

KERALA AGRICULTURAL UNIVERSITY
B.Sc.(Hons.) Agriculture – 2010 Admission - 1st Semester
Final Examination – March/April 2011

Cat. No. : Ssac 1101

Title : Introduction to Soil Science (2+1)

Max. marks: 80

Time : 3 hours

I. Fill up the blanks

(12 x 0.5 = 6.0)

1. Soil is derived from a Latin word _____
2. The most abundant metallic element in earth crust is _____
3. The troposphere region spread over a height of _____
4. The thickness of mantle is _____
5. The water lies between wilting coefficient and field capacity is known as _____
6. The SiO₂ content of ultra basic rock is _____
7. _____ proposed the Nebula hypothesis of earth formation
8. The dominant clay mineral in alluvial soil is _____
9. Heavy minerals are having the specific gravity of _____
10. _____ and _____ are the primary and secondary sources of organic matter
11. Among the components of organic matter, _____ decomposes very slowly
12. The term pH was coined by _____

II. Match the following

(12 x 0.5 = 6.0)

- | | |
|--------------------|--------------------------------|
| 1. Gleization | a) Colloid |
| 2. Oxygen | b) High anion exchange |
| 3. Syenite | c) Non ferro-magnesium mineral |
| 4. Lignite | d) Poor drainage |
| 5. Albite | e) Weathering stage |
| 6. Kaolinite | f) Plutanic rock |
| 7. Fe oxides | g) Carbonaceous rock |
| 8. Humus | h) Marble |
| 9. Wind deposition | i) Non metallic element |
| 10. Senile | j) Soil temperature regulation |
| 11. Mulch | k) Eolian |
| 12. Muscovite | l) Soda feldspar |
| | m) Cementing agent |

III. State True or False (*any twelve*)

(12 x 0.5 = 6.0)

1. The hardness of Topaz is 7 in the Mohr's scale
2. The main source of soil heat is through solar radiation
3. Transformation of unconsolidated sediments to hard rock is called diagenesis
4. Tourmaline is a manganese rich mineral
5. Surface entry of water into the soil is called infiltration
6. Durability of ped is called Grade
7. Chemical combination of water with particular mineral is called hydrolysis
8. The colour of haematite is cherry red
9. The proportion of water and air in the soil is not interrelated
10. Laterite soils are found in Malabar hills of Kerela state
11. In soil profile, B horizon is known as eluvial horizon
12. The factors of soil formation was proposed by Joffe in the year 1941
13. Clay soils have higher pore space than sandy soils

IV. Answer in one word / sentence / *define*

(12 x 0.5 = 6.0)

1. Who authored the latest edition of the book Nature and Properties of Soil?
2. Give the chemical formula for Gibbsite and Limonite
3. Mention the major difference in the soil profile of arable and forest soil
4. What is the CEC of kaolinite clay?
5. Name a phosphorus containing mineral
6. What is chroma?
7. What is percolation?
8. Mention any two methods of determining soil moisture
9. List the components of soil
10. Mention the major minerals present in granite rock
11. Define soil pH

12. What is streak? •

V. Write Short notes on (Answer any **Eight** questions only)

(8 x 2 = 16)

1. C: N ratio
2. Soil moisture constants
3. Clay - humus complex
4. Podzolization and Laterization
5. Importance of soil temperature
6. Alluvium and Colluvium
7. Spheres of earth
8. Amorphous minerals
9. Pedological and Edaphological approach
- 10 Reclamation of acid soils

VI. Explain (Answer any **Four** questions only)

(4 x 5 = 20)

1. With a neat diagram explain a hypothetical soil profile
2. Discuss the salient features, merits and demerits of USDA soil taxonomy
3. What is weathering? Explain the processes of chemical weathering with examples
4. Define humus. Discuss on the significance of organic matter on soil fertility and explain the factors influencing the organic matter status of the soil.
5. What do you understand by ion exchange? Explain about the significance of ion exchange reactions in soil.

VII. Answer any Two of the following

(2 x 10 =20)

1. What is meant by soil degradation? Explain in detail the origin, characteristics and reclamation of saline, sodic and saline alkali soils.
2. What do you understand by soil formation? Discuss in detail the role of various factors on soil formation
3. Define soil structure. Give a detailed account on the types and classes of soil structure. Discuss on the conditions essential for soil structural development.