PG Odd Semester (CBCS) Exam., December—2016

LIFE SCIENCE AND BIOINFORMATICS

(3rd Semester)

Course No. : LSBCC–304 (B)

(Special Paper)

Full Marks : 70
Pass Marks : 28

Time : 3 hours

The figures in the margin indicate full marks for the questions

Candidates are to answer *either* Option—I *or* Option—II *or* Option—III

OPTION—I

(Microbial Ecology)

1. Explain the features that are shared and unique between prokaryotes and archea kingdoms. 14

OR

2. Write short notes on any *two* of the following : 7×2=14

(*a*) Bacterial diversity

(*b*) Origin of mitochondrion and chloroplast

(*c*) Microbial community structure

3. Define and differentiate Shelford's law and Liebig's law.

Discuss how different microbial populations adopted to growth at 'low' and 'high' temperatures. 4+10=14

OR

4. Write short notes on the following : 7+7=14

(*a*) Auto and Allo chthonous microbes

(*b*) Habitat *vs.* Niche

5. Explain the role of mircobes in biodegradation of xenobiotics. Illustrate the pathways operational in xenobiotic compound degradation. 7+7=14

OR

6. Explain the basis of beneficial plant-microbe interactions using suitable examples. 14

7. Explain the role of different microbes in phosphorus or nitrogen cycle. 14

OR

8. Write short notes on any *two* of the following : 7×2=14

(*a*) Biofertilizer

(*b*) Role of microbes in fuel recovery

(*c*) Microbial control of pests

9. Discuss various genotyping methods for identifying microbial isolates. 14

OR

10. Write short notes on the following : 5+5+4=14

(a) Metagenomics and its applications

(b) 16S rDNA

(c) PCR-RFLP

OPTION—II

(Taxonomy of Angiosperm and Medicinal Plant Studies)

1. Describe different types of taxonomic keys and mention their significance in plant identification. 14

OR

2. Describe a suitable method used in assessing relationship in plant taxonomy. 14

3. Following Cronquist (1981) system of classification write a detailed note on morphological diversity in the order Orchidales. 14

OR

4. Write a brief note on application of DNA markers in angiosperm taxonomy. 14

5. Highlighting RFC, Fic and use value, describe method of ethnobotanical data collection. 14

OR

6. Write short notes on any *two* of the following : 7×2=14

(a) Nutraceuticals

(b) LD_{50}

(c) Method of investigating hepato-protective activity of plant materials

7. *(a)* Write in brief the working principle of HPLC.

(b) Write on data interpretation of NMR spectra. 7+7=14

OR

8. Describe the following in brief : 7+7=14

(a) Biosynthetic pathways of phenols

(b) Separation of organic compounds using solvent partitioning

9. Write brief notes on molecular decking and QSAR. 14

OR

10. Write a brief note on TPR in drug discovery highlighting some of the controversies in drug patents. 14

OPTION—III

(Plant Biochemistry and Molecular Biology)

1. Explain free energy change for reactions under chemical equilibrium and oxidation-reduction reactions. 14

OR

2. Write notes on the following : 7+7=14

(a) Second law of thermodynamics

(b) Michaelis-Menten equation

3. Discuss biosynthesis of fatty acids and their regulation in plants. 14

OR

4. Explain biosynthesis of starch and its regulation in plants. 14

5. Discuss various methods of plant genetic engineering and generation of transgenic plants. 14

OR

6. Write notes on the following : 7+7=14

(a) Cloning vectors

(b) Biosafety

7. Discuss the various OMICs platform available for functional genomic studies in plants. 14

OR

8. Write notes on the following : 7+7=14

(a) Next generation sequencing

(b) Comparative genomics

9. What is signal transduction in plants? Analyze ROS signalling in plants. 14

OR

10. Write notes on the following : 7+7=14

(a) Signalling crosstalk

(b) Epigenetics

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