SH-III/ENV/302/C-6/19

B.Sc. 3rd Semester (Honours) Examination, 2019-20

ENVIRONMENTAL SCIENCE

Course ID : 31812 **Course Code : SH/ENV/302/C-6**

Course Title: Environmental Biotechnology

Time: 1 Hour 15 Minutes **Full Marks: 25**

The figures in the margin indicate full marks.

1. Answer *any five* from the following questions: 1×5=5

(a) Distinguish between Prokaryotes and Eukaryotes based on genetic material, and membrane bound organelles.

(b) Distinguish between euchromatin and heterochromatin.

(c) Distinguish between DNA and RNA on the aspects of organization and nucleotide constitution.

(d) Write down the central dogma of molecular biology.

(e) What do you mean by recombinant DNA technology?

(f) Write down four effective steps for waste water treatment.

(g) Define biopiles.

(h) Write down the scientific names of two PGPR bacteria and their function.

2. Answer *any two* from the following questions: 5×2=10

(a) Differentiate between bio-insecticides and bio-pesticides. Write down the name of three bio-insecticides and bio-pesticides each commonly used, their application procedure and functions. 2+3=5

(b) Define integrated pest control methods. Write down the procedures followed for integrated pest management in developed and developing countries. 2+3=5

(c) Write down the chemical components of DNA. Draw the chemical structure of four bases, Deoxyribose sugar and phosphoric acid. Describe how a nucleotide is formed from the said components. 1+3+1=5

(d) Distinguish between the B-form and Z-form structures of DNA. RNAs as intermediaries for gene expression are transcribed from DNA, transported out of the nucleus into cytoplasm and used for protein synthesis — Describe the roles performed by different RNAs for protein synthesis. 1+4=5

3. Answer *any one* from the following questions: 10×1=10

(a) Define aminoacids. How aminoacids are required for protein synthesis *in Vivo* and *in Vitro*? Classify aminoacids on the basis of their neutrality, (+)vely charged, (–)vely charged, hydrophobicity and hydrophilocity. How can you assume a protein to be acid or basic on knowing the aminoacid content? Write down the name of initiator aminoacid and initiator codon sequence for protein synthesis. 1+2+4+2+1=10

(b) Replication is the prime process for transmission of genetic material from parent to daughter cells, transcription and translation are the major steps for gene expression, describe the functional aspects of each of these process. Describe the fundamental components required and their usage for DNA/gene cloning in recombinant DNA technology. 5+5=10

———————