**18CE505**

**Hall Ticket Number:**

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| **II/IV B.Tech (Regular) DEGREE EXAMINATION** | | | |
| **February, 2021** | **Civil Engineering** | | |
| **Fifth Semester** | **Soil Mechanics** | | |
| **Time:** Three Hours | | **Maximum: 5**0 Marks | |
| *Answer ALL Questions from PART-A.* | | | (1X10 = 10 Marks) |
| *Answer* ***ANY FOUR*** *questions from PART-B.* | | | (4X10=40 Marks) |
|  | | | **PART-A** |

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| 1. | a) | What are the types of soil formation? | CO1 |  |
|  | b) | Differentiate void ratio and porosity | CO1 |  |
|  | c) | State Darcy’s law and it’s validity | CO2 |  |
|  | d) | Draw the plasticity chart | CO2 |  |
|  | e) | What are the different types of heads in flow condition? | CO2 |  |
|  | f) | Define degree of compaction and zero air void lines | CO3 |  |
|  | g) | Differentiate standard proctor and modified proctor tests. | CO3 |  |
|  | h) | Differentiate compaction and consolidation of soils | CO4 |  |
|  | i) | What are the types of drainage conditions in triaxial tests? Explain briefly. | CO4 |  |
|  | j) | What are the different laboratory and field tests to be conducted to find shear strength of soils and their suitability? | CO4 |  |
| **PART-B** | | | | |
| 2. | a) | Explain in detail how soils are formed and various types of soils formed by the methods of transportation and deposition. | CO1 | 5M |
|  | b) | Explain in detail regional soil deposits of India | CO1 | 5M |
|  |  |  |  |  |
| 3. | a) | Derive relationship among void ratio(e), degree of saturation (s), water content (w) and specific gravity (G) | CO1 | 5M |
|  | b) | An embankment having a total volume of 15000m3 has a water content of 16% and dry density of 1.75g/cc. It was constructed from a barrow pit having water content13% and void ratio 0.6. Calculate the quantity of soil which was excavated for construction of above embankment. Take G = 2.68 | CO1 | 5M |
|  |  |  |  |  |
| 4. | a) | Explain in detail IS soil classification system and draw flow chart | CO2 | 5M |
|  | b) | What are the factors affecting permeability of soils ? Explain in detail | CO2 | 5M |
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| 5. | a) | Explain falling head method of determining coefficient of permeability with a neat diagram | CO2 | 5M |
|  | b) | A constant head permeability test was conducted on a cylindrical specimen of diameter 7.5cm having a head of 24.7 cm over a sample of length 18 cm. the quantity of water collected in 60 sec was 626 ml. Calculate coefficient of permeability. | CO2 | 5M |
|  |  |  |  |  |
| 6. | a) | Write a short notes on principle of effective stress and physical meaning of effective stress | CO3 | 5M |
|  | b) | Derive equation for critical hydraulic gradient for quick sand condition | CO3 | 5M |
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| 7. | a) | Explain in detail various factors affecting compaction | CO3 | 5M |
|  | b) | Calculate the maximum dry density and optimum water content for the following results obtained from a standard proctor test (SPT) of a sample. Volume of mould is 950 ml.   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | Water content (%) | 12 | 14 | 16 | 18 | 20 | 22 | | Mass of wet soil (kg) | 1.68 | 1.85 | 1.91 | 1.87 | 1.87 | 1.85 | | CO3 | 5M |
|  |  |  |  |  |
| 8. | a) | Compare the two methods of determining coefficient of consolidation. | CO4 | 5M |
|  | b) | A 8 m thick clay layer with single drainage settles by 120 mm in two layers. The coefficient of consolidation for this clay was 6 x 10 -3cm2/sec. Calculate the ultimate consolidation settlement. | CO4 | 5M |
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| 9. | a) | Explain three types of triaxial tests based on drainage conditions | CO4 | 5M |
|  | b) | A series of direct shear tests was conducted on a soil, each test was carried out till the sample failed. The following results were obtained.   |  |  |  | | --- | --- | --- | | Sample No. | Normal stress (kN/m2) | Shear stress (kN/m2) | | 1  2  3 | 15  30  45 | 18  25  32 | | CO4 | 5M |

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