CBSE Class 12 Biotechnology 2011 - Set 99

Question Paper

Conducted by the Central Board of Secondary Education (CBSE)

Time Allowed: 3 Hours **Maximum 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 three marks and two questions of five 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.

(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 for growing bacterial cells. Do you expect the animal cells to grow or not ?

4. In micropropagation apical meristems 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 Bioinformatics databases and their uses.

8. Write the structure of a dideoxynucleotide 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) Antifoams, (d) Corn-steep liquor.

13. Genome analysis has the potential to identify patients with disease susceptibilities. Explain.

14. Highlight the principle of 'insertional inactivation'.

15. How does the charge relay system operate in the enzyme Chymotrypsin ?

Section C

16. How is transformation of plant tissue achieved using *Agrobacterium tumefaciens* ? Indicate the salient steps.

17. Outline the steps and principles 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 explain 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 vectorless DNA transfer methods.

23. Why are sequence databases important ? Name atleast three such databases and their uses.

24. A given recombinant protein is expressed intracellularly in *E. coli*. Which culturing method is best suited for obtaining maximum yield of this protein ? Explain.

OR

24. Differentiate between fed-batch and continuous microbial cultures.

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 bioreactor/fermentor volume = 2000 L (atleast 20% space must be kept for oxygen and CO_2)
(b) No. of animal cells in culture = 10^5/mL
(c) No. of virus particles per animal cell = 50
(d) Molecular mass of virus = 10^6 (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

26. 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

28. How is a cDNA library generated and what are its uses ?

- End of Question Paper -