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ET-531(B)

B.Tech. Civil (Water Resources Engineering)

Term-End Examination

00135 **December, 2014**

ET-531(B) : SOIL SCIENCE

Time : 3 hours *Maximum Marks : 70*

Note : *Answer any* ***five*** *questions. All questions carry equal marks. Well-labelled diagram shall carry due weightage.*

1. (a) Differentiate between chemical and biological weathering. 7

(b) Detail out specific processes involved in soil formation. 7

2. (a) Explain the following processes and their importance in imparting soil characteristics : 7

(i) Diffusion

(ii) Thermal conductivity

(b) Differentiate between soil consistency and soil aggregate stability. Explain both with suitable examples. 7

3. (a) Explain sorption and desorption. How are these different ? Also explain the suction-water-content curves in above respects. 7

(b) Write design principles and utility of the following instruments used for moisture measurement (any ***two***) : $2 \times 3\frac{1}{2} = 7$

(i) Resistance meter

(ii) Neutron probe

(iii) Tensiometer

4. (a) What is the importance of ion exchange phenomenon ? What are the different measures for it ? How is information on ion exchange beneficial ? 7

(b) What do you mean by soil pH ? What are the different parameters and their limits to classify soil as acidic and alkaline ? What are the harmful effects of soil alkalinity and acidity ? 7

5. (a) What are the characteristic features of black soil ? How is it different from red soil ? 7

(b) Explain the relationship between soil pH and the relative availability of plant nutrients. Briefly explain integrated nutrient management. 7

6. (a) What are the diagnostic horizons and diagnostic features in soil taxonomy ? How are they different ? 7

(b) Briefly describe categories of the soil given by the US system. What are the basic differences with that of the Indian system ? 7

7. (a) Give a detailed classification of soil organisms. How do soil flora and soil fauna make a difference in soil health ? 7

(b) Differentiate amongst bacteria, fungi and algae. How are these important for agriculture ? 7

8. (a) List the processes through which organic and mineral matter is converted into a form which is available for plant growth. Also explain carbon cycle and its utility. 7

(b) Write short notes on the following : $2 \times 3\frac{1}{2} = 7$

(i) Nitrogen cycle

(ii) Humus synthesis
