

M.Sc. (Ag.) Semester-II Examination 2017
Soil Science and Agricultural Chemistry
Course : SSC-505
(Soil Biology and Biochemistry)

Time : 3 Hours

Full Marks : 50

Questions are of value as indicated in the margin

Answer **any four** questions

1. (a) Write down the different microbial interactions that exist in soil.
(b) How do soil texture, pH and organic C influence the microbial community in soil?
(c) 'Actinomycetes are the transitional group between bacteria and fungi' - explain. 3+6+3.5=12.5
2. (a) Mention the soil enzymes and the reactions involved in nitrogen cycle.
(b) What is the significance of root exudates in rhizosphere?
(c) Write down the functions of protease and phosphatase enzymes and their bio-chemical reactions in soil.
(d) How do rhizosphere microorganisms improve phosphorus availability to plant?
2.5+2+3+5=12.5
3. (a) What are the basic differences between cellulose and hemicelluloses?
(b) How does lignin contribute to soil humus formation?
(c) Write down the characteristics of humus.
(d) What are the sources of negative charges in humus?
(e) What do you mean by catabolite repression? 3+4+2+2+1.5=12.5
4. (a) Discuss the factors affecting the rate of decomposition of organic matter in soil.
(b) Write a note on aerobic and anaerobic decomposition of organic matter.
(c) How does clay affect the decomposition of organic substrate in soil?
(d) How do microorganisms degrade cellulose in soil organic matter? 3+4+2.5+3=12.5
5. (a) How does vermicomposting differ from conventional composting?
(b) What are the advantages of vermicomposting?
(c) Mention the types and species of earthworms commonly used for vermicompost preparation in our country.
(d) Outline the steps of vermicomposting.
(e) Write about the precautions and care that should be taken during vermicomposting.
2+3+2+2+3.5=12.5
6. (a) Define biofertilizer, 'Bio inoculants are not bio manures' – explain.
(b) How do biofertilizers differ from chemical fertilizers?
(c) Classify biofertilizers on the basis of plant nutrients.

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(2)

- (d) Discuss on the application technology of bacterial biofertilizers. $2.5+2+4+4=12.5$
7. (a) What is mycorrhiza? What types of mycorrhizal association are found in soil?
- (b) Write about 'cross inoculation group and *Rhizobium* legume association in symbiotic N-fixation.
- (c) Elucidate the preparation and characteristics of good quality compost.
- (d) What is the significance of C/N ratio in organic matter decomposition? $3+3+4+2.5=12.5$
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