

B.Sc.(Ag.) Honours Semester– VII Examination, 2014

Course No. : SSC-EL –2 (Advanced Soil Science)

(Old Syllabus)

Signature of Centre Superintendent

Roll No.: (in figure) _____ (in words) _____
Student Index No. _____ Regn. No. _____ of _____

Time : Two hours

Full marks : 50

Questions are of value as indicated in the margin

Part-I

(Objective and Short Answer Type)

(Use only ball point pen)

Time : 30 minutes

Full marks : 20

- Note :** 1. Answer in question paper itself.
2. Striking, rewriting and overwriting are not allowed in the objective type questions.

1. State whether the following statements are True (T) or False (F) (any five):

1×5=5

- i) Excessive tillage reduces infiltration. ☐
- ii) Thermal conductivity varies with the degree of compaction of soil. ☐
- iii) If the temperature of the suspension increase, the sedimentation time for silt and clay particles increase. ☐
- iv) Soils having more amount of macropores generally have higher porosity. ☐
- v) When a higher charged ion is substituted by lower charged ion, negative charge occurs. ☐
- vi) The water content of a soil is inversely related to the suction with which water is held by the soil. ☐
- vii) Friable consistency represents the optimum moisture condition for tillage. ☐
- viii) The udic moisture regime is common in soils of arid climate. ☐

2. Fill in the blanks (any five):

1×5=5

- i) X-ray diffraction method is useless in the identification of _____ minerals.
- ii) The expression of soil water potential in weight basis is _____.
- iii) The source of charge of kaolinite is _____.
- iv) Thermal diffusivity is the ratio of thermal conductivity to _____.
- v) The unit of viscosity is _____.
- vi) In laterite soils the dominant cementing agent _____ responsible for aggregate formation.
- vii) Liming of acid soils _____ availability of phosphorus.
- viii) The quality of irrigation water that can be used safely when its RSC value is _____ me per litre.

3. Answer in brief (*any five*) of the following:

2×5=10

(i) Y-index value

(ii) Heat capacity and specific heat

(iii) Cation exchange

(iv) pH dependant charge

(v) Soil crusting

(vi) Reynold's number

(vii) X-ray diffraction analysis

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Part–II

(Descriptive Type)

Time : 1.5 Hours

Full marks : 30

Questions are of value as indicated in the margin.

Answer **any three** questions.

4. State Darcy's law and its limitations in soil water movement. What do you mean by hydraulic conductivity? Discuss about the factors affecting hydraulic conductivity of a saturated soil.
5+2+3=10
 5. What do you mean by dynamic properties of soil? Explain different Atterberg's limit and mention the importance of these units in conducting different agricultural operation in the field. What are the factors affecting viscosity and swelling of clays?
2+5+3=10
 6. What is brucite layer and how does it become charged? Write down the structure of fine grain mica clay mineral showing the arrangement of different constituents and charge in different layers. Mention some of its important properties.
2+6+2=10
 7. What do you mean by holomorphic soils? Describe the important characteristics of saline, sodic and saline-sodic soils. Describe the different problems involved in saline and sodic soils.
2+4+4=10
 8. Write an account on the following (**any four**):
2.5×4=10
 - (i) Isomorphous substitution
 - (ii) Leaching requirement
 - (iii) Diffuse double layer
 - (iv) Diagnostic horizons
 - (v) Stoke's law
 - (vi) Differential Thermal Analysis
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