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 cerevisae*

3. Ribosomal RNA database provide information about rRNA subunit sequence, whereas UniProt KB provide information of 1

A. Nucleotide sequence

B. Annonated 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 transfered 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 againts the number of microbes per unit time and show the area of log phase and stationary phase. 2

24. Draw a diagramatic 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 inroducing 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
