Question Paper 2011 Outside Delhi set 1
CBSE Class 12 Biotechnology

General Instructions:

(i) All questions are compulsory.
(ii) There is no overall choice. However, an internal choice has been provided in one question of three marks and two questions of five marks. You have to attempt only one of the choices in such questions.
(iii) Questions number 1 to 5 are very short answer questions, carrying 1 mark each.
(iv) Questions number 6 to 15 are short answer questions, carrying 2 marks each.
(v) Questions number 16 to 25 are also short answer questions, carrying 3 marks each.
(vi) Questions number 26 to 28 are long answer questions, carrying 5 marks each.
(vii) Use of calculators is not permitted. However, you may use log tables, if necessary.

SECTION A

1. Name the bacterium toxin which is used to engineer crops resistant to bollworms.
2. How would you grow a bacterium in the laboratory which has been isolated from a hot spring?
3. Animal cells in a culture medium were placed in a regular incubator used forgrowing bacterial cells. Do you expect the animal cells to grow or not?
4. In micro propagation apical meri stems are used for raising virus-free plants. Why?
5. A given microbial species grows slowly. Of the two - specific growth rate (μ) or doubling time (t), which one would be lower?

SECTION B

6. CHO animal cell line is used to express r-HuEPO. Why? What is the function of this protein?
7. Indicate any two Bio informatics databases and their uses.
8. Write the structure of a de oxy nucleotide triphosphate and its role in DNA sequencing.

9. Why is 'curd' considered beneficial?
10. Briefly list the features of finite cell lines and continuous cell lines.
11. Differentiate between somaclones and gametoclones.
12. Indicate the use of the following in microbial cell cultures:
(a) Aeration,
(b) Agar,
(c) Anti foams,
(d) Corn-steep liquor.
13. Genome analysis has the potential to identify patients with disease susceptibilities. Explain.
14. Highlight the principle of 'insertion inactivation'.
15. How does the charge -relay system operate in the enzyme Chymotrypsin?

SECTION C

16. How is transformation of plant tissue achieved using Agro bacterium tumefaciens? Indicate the salient steps.
17. Outline the steps and principals involved in isolating Streptomycin, an extracellular microbial product.
18. Schematically depict the steps involved in Fluorescence In Situ Hybridization (FISH).
19. In the diagnosis of tuberculosis, the older methods depended on culturing the causative bacillus from sputum. Newer methods include PCR-based assays. With the help of a diagram explains the principle of PCR-based assay. How is it more effective than culturing methods?
20. Describe protoplast culture and its applications.
21. Thalassaemic patients produce excess alpha or beta sub-units of haemoglobin leading to impaired oxygen binding capacity by their erythrocytes. How can it be determined as to which sub-unit is produced in excess?
22. Describe three vector less DNA transfer methods.
23. Why are sequence databases important? Name at least three such databases and their uses.
24. A given recombinant protein is expressed intra cellularly in E. coli. Which culturing method is best suited for obtaining maximum yield of this protein? Explain.

OR

Differentiate between fed-batch and continuous microbial culture.

25. Foot and Mouth Disease Virus (FMDV) vaccine is made by growing the virus in animal cells, breaking the cells, harvesting the virus and finally inactivating it before vaccine formulation. Based on the data given below, calculate the packed volume and weight of virus harvested:

(a) Total bio reactor/fermenter volume = 2000 L

(at least 20% space must be kept for oxygen and CO2)

(b) No. of animal cells in culture = 105/mL .

(c) No. of virus particles per animal cell = 50

(d) Molecular mass of virus = 106 (1 million)

(Assume virus is a sphere of radius 1 nm)

SECTION D

26. What are the advantages of whole genome sequencing projects? How is gene prediction carried out in such projects using computational tools?

OR

What is meant by the term "genomics"? Differentiate between structural and functional genomics.

27. One of the first examples of molecular disease was sickle cell anaemia. Describe the technique which was used to establish this discovery.

28. With a suitable diagram, explain how RFLP technique is useful for differentiating DNA sequences.

OR

How is a C DNA library generated and what are its uses?