BIOTECHNOLOGY
CLASS XII

Time: 3Hrs

Max.marks: 70

General Instructions

i. *All questions are compulsory.*

ii. *There is no overall choice. However, an internal choice has been provided in one question of **3**marks and three questions of **5**marks. You have to attempt only one of the choices in such questions. Question Paper contains four sections – A, B, C and D.*

iii. *Question numbers 1 to 5 are very short answer questions, carrying 1 mark each.*

iv. *Question numbers 6 to 15 are short answer questions, carrying 2 marks each.*

v. *Question numbers 16 to 25 are also short answer questions, carrying 3 marks each.*

vi. *Question numbers 26 to 28 are long answer questions, carrying 5 marks each.*

SECTION-A

1. Expand VNTR.
   1
2. What are the IUPAC codes for a) G or C b) A or T
   1
3. Which organelles have organelle DNA?
   1
4. Write one difference between domain and subunit.
   1
5. What kind of amino acids reduce muscle breakdown and act as an energy source during, before and after exercise? Give one example.
   1

SECTION-B

6. What does BV measure?
   Which one of the following proteins has the highest BV?
   a) rice b) wheat c) whey d) soya e) egg
   2
7. Name the microbial source and recognition sequence of

a) BamH*I* b) EcoR*I* c) EcoR *II* d) Hind *III*
2

8. *Bacillus subtilis* under ideal conditions occupies 5% of the total volume of a fermenter. Under such conditions the culture medium (after bacilli are filtered off) has a concentration of 1 mg/ml of the secreted protein trehalase.
   (i) Calculate the volume of culture filtrate required to purify 1 kg of trehalase.
   (ii) What are the total number of *B. subtilis* cells which produce this amount of enzyme? Assume that each cell is a cylinder which has dimensions of 1 µm diameter and length 2 µm
   2
9. What is protoplast culture?
   List down four purposes for which protoplast culture is utilized?
   2
10. Which are the two types of cell lines?
    How do they differ from each other?
    2
11. What are cosmids? Write insert size that can be cloned into cosmids?
    2
12. What kind of culture is called batch culture?
    Which are the different Growth phases in batch culture?
    2
13. How can callus cultures be maintained for prolonged periods?
    List down three uses of callus culture?
    2
14. Define totipotency. Name three enzymes used for making protoplasts from leaf or seedlings?
    2
15. Explain the use of a) r-HuEPO b) OKT3
    2

SECTION-C

16. Indicate three important non-covalent forces which contribute to protein folding and explain how they arise?
    3

17. Explain six methods of introducing DNA into host cells.
    3
18. Give a chronological account of conception and actualization of Human Genome Project.
    3
19. Indicate three equipments used for microbial cultures. Draw a labelled diagram that illustrates the basic design of a fermenteor.
    3
20. What is meant by micropropagation? Explain the four defined steps in micropropagation method.
    3
21. What are ICM cells? Indicate four potentialities that these cells possess which make them suitable for genetic modifications and tissue culture.
    3
22. Which are the ethical concerns raised by genetic modifications of animals. What are your recommendations in this regard?
    3
23. What is Lyophilization? What is its advantage? What are the functions of the microbial culture collections?

    OR

    Name the microbes (Scientific name) that are used for commercial production of the following products.

    a) streptomycin
    b) dextran
    c) interferons
    d) hepatitis B surface antigen
    e) penicillin
    f) poly 3 hydroxybutyrate

    3
24. What are the conventions adopted by the Data base personnel to store nucleic acid data and protein sequence data with regard to the direction of the sequence? What is the basis of the convention?
    3
25. Which are the two main sources from which DNA is obtained for cloning experiments designed to identify an unknown gene? Differentiate between genomic library and cDNA library. Indicate

the two major advantages of cDNA library over genomic library.
3

SECTION-D

26. What is the goal of mass spectrometric analysis of biomolecules like peptides and proteins? Explain two methods which are used to achieve this goal. Draw an outline of a mass spectrometer and label the parts and components.

OR

Describe the method of improving subtilisin.
5

27. What is proteomics?
List down and explain different types of proteomics.

OR

The relationship between number of genes and number of proteins is non-linear. Discuss giving diagrammatic illustration.
5

28. Explain the RFLP technique. What is the main use of this technique? Illustrate with labelled diagrams.

OR

Describe the principle for Sanger's dideoxy sequencing procedure. Why is this known as the chain termination method?
5