

M.Sc. (Ag.) Examination, 2018
Semester-II
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 five** questions

1. (a) Why is soil considered as a good substrate for microbial growth?
(b) How soil organisms are classified on the basis of C-and energy source.
(c) Define/explain species diversity, functional diversity and keystone species of soil ecosystem?
(d) How do the consortia of soil microflora and fauna stimulate decomposition of added organic matters in soil 2+2+4+2=10
2. (a) Write down the various categories of organic matter that are added to soil.
(b) Write down the changes that occur in soil during the decomposition of added organic matter in soil?
(c) What are the end products of aerobic and anaerobic decomposition of organic matters decomposition?
(d) Elucidate the factors that affect the rate of decomposition. 2+3+2+3=10
3. (a) Define biological nitrogen fixation.
(b) What are the basic requirements (physiological need) for biological nitrogen fixation?
(c) Write a short note on nitrogenase enzyme complex.
(d) Classify various non-symbiotic nitrogen fixers on the basis of their carbon and oxygen requirement.
(e) Elucidate the factors that affect the BNF. 1+2+2+2+3=10
4. (a) What are the major types of mycorrhizae?
(b) Write brief note on ecto-and endo-mycorrhizae.
(c) Elucidate the importance of mycorrhizal association with respect to uptake and transfer of plant nutrients, carbon flow to fungal partner, interaction with other soil microorganisms.
(d) Write down the problems and prospect of inoculums production of mycorrhizae. 1+3+4+2=10

(2)

5. (a) Schematically represent the C-cycle in nature showing its major biological steps.
(b) Define denitrification. Give some example of denitrifying bacteria and their enzymes involved in denitrification.
(c) Define nitrification. Elucidate two distinct steps in nitrification with microorganisms and energy in each steps.
(d) What are the factors affecting denitrification in soil? $3+2+2+3=10$
6. (a) Differentiate between Indore and Bangalore methods of composting.
(b) How compost can be accelerated and enriched with microbial and mineral additives?
(c) Write down the process of vermicompost preparation along with the selection of earth worms and biomass. $2+3+5=10$
7. (a) Define biofertilizer.
(b) How does it differ from chemical fertilizer?
(c) Classify different types of biofertilizer with appropriate example and area of application.
(d) Write down the outline of production method of any biofertilizer used for field crops.
(e) Write down the application technology of bacterial biofertilizer. $1+1+4+1+3=10$
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