Q.P. Code: 16CE155 **R16**

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

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech II Year I Semester Supplementary Examinations June 2019

SOIL SCIENCE & SOIL MECHANICS

(Agriculture Engineering)

Time: 3 hours **Max. Marks: 60**

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

UNIT-I

1. a) Discuss the roll of any five nutrients in plant growth. **6M**
   b) Explain in detail about Soil Biology. **6M**

OR

2. a) Define soil erosion? Describe different kinds of soil erosion? **6M**
   b) Explain various Agro climatic zones of Andhra Pradesh and mention their characteristics? **6M**

UNIT-II

3. a) Enumerate different objectives of Tillage? **6M**
   b) Explain in brief, how the physical properties of soil are effected by Tillage. **6M**

OR

4. a) How do you reclaim saline and alkali soils? **6M**
   b) What is meant by ion exchange? What are the different factors affecting ion exchange? **6M**

UNIT-III

5. a) Define: degree of saturation; porosity; air content and density index **6M**
   b) A partially saturated soil sample has a moisture content of 14% and bulk unit weight of 20kN/m^3. Given that the specific gravity of solids is 2.70, determine the degree of saturation and void ratio. What will be the unit weight of the sample on complete saturation? **6M**

OR

6. A natural soil deposit has a bulk unit weight of 18.5 kN/m^3 and water content of 5%.Estimate the amount of water required to be added to 1 m3 of soil to raise the water content to 15%. Assume the void ratio to remain constant. The specific gravity of solids is 2.67. **12M**

UNIT-IV

7. a) Explain Westergaard's theory for the determination of the vertical stress at a point. How is it different from Bossinesq's solution? **6M**
   b) A point load of 5000 KN is acting at the ground surface. Determine the vertical stress at a point'P' which is 5m directly below the load. What will be the vertical stress at a point which is at a depth of 5m and at a horizontal distance of 3m from the axis of the load? Use Boussinesq's theory. **6M**

OR

8. What are the properties and uses of a flow net? If K1, K2 are the permeability's of layers h1, h2, h3 thick, what is its equivalent permeability in the horizontal and vertical directions? Derive the formulae used. **12M**

UNIT-V

9. a) Differentiate between Compaction and consolidation and Standard proctor test and modified proctor test. **6M**
   b) Following are the results of a standard compaction test performed on a sample of soil.

Water content (%)	5	10	13	18	24
Bulk density (KN/m^3)	17.80	20.00	21.00	21.60	20.80

   Determine the OMC and maximum dry density; calculate the water content necessary to Completely saturate the sample at its maximum dry density assuming no change in volume. Take G=2.72. **6M**

OR

10. a) Describe a method to determine the pre-consolidation pressure of soil. Explain its Significance. **6M**

b) Explain the principle of direct shear test. What are the advantages of this test? What is its limitation? **6M**

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