

**B.Tech. Civil (Water Resources  
Engineering)**

**Term-End Examination  
December, 2012**

**ET-531(B) : SOIL SCIENCE**

*Time : 3 hours*

*Maximum Marks : 70*

**Note :** *Answer any five questions.*

*All questions carry equal marks.*

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|----|-----|--|---|
| 1. | (a) | Define weathering of rocks. Also discuss the concept of Soil Genesis.  | 5 |
|    | (b) | What are the different types of rocks and minerals ? How the chemical properties of the soils are affected by rock types ? | 5 |
|    | (c) | How many types of sedimentary rocks are found. Which is the most abundantly available sedimentary rock type ?              | 4 |
| 2. | (a) | Define soil texture. Differentiate between USDA and ISSS soil textural classification.                                     | 4 |
|    | (b) | What is Stoke's law ? How is it used in textural analysis in International Pipette method of soil textural analysis ?      | 4 |
|    | (c) | What are Atterberg Limits ? Define the plasticity index ?  | 3 |
|    | (d) | How the Atterberg Limits are estimated in the laboratory conditions ?  | 3 |

3. (a) Explain Hysterisis with respect to sorption and desorption. 5
- (b) The bulk density of a soil sample is 1.6g/cc and the particle density is 2.6g/cc. Calculate its porosity (n). 4
- (c) Define void ratio (e) and express a relationship between porosity (n) and void ratio (e). 5
4. (a) Differentiate between Permeability and Hydraulic conductivity. 3½
- (b) What do you understand by Soil Plant Atmospheric Continuum ? 3½
- (c) Develop an expression of Root Zone Water Balance and clearly explain the terms used. 3½
- (d) Differentiate between Permanent Wilting Point (PWP) and Saturation Percentage (SP). 3½
5. (a) What is the relevance of soil surveys ? 3½
- (b) Write down the benefits of interporation of soil survey reports. 3½
- (c) Explain the diagnostic features of Horizons for texonomic classification. 3½
- (d) Explain the criteria adopted in Land evaluation and determine the Storie Index Rating if the following information are given : 3½

- (i) Profile-stratified clay subsoil.
- (ii) Surface texture clay.
- (iii) Slope (Hilly region) > 16-30%.
6. (a) What are different systems adopted in evaluating the lands for productivity ?  $3\frac{1}{2}$
- (b) Define Plant Pathogenicity.  $3\frac{1}{2}$
- (c) What are different levels of control measures against pathogens ?  $3\frac{1}{2}$
- (d) Explain the thermal capacity of soil.  $3\frac{1}{2}$
7. (a) What is Soil Fauna ? Explain.  $3\frac{1}{2}$
- (b) Discuss the role of algae in enhancing soil fertility.  $3\frac{1}{2}$
- (c) Explain the microbial metabolism and soil enzymes.  $3\frac{1}{2}$
- (d) Differentiate between symbiotic and non-symbiotic nitrogen fixing bacteria.  $3\frac{1}{2}$
8. Write short notes on *any four* of the following :
- (a) Carbon cycle  $4 \times 3\frac{1}{2} = 14$
- (b) Immunization of the soil
- (c) Nitrogen Cycle
- (d) Hydrological Cycle
- (e) Soil organic matter.
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