

2020

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** questions from the rest.

1. Answer **any ten** questions : 2×10
- (a) Name any two genetically engineered therapeutic agents approved for clinical use in humans.
 - (b) What is Bt cotton? Name the gene which is incorporated.
 - (c) What is the major problem with traditional 'live vaccines'?
 - (d) What is microbial polyhydroxyalkanoates (PHA)? How is it produced?
 - (e) 'Copyright does not cover or protect ideas and concepts.'— Explain the statement.
 - (f) How is cocoa butter produced?
 - (g) Where does biotransformation occur in the body?
 - (h) What are the advantages of using immobilised enzymes?
 - (i) Give an example of each of methane and hydrogen producing microbes.
 - (j) Mention any two uses of *Lactobacillus sakei* in food technology?
 - (k) Why is xanthan considered to be an industrially important microbial polysaccharide?
 - (l) What is xenobiotics? Give Example.
 - (m) Name two bacterial toxins with their producer organisms.
 - (n) How can yeast artificial chromosome be used as a genetic engineering tool?
 - (o) Give two examples of recombinant subunit vaccine.
2. (a) What is HFCS? Schematically show HFCS production?
(b) Give example of a bioinsecticide. How is it produced and how does it work? (1+3)+(1+3+2)
3. (a) What do you mean by therapeutics? Give example.
(b) What are the major portals of entry for pathogens? How do pathogens cause damage to the host?
(c) What are the three types of host-microbe interactions? Can pathogens invade blood-brain barrier (BBB)? Discuss with shetagh example. 2+(2+2)+(2+2)

Please Turn Over

4. (a) Suppose, you have isolated a bacterium from waste water, worked on it and now you want to claim a patent for it. What are the essential criteria to support your claim?
- (b) Write down the trademark symbols for :
- (i) Registered trademark
 - (ii) Unregistered trademark
 - (iii) Unregistered service mark.
- (c) What are 'neighboring rights'?
- (d) What is Budapest Treaty? 3+3+2+2
5. (a) How is the Hepatitis B vaccine produced by recombinant DNA technology? How is it purified? Is it given alone or with adjuvant? Explain.
- (b) Why streptokinase is important?
- (c) Write down the name of a microbial polysaccharide with producer organism and mention its importance. (2+1+1+1)+2+(1+1+1)
6. (a) How does RNAi work?
- (b) Discuss in brief any one therapeutic application of RNAi.
- (c) How is RNAi delivered to combat drug resistance?
- (d) Differentiate between siRNA and miRNA on the basis of their mechanism of action. 3+3+2+2
7. (a) Filtration is a very initial step in product purification. What are the various filtration techniques used in product purification step?
- (b) If a product is negatively charged protein, which exchanger is used for its purification? How is the bound protein eluted?
- (c) If the products are coagulation factor, enzyme, antigen and glycoprotein, what will be the corresponding immobilised ligands? 3+(1+2)+1×4
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