

M.Sc. (Ag.) Examination, 2018
Semester-II
Soil Science and Agricultural Chemistry
Course : SSC-501
(Soil Physics)

Time : 3 Hours

Full Marks : 50

Questions are of value as indicated in the margin

Answer **any five** questions

1. (a) Write down Stokes law with equation. What are the assumptions and limitations of that law?
(b) Write in detail about the factors that influence aggregate stability.
(c) How do cations influence in the genesis of soil structure? 2+3+3+2=10
 2. (a) Describe Atterberg's limits.
(b) Differentiate between soil compaction and soil consolidation.
(c) What are the effects of puddling on bulk density, apparent specific volume change and organic matter decomposition? 4+3+3=10
 3. (a) What is hysteresis and how is it influenced?
(b) Derive Poiseuille's equation and state the assumptions of it.
(c) Briefly discuss the factors affecting saturated hydraulic conductivity. 4+4+2=10
 4. (a) Define soil water potential and what are its major components.
(b) Write in brief about the mechanism of soil crust formation and its management.
(c) How can soil temperature under field conditions be optimized? 3+4+3=10
 5. (a) Compare the composition of soil air and atmospheric air.
(b) How does gaseous interchange take place in soil air?
(c) Briefly describe the heat capacity, thermal conductivity and thermal diffusivity of soil. 2+4+4=10
 6. (a) Describe in brief Philip's horizontal and vertical infiltration equations.
(b) What is the difference between infiltration and percolation of water? Why does the infiltration rate fall with time?
(c) What are the essential physical conditions required for evaporation? 4+2+2+2=10
 7. Write short notes on (**any five**) : 2×5=10
(a) Darcy's law (b) Void ratio (c) Soil strength (d) Oxygen diffusion rate
(e) Swelling and shrinkage of soil (f) Soil conditioners (g) Fourier's law
(h) Zeta potential
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