Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_



**End Semester Examination – Nov/Dec – 2017**

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| **Code :** | **17CE3035** | **Duration :** | **3hrs** |
| **Sub. Name :** | **STRENGTH AND DEFORMATION CHARACTERISTICS OF SOILS** | **Max. marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | Explain the volume change behavior of soil and its strength parameters. | CO1 | 10 |
| b. | Samples of compacted, clean dry sand were tested in a shear box 6cm x 6cm and the following results were obtained.   |  |  |  |  | | --- | --- | --- | --- | | Sample | Normal load  (N) | Peak shear load (N) | Ultimate shear load(N) | | 1 | 100 | 90 | 55 | | 2 | 200 | 181 | 152 | | 3 | 300 | 270 | 277 | | 4 | 400 | 362 | 300 |   Determine the angle of shearing resistance of the sand in i. the dense state ii. the loose state. | CO2 | 10 |
| (OR) | | | | |
| 2. | a. | A cylinder of soil fails under an axial load of 160kN/m2, when it is laterally unconfined the failure plane makes an angle of 50° with the horizontal. Calculate the value of cohesion and the angle of internal friction of the soil. | CO3 | 10 |
| b. | List out the limitations of vane shear test. | CO2 | 10 |
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| 3. | a. | A vane 10 cm long and 8cm in dia was pressed into soft clay at the bottom of bore hole. Torque was applied and gradually increased to 45 N-m when failure took place subsequently the vane was rotated rapidly so as to completely remould the soil. The remoulded soil was sheared at the torque of 18N-m. Calculate the cohesion of clay in the natural state and also the value of sensitivity. | CO3 | 10 |
|  | b. | Enumerate the stress path methods. | CO5 | 10 |
| (OR) | | | | |
| 4. | a. | Illustrate the yield criteria of Von Mises & KvickPatriak. | CO5 | 10 |
|  | b. | A lateral pressure in a triaxial compression test in a cohesive soil gives the following results;angle of shearing resistance Ø=17.5 °; cohesion = 3.0 kg/cm2 total axial stress failure =18kg/cm2 Determine the lateral pressure. | CO4 | 10 |
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| 5. | a. | Make detailed discussion on Mour-Coulomb failure criterion. | CO4 | 10 |
|  | b. | Explain the Skempton and Henkle pore pressure parameters. | CO6 | 10 |
| (OR) | | | | |
| 6. | a. | In case of normaly consolidated clays, prove that | CO4 | 10 |
|  | b. | Enumerate the total stress and effective stress approach on soil. | CO5 | 10 |
| 7. |  | Determine the shear strength in terms of effective stress on a plane within a saturated soil mass at a point where the total normal stress is 200 kN/m2 and the porewater pressure is 80 kN/m2. The effective stress, shear strength parameters for the soil are c’=16 kN/m2 and Ø=30 °. | CO6 | 20 |
| (OR) | | | | |
| 8. | a. | In an in situ vane shear test on a saturated clay ,a torque of 35Nm was required to shear the soil. The diameter of the vane was 50 mm and length 100 mm. Calculate the undrained shear strength of clay. The vane was then rotate rapidly to cause remoulded state was 5 Nm. Determine the sensitivity of clay. | CO4 | 10 |
|  | b. | Enumerate the Elastic properties of soil and limitations of elasto-plastic and visco-elastic laws. | CO5 | 10 |
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|  | | **Compulsory**: |  |  |
| 9. | a. | Define dilatancy and overburden correction factors. | CO1 | 5 |
|  | b. | Explain liquefaction and liquefaction potential. | CO2 | 8 |
|  | c. | Discus the various state of volume change behavior of soil. | CO3 | 7 |

ALL THE BEST