**Q.P. Code: 16CE122** **R16**

**Reg. No:** | | | | | | | | | | |

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR**

(AUTONOMOUS)

**B.Tech III Year I Semester Supplementary Examinations November-2020**

**GEOTECHNICAL ENGINEERING-I**

(Civil Engineering)

Time: 3 hours Max. Marks: 60

(Answer all Five Units **5 x 12 = 60** Marks)

**UNIT-I**

| | | | |
|---|---|---|---|
| **1** | **a** | Explain the phenomenon of formation and transportation of soils. | **6M** |
| | **b** | Write notes on structure of soils. | **6M** |

**OR**

| | | | |
|---|---|---|---|
| **2** | **a** | What was the relative density write the importance of this term? | **6M** |
| | **b** | The unit weight of sand backfill was determined by field measurements to be 17.13kN/$m^3$. The Water content at the time of test was 8.60% and the unit weight of the solid constituents was 25.50kN/$m^3$ .In the laboratory the void ratio in the loosest and densest state ware found to be 0.642, 0.462. | **6M** |

**UNIT-II**

| | | | |
|---|---|---|---|
| **3** | | Write the permeability equation by constant head method and explain factors effecting permeability. | **12M** |

**OR**

| | | | |
|---|---|---|---|
| **4** | | What is flow net? Describe its properties and applications. How to construct a flow net? | **12M** |

**UNIT-III**

| | | | |
|---|---|---|---|
| **5** | | A concentrated load of 1500 kN acts vertically at the ground surface. Determine the vertical stress at A point which is at<br>i) a depth of 2.5 m and a horizontal distance of 4.0 m.<br>ii) at a depth of 5.0 and a radial distance of 2.5 m | **12M** |

**OR**

| | | | |
|---|---|---|---|
| **6** | **a** | What are the factors that affect compaction? Discuss in brief | **5M** |
| | **b** | The soil from a borrow pit is at a bulk density of 17.50 kN/$m^3$ and a water content of 12.3%. It is Desired to construct an embankment with a compacted unit weight of 19.82 kN/$m^3$ at a water Content of 17%.Determine the quantity of soil to be excavated from the barrow pit and the amount of water to be added for every 100 m3 of compacted soil in the embankment. | **7M** |

**UNIT-IV**

**7** **a** Define the Following terms **6M**

i) Coefficient of compressibility,

ii) Coefficient of volume change

iii) Compression index

**b** Discuss the spring analogy for primary consolidation. **6M**

**OR**

**8** **a** A saturated soil has a compression index of 0.25. Its void ratio at a stress of 10 kN/$m^2$ is 2.06 and Its permeability is 3.7 × 10–7 mm/s. Compute **12M**

(i) Change in void ratio if the stress is increased to 18.5 kN/$m^2$

(ii) Settlement in (i) if the soil stratum is 5 m thick; and

(iii) Time required for 40% consolidation if drainage is one-way.

**UNIT-V**

**9** **a** Explain the principle of the direct shear test. What are the advantages of this test? **6M**

**b** Write brief critical notes on Mohr's Circle. **6M**

**OR**

**10** A triaxial compression test on a cohesive sample cylindrical in shape yields the following effective Stresses: **12M**

Major Principal stress ... 8 MN/$m^2$

Minor principal stress ... 2 MN/$m^2$

Angle of inclination of rupture plane is 60° to the horizontal. Present the above data, by means of a Mohr's circle of stress diagram. Find the cohesion and angle of internal friction.

*** END ***