

2022

**MICROBIOLOGY — HONOURS**

**Paper : DSE-A-1**

**(Microbial Biotechnology)**

**Full Marks : 50**

*The figures in the margin indicate full marks.*

*Candidates are required to give their answers in their own words as far as practicable.*

Answer **Question no. 1** and **any three** from the rest.

1. Answer **any ten** questions :

2×10

- (a) What is 'Budapest Treaty'?
  - (b) How can you use microbial biosensor for monitoring pollution level in a water body?
  - (c) How are parasporal crystals of Cry proteins activated into active toxins?
  - (d) Which cell disruption technique should be used for industrial production of a cytosolic therapeutic protein and why?
  - (e) What are bacteriocins?
  - (f) How long a copyright is valid?
  - (g) What is VAM?
  - (h) What is intrinsic bioremediation?
  - (i) A single miRNA can regulate multiple mRNAs— justify.
  - (j) What is bioaugmentation?
  - (k) Write down the names of two microorganisms involved in degradation of PAHs.
  - (l) Mention two important applications of RNAi.
  - (m) What do you mean by subunit vaccines? Give example.
  - (n) "Nutrient manipulation is an important factor for optimum yield of microbial polysaccharides". Explain.
  - (o) Mention any two criteria for the choice of the recovery process of microbial products.
2. (a) What is PHB? Give the name of a microorganism that produces PHB. What could be the possible commercial applications of this compound?
- (b) Give a brief account of the working principle of a microbial biosensor.
- (c) Schematically represent the production of recombinant Hepatitis B vaccine. (2+1+2)+3+2

**Please Turn Over**

3. (a) How does a patent document help in research and development?  
(b) "Copyright does not cover or protect ideas and concepts."— Explain the statement.  
(c) Write down any one ground for the refusal of registration of a trademark.  
(d) State the special applications of immobilized cells. 2+3+2+3
4. (a) Describe briefly the basic biological treatment essential for lignocellulosic materials used for biofuel production.  
(b) What are the major components of biogas? Specify the factors affecting large scale biogas production.  
(c) Differentiate between the DNA-based and RNA-based strategies of using RNAi as therapeutics.  
(d) Cite examples of an algal strain and a bacterial strain for commercial production of biodiesel and biohydrogen. 2+(1+2)+3+2
5. (a) Explain the basic principle of affinity chromatography with a suitable example.  
(b) A 90 KD therapeutic protein after purification is showing a 20 kD contaminating protein band in SDS-PAGE. How can this contamination be removed?  
(c) What are the two major filtration techniques used in downstream processing?  
(d) List the different factors affecting the efficiency of filtration. 3+2+2+3
6. (a) What is the clinical use of streptokinase? Which organism produces this?  
(b) Why recombinant streptokinase is preferred over native streptokinase?  
(c) What is cocoa butter? How is it produced? (2+1)+2+(2+3)
7. Write short notes on *any four* : 2½×4
- (a) 2G ethanol  
(b) Production of HFCS  
(c) Humulin  
(d) Membrane filtration  
(e) Biotransformation.
-