO3 | L2 | 1 |
|  | h) | Full form of OMC. | CO3 | L2 | 1 |
|  | i) | Explain Zero Air-Void line. | CO3 | L2 | 1 |
|  | j) | What is meant by the term shear strength? | CO4 | L2 | 1 |
|  | k) | What is Consolidation? | CO4 | L3 | 1 |
|  | l) | What is shear stress and how is it related with Shear Strength parameters? | CO4 | L2 | 1 |
|  | m) | What are the characteristic of Mohr's circle? | CO4 | L2 | 1 |
|  | n) | Write the Equation for finding permeability by Variable head method. | CO1 | L2 | 1 |
| **Unit-I** | | | | | |
| 2 | a) | Define void ratio, porosity, degree of saturation, water content in a soil mass. | CO1 | L2 | 7M |
|  | b) | Following are the results obtained from a liquid limit test on a clay sample whose plastic limit is 20% plot the flow curve and obtain the liquid limit, plasticity index.   |  |  |  |  |  | | --- | --- | --- | --- | --- | | No of blows | 12 | 18 | 22 | 34 | | Moisture content (%) | 56 | 52 | 50 | 45 | | CO1 | L4 | 7M |
|  |  | **(OR)** |  |  |  |
| 3 | a) | Explain the IS Soil classification system. | CO1 | L2 | 7M |
|  | b) | The laboratory test results of a soil sample are given below. Percentage finer than 4.75 mm is 60, percentage finer than 0.075 mm is 30; liquid limit = 35 %; plastic limit = 27 %. Give the classification of soil with justification. | CO1 | L4 | 7M |
| **Unit-II** | | | | | |
| 4 | a) | Derive an expression to determine coefficient of permeability of soil by laboratory falling head permeability test. | CO2 | L3 | 7M |
|  | b) | Determine the average horizontal and vertical permeability coefficients of a soil deposit made up of three horizontal strata, each 1m thick, if the coefficients of permeability are 1x10-1mm/s, 3x10-2mm/s, and 8x10-3 mm/s respectively for the three layers. | CO2 | L4 | 7M |
| **(OR)** | | | | | |
| 5 | a) | Explain about quick sand condition in detail. | CO2 | L2 | 7M |
|  | b) | Write about principle and physical meaning of effective stress. | CO2 | L4 | 7M |
| **P.T.O**  **20CE405**  **Unit-III** | | | | | |
| 6 | a) | Explain briefly about Newmark’s Influence Chart and Westergaards equation? | CO3 | L2 | 7M |
|  | b) | A concentrated load of 200kN is applied at the ground surface. Determine the vertical stress at point P which is 6m directly below the load. Also calculate the vertical stress at point R which is at a depth of 6m but at a horizontal distance of 5m from the axis of the load. | CO3 | L4 | 7M |
| **(OR)** | | | | | |
| 7 | a) | Write factors effecting compaction. | CO3 | L2 | 7M |
|  | b) | Compare S.P.T and M.P.T compaction tests. | CO3 | L4 | 7M |
| **Unit-IV** | | | | | |
| 8 | a) | Define Consolidation. Explain different types of consolidations. | CO4 | L3 | 7M |
|  | b) | What is coefficient of consolidation? How many days would be required by a clay stratum of 5 m thick, draining at both ends with coefficient of consolidation = 50 x 10-4 cm2/sec to attain 50% of its settlement? (use T50 = 0.197) | CO4 | L4 | 7M |
| **(OR)** | | | | | |
| 9 | a) | Explain Unconfined compression test in detail with a neat sketch. | CO4 | L3 | 7M |
|  | b) | Write about Triaxial test with neat diagram. | CO4 | L4 | 7M |

