

2019
BIOTECHNOLOGY
(Theory)

Full Marks : 70

Pass Marks : 21

Time : Three hours

All the questions are compulsory.

The figures in the right margin indicate full marks for the questions.

For question Nos. 1 to 4 are of objective type questions carrying 1 mark each, select the most appropriate one from the given alternatives A, B, C and D and rewrite the same.

1. Oxygen is transported through human body by 1
- A. Myoglobin
 - B. Collagen
 - C. Lactoglobulin
 - D. Haemoglobin
2. Commercially developed interferons are produced through rDNA technology by using 1
- A. *Aspergillus niger*
 - B. *Aspergillus oryzae*
 - C. *Escherichia coli*
 - D. *Saccharomyces cerevisiae*

3. Ribosomal RNA database provide information about rRNA subunit sequence, whereas UniProt KB provide information of 1
- A. Nucleotide sequence
 - B. Annotated protein sequence
 - C. Three-D structure of protein
 - D. Polygenetic analysis and alignment of proteins
4. By which culture technique, how can we develop seedless citrus crops? 1
- A. anther culture
 - B. pollen culture
 - C. ovary culture
 - D. endosperm culture

For question Nos. 5 to 14 are of very short answer type questions carrying 1 mark each.

5. What are cosmid vectors? 1
6. Write *one* practical application of expression proteomics. 1
7. What are Finite Cell Lines? 1
8. Hydrophobic region of protein form the core of a folded protein. Why? 1
9. How do National Biomedical Research Foundation helps to the researchers? 1
10. Which computer programmes are used for gene predictions in prokaryotes and eukaryotes? 1
11. How does *Agrobacterium rhizogenes* act as secondary metabolites in plants? 1

12. How does microinjection differ from electroporation system of gene delivery into cells ? 1
13. Why are antibiotics used in culture medium? 1
14. Pulse contain higher quantity of protein but lesser quality of protein. Support this statement by giving a suitable example. 1

For question Nos. 15 to 24 are of short answer type -II questions carrying 2 marks each.

15. What is ionic bond ? Give *one* example of it. 2
16. What are the two components of Restriction Modification System of the molecular scissors ? 2
17. What is metagenomics ? Give *one* utility of metagenomic approach. 2
18. How do genomic library differ from cDNA library? 2
19. How can the genes of our interest can be transferred directly by using gene gun? 2
20. Even though T-cells rejects transplants, how is organ transplantation successfully done ? 2
21. Foaming is the most practical problem in microbiological culture. Write the common cause of foaming and how to reduce it. 2
22. A drug that catalyzes the conversion of plasminogen to plasmin which is responsible for dissolving blood clots. Suggest the possible name of the drug and mention its use. 2
23. Draw a graphical representation of a typical bacterial growth curve against the number of microbes per unit time and show the area of log phase and stationary phase. 2
24. Draw a diagrammatic representation of an artificial seed and label somatic embryo

and artificial endosperm. 2

For question Nos. 25 to 31 are of short answer type-I questions carrying 3 marks each.

25. State the main groups of amino acid with one example each. 3
26. Write *three* principles involved in BLAST family of search tools. 3
27. List *three* advantages of animal cell culture. 3
28. Why “generally regarded as safe” listed organisms are used as source of protein as well as for introducing genes in downstream processing? 3
29. List three differentiating points between Yeast artificial chromosomes from Bacterial artificial chromosomes. 3
30. The relationship between number of genes and number of proteins is not linear. Why? 3
31. How fed-batch culture is better than a batch culture? Write *three* points. 3

For question Nos. 32 to 34 are of long answer type questions carrying 5 marks each.

32. List five constraints associated with public acceptance of GM crops and GM foods. 5
33. How do milk of buffalo differ from human in the protein content, casein, fat, lactose and calorific value? 5
34. “Synthesis of DNA is required for the survival of a living organism”. Write the major enzyme responsible for this process and give four properties of it. 5