

U.G. 6th Semester Examination - 2022

Molecular Biology and Biotechnology

[HONOURS]

Discipline Specific Elective (DSE)

Course Code : MBBT-H-606-T-DSE-4

Full Marks : 40

Time : 2 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 : $2 \times 5 = 10$
- a) Write the name of two microbes involved in biodegradation of pesticides.
 - b) Name two lignin degrading bacteria.
 - c) Name two microbial enzymes which can be involved in biodegradation of polyaromatic polychlorinated compounds.
 - d) Which metal ore is known as 'Fool's Gold' and why?
 - e) Mention the composition of biogas.
 - f) What is gasohol? Why it is a significant fuel?
 $1+1$
 - g) What is the principle of working of a microbial fuel cell?

[Turn Over]

- h) Biochemically explain the process of microbial hydrogen production.
2. Answer any **two** of the following: $5 \times 2 = 10$
- a) What are methanogenic bacteria? Describe the process of methane production by them.
 $2+3$
 - b) Give a comparative account of environmental impacts of conventional and modern fuels.
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 - c) Describe the microbial aerobic and anaerobic degradation of cellulose. How heavy metal resistant bacteria respond to intoxication of heavy metals?
 $2\frac{1}{2} + 2\frac{1}{2}$
 - d) Why *Acidithiobacillus ferrooxidans* are commonly used for bioleaching? Explain direct and indirect bioleaching of uranium.
 $1+4$
3. Answer any **two** of the following: $10 \times 2 = 20$
- a) Explain the process of biodegradation of petroleum hydrocarbon. Write the significance of temperature and pH in biodegradation of petroleum hydrocarbon. 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 bioprocessing of gold.
Describe the mechanism behind the extraction of metal from acid soluble ore (for example CuFeS_2) and acid insoluble ore (for example FeS_2). 5+5
- c) State the role of VAM as a biofertilizer. What is the role of nitrogen fixing bacteria in enrichment of soil? How do you isolate such bacteria? 4+3+3
- d) Mention the hazardous materials present in municipal and industrial wastes. Describe the processes involved in secondary treatment of municipal waste water. Why chlorination is important? 3+6+1
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