Question Paper 2011 Delhi set 1
CBSE Class 12 Biotechnology

General Instructions :

- All questions are compulsory.
- There is no overall choice. However, an internal choice has been provided in one question of two marks and two questions of five marks. You have to attempt only one of the choices in such questions.
- Question numbers 1 to 6 are very short answer questions, carrying 1 mark each.
- Question numbers 7 to 14 are short answer questions, carrying 2 marks each.
- Question numbers 15 to 25 are also short answer questions, carrying 3 marks each.
- Question numbers 26 to 28 are long answer questions, carrying 5 marks each.
- Use of calculators is not permitted. However, you may use log tables, if necessary.

1. Which method of measuring microbial growth will give most accurate representation of cell number ?

2. Monoclonal antibody against CD-3 is an effective therapeutic agent in overcoming kidney allograft rejection. How?

3. Why is liquid nitrogen used to store animal cells?

4. Which two properties makes virus good vectors?

5. Why is humulin considered better than pig insulin for treatment of diabetes?

6. If you are given a sequence of alphabets without any label, how will you find out whether it is RNA or protein?

7. Write four precautions one should take, to maximize protein stability during various purification steps.

8. Eukaryotic cells are often preferred for expression of eukaryotic proteins. Why?

9. Embryo rescue is needed in case of inter-generic or inter-species crosses in plants. Why?

10. Protoplast culture is gaining importance in plant biotechnology. Why?

11. CO^2 incubators are used to grow animal cells in culture rather than regular BOD's. Why?
OR
Give two features to distinguish finite cell lines and continuous cell lines.

12. Calculate the generation time of a bacterial population in which the number of bacteria increases from 104/ml to 107/ml during four hours of exponential growth.

13. Mention two problems which make the downstream processing of recombinant proteins difficult and costly

14. Indicate the use of the following in microbial cell culture :
(a) olive oil
(b) baffle flask
(c) urea
(d) agar

15. (a) Explain, in brief, two types of non-covalent interactions found in proteins.
(b) Name two covalent interactions found in proteins.

16. What is the use of adding subtilisin to the laundry detergents ? Why and how is the wild type subtilisin changed to the improved one which is used in detergents nowadays ?

17. What are the four essential features of vectors ? Give two reasons why plasmid vectors are ideal for cloning

18. Represent various basic steps in r-DNA technology using labelled diagram.

19. Differentiate between primary and secondary metabolites. Name any two secondary metabolites produced through tissue culture.

20. What are the genetic engineering strategies used to create transgenic crops with following traits ?
(a) Herbicide tolerance
(b) Insect resistance
(c) Virus resistance

21. In a genome sequence, are ‘in-silico’ prediction methods for gene number, accurate? Suggest any two reasons.

22. How are fluorescent colours introduced into chromosomes ? Give a possible use of this technique. Draw a suitable diagram of the same.

23. In animal cell culture, osmolarity of the culture medium has significant role in cell growth and function. Justify. What ingredients decides osmolarity of the medium ?

24. What are monoclonal antibodies ? How hybridoma technology has been used to produce monoclonal antibodies at commercially feasible level?

25. Draw flow chart to show steps for the isolation of an extracellular metabolite from microbial culture, using an example.

26. (a) Even minor genetic variations in the coding regions of genes underlie differences in our susceptibility to or protection from all kinds of diseases. What are these genomic variations called ? Explain with an example such variations, associated with any disease.
(b) Give two more applications of such variations present in the non-coding region of the genome.
OR
Expand the term BLAST. Discuss the steps involved in comparison of DNA sequences using this tool.

27. What are zymogens ? Explain how the correct folding of enzyme chymotrypsin leads to its function. Give examples of two more enzymes which use the same mechanism.
OR
(a) How can it be proved that sickle cell anaemia results from an amino acid substitution in haemoglobin ?
(b) Why does the shape of haemoglobin gets altered ?

28. PCR technique has revolutionised modern biology. Briefly highlight the technique and suggest how it can be used to detect the presence of pathogens.