

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST-1 EXAMINATIONS- 2024

M.Sc. 2nd Semester (BT)

COURSE CODE (CREDITS): **20MSWBT232**

MAX. MARKS: 35

COURSE NAME: **Environmental Biotechnology**

COURSE INSTRUCTORS: **Dr. Ashok Kumar Nadda**

MAX. TIME: 2 Hours

Note: (a) All questions are compulsory.

(b) Marks are indicated against each question in square brackets.

(c) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

Section I

Q1. Answer the following questions. Each question is carrying one mark only.

- a) What is cellulosic ethanol, and how is it different from traditional ethanol? Give two example of microbial genera used in the production of bioethanol **(Mark 1)**
- b) What types of microorganisms are typically used in Microbial enhanced oil recovery (MEOR)? Give suitable examples. **(Mark 1)**
- c) How do phosphate-solubilizing bacteria aid in plant growth? Give two example of phosphate solubilizing microorganims **(Mark 1)**
- d) What types of feedstocks are suitable for biogas production using anaerobic digestion techniques? Give the example of common feedstock available in india that can be used for biofuels production **(Mark 1)**
- e) Discuss the environmental benefits and challenges of using biopesticides as biocontrol agents? **(Mark 1)**

Section II

Q 2 What are bioadhesives? Name a common natural source of bioadhesives. How can bioadhesives contribute to sustainability? **(Marks 3)**

Q 3 Enlist the enzymes and their sources used in the biomass degradation. Explain with the help of suitable examples. What is the main goal of feedstock biomass? **(Marks 3)**

Q 4 Describe the mechanism of action of *Bacillus thurengiensis*. Why Bt toxin protein is not harmful to the animals or plants? What are conditions required for the action of Bt toxin. (Marks 3)

Q 5 What are biolubricants. Name the natural sources of biolubricants. What are some key properties that biolubricants must possess? How do biolubricants contribute to environmental sustainability? (Marks 3)

Q 6 Write an essay on the mechanism of the synthesis and usage of bioplastic in the various fields. What is the current status of bioplastic production in India? (Marks 3)

Section III

Q 7 How the hydrocarbons are typically introduced into the environment? What role do microorganisms play in the bioremediation of hydrocarbons? Name a common type of microorganism used in the bioremediation of hydrocarbons. (Marks 5)

Q 8 Discuss the role of various microbial genera in the MEOR (Microbial enhanced oil recovery) process. How does the microbe can be used to increase oil recovery from deep wells? Explain with a labeled diagram. (Marks 5)

Q 9 With the help of a labeled diagram illustrate the various biological routes of bioethanol production along with examples of major microbial genera involved. Give examples of various biproducts formed during the ethanol production which inhibit its production. (Marks 5)