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B.Tech Even Semester (CBCS) Exam., May—2018

AGRICULTURAL ENGINEERING

(4th Semester)

Course No. : AECC11

(Soil Science)

Full Marks : 50
Pass Marks : 15

Time : 2 hours

Note : 1. Attempt *any* **five** questions.

2. Begin each answer in a new page.

3. Answer parts of a question at a place.

4. Assume reasonable data wherever required.

5. The figures in the margin indicate full marks for the questions.

1. *(a)* What is horizon? Briefly explain about the major kinds of changes that take place during the formation of horizon. 1+4=5

(b) Define the following : 1×5=5

(i) Andisols

(ii) Gelisols

(iii) Histosols

(iv) Vertisols

(v) Mollisols

2. *(a)* Distinguish between the following : 2+2+2=6

(i) Water holding pores and Aeration pores in soils

(ii) Dry bulk density and Wet bulk density of soils

(iii) Prism-like structure and Platy structure in soils

(b) Write the effect of texture and structure on porosity. 4

3. *(a)* What is soil colour? Mention about the factors affecting soil colour. 1+3=4

(b) Write short notes on the following : 3+3=6

(i) General properties of soil colloids

(ii) Importance of soil aeration

4. *(a)* Give a specific relation between soil temperature and soil moisture. Write the factors affecting of soil temperature. 1+4=5

(b) How the gases can exchange between soil and atmosphere? Write the mechanism of gas exchange. 5

5. *(a)* What is soil air? Write factors affecting of the composition of soil air. 1+4=5

(b) How do the forces of adhesion and cohesion operate in the soil system? 2

(c) A soil core with a height of 8 cm and a diameter of 6 cm, weighs 225 g when collected and 198 g when oven-dried. When the core was ground and poured into 100 ml of water, the final volume of the soil-water mixture was 171 ml. Calculate the soil bulk density, particle density and percent pore space. 3

6. *(a)* Explain the hydrometer method of classifying soil texture. 5

(b) Calculate the percentage of sand, clay and silt when a 40 second and 8 hour hydrometer readings are 20 and 15 respectively. Assume that a 50 g soil sample is used. 3

(c) Differentiate between type, class and grade of soil. 2

7. *(a)* What is weathering? Describe different types of weathering. 1+4=5

(b) Describe the importance of soil as a medium for plant growth and ecosystem. 5

8. *(a)* Briefly describe about the sources of charges on soil colloids and their charge characteristics. 5

(b) Briefly describe about the electrokinetic phenomena in soil colloids. 5

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