

U.G. 6th Semester Examination-2021**Molecular Biology & Biotechnology****[HONOURS]****Discipline Specific Elective (DSE)****Course Code : MBBT-H-606-T-DSE-4****(Environmental Biotechnology)**

Full Marks : 40

Time : 2½ Hours

*The figures in the right-hand margin indicate marks.**Candidates are required to give their answers in their own words as far as practicable.*

1. Answer any **five** of the following: 2×5=10
- a) Give two examples of pesticides.
 - b) Name two lignin degrading bacteria.
 - c) What are the four classes of petroleum hydrocarbons?
 - d) Name two main approaches of oil spill bioremediation.
 - e) What are the disadvantages of bioleaching?
 - f) Describe the process of microbial conversion of sugar to grain alcohol.
 - g) Mention few merits and demerits of biogas production.

- h) Mention the specific components removed from municipal wastes and industrial effluents during their treatment.

2. Answer any **two** of the following: 5×2=10
- a) Mention the source material used for production of biogas. Mention the components of biogas. What are the advantages of gasohol as an automobile fuel over gasoline (petrol)?
1+2+2
 - b) How will you isolate nitrogen fixing bacteria from soil? Mention the utility of VAM as biofertilizer.
2+3
 - c) Describe the microbial aerobic and anaerobic degradation of cellulose. How do heavy metal resistant bacteria respond to intoxication of heavy metals?
 $2\frac{1}{2}+2\frac{1}{2}$
 - d) Describe the different types of bioleaching with examples.
5
3. Answer any **two** of the following: 10×2=20
- a) Write a short note on the importance of 'Pseudomonads' in microbial degradation of petroleum hydrocarbons. 'Ambient temperature of the environment affects both the properties of spilled oils and activity of microorganism'.

[Turn over]

Justify. Rank the susceptibility of following hydrocarbons to microbial degradation.

- A) Cycline alkane
- B) Polycyclic aromatic hydrocarbons
- C) Linear alkane
- D) Small aromatics

E) Branched alkanes 5+3+2

b) Write a short note on bioleaching of copper. How microbes can be genetically modified to enhance the process of bioleaching. 5+5

c) Give a comparative account of different methods (trickling filter, activated sludge technique (aeration), oxidation pond, etc.) used in secondary treatment of wastewater. What is the role of sedimentation tank and grit chamber in primary treatment of wastewater? Give examples of symbiotic and free living nitrogen fixing bacteria. Mention their roles in soil enrichment. 5+2+3

d) Critically examine the environmental impacts of using conventional fuels. Give two examples of hydrogen producing microorganism. Also mention the substrate used by them. Explain the

process of methanogenesis by citing the examples of some methanogenic bacteria.

5+2+3
