

CBSE Class 12 Biotechnology 2019 - Set 99 - Compartment



Question Paper

Conducted by the Central Board of Secondary Education (CBSE)

Time Allowed: 3 Hours

Maximum Marks: 70

General Instructions

- (i) Question paper contains four sections A, B, C and D.
- (ii) There is internal choice in questions in all the sections. You have to attempt only one of the choices in such questions.
- (iii) Questions No. 1 to 6 are very short answer questions, carrying 1 mark each.
- (iv) Questions No. 7 to 14 are short answer questions, carrying 2 marks each.
- (v) Questions No. 15 to 25 are also short answer questions, carrying 3 marks each.
- (vi) Questions No. 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. The pH of growth media for microbial growth is not always adjusted to 7.0. Why ?

2. Suggest one benefit of raising 'haploid' plants.

OR

2. For obtaining 'virus-free' plants even from 'virus-infected' plants, apical meristem can be used. Why ?

3. In a PCR reaction, following components were taken: double stranded DNA, Taq polymerase, dNTPs and double stranded primer. But even after 30 cycles, no amplification of the target DNA could be seen. Why ?

4. In DNA sequence readouts occasionally an 'S' symbol appears. What does it mean ?

5. State the principle of 'MALDI' used in characterization of a protein.

OR

5. Protein chemists prefer to monitor absorbance of protein fractions eluting from a chromatographic column at 280 nm. Why ?

6. Specify the use of alkaline phosphatase in r-DNA technology.

Section B

7. What is the technique by which proteins can be selectively altered for their amino acid sequence ? Indicate any one application of this technique.

OR

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

8. Why do 'in vitro' cultures of plant cells require several nutrients unlike intact plants ? Name any two such nutrients.

9. A DNA fragment of size 24 kbp has to be cloned. Indicate with reasons the cloning vector and host which can be used for this purpose.

10. During organogenesis, what would happen if the amount of following hormones is high in the medium ? (a) Auxin (b) Cytokinin

11. What is FISH technique used for ? How are fluorescent colours introduced into chromosomes ?

OR

11. What are ESTs ? How are they useful in genome analysis ?

12. What purpose is served by the use of Laminar Air Flow hood during culture of animal cells ? State any two points.

OR

12. r-HuEPO is preferred over blood transfusion in persons with blood loss. Why ?

13. Differentiate chemically between dNTP and ddNTP. Explain why ddNTPs are used in Sanger's method of DNA sequencing.

14. Administration of monoclonal antibodies against CD3 can accept renal allograft in patients. Why ?

Section C

15. Indicate the use of the following in microbial culture : (a) Liquid nitrogen (b) Corn steep liquor (c) Aeration

16. What are RFLPs ? Indicate how these can be used in DNA fingerprinting.

17. Thalassaemic patients produce excess alpha or beta subunits of haemoglobin leading to impaired oxygen binding capacity by their erythrocytes. How can it be determined as to which subunit is produced in excess ? Describe one technique.

18. In a genome analysis, is 'in-silico' prediction for gene number accurate ? Suggest any two reasons.

OR

18. In biological language, what are the equivalents of the following : (a) Letters (b) Words. Why is it useful to search a database to identify newly determined DNA sequence ? Give any two reasons.

19. Indicate three conditions which are important in maximizing the stability of proteins during their production at industrial scale.

OR

19. Indicate three factors which decide the purification scheme for any given protein during their production at industrial scale.

20. Why are B-lymphocytes fused with myeloma cells in hybridoma technique ? Give an important application of this technique.

OR

20. The animal cell culture became a routine laboratory technique in 1950s. State any three advantages of animal cell culture.

21. State three reasons for completely sequencing a genome.

22. For a fed-batch culture, draw a graph to illustrate the variation of cell density (X), concentration of substrate (S) and cell specific substrate turnover rate (Q_S) with time.

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

24. Calculate the generation time of a bacterial population in which the number of bacteria increases from 10^4 /mL to 10^7 /mL during four hours of exponential growth.

25. An unusual plasmid has been discovered which has high transformation ability in *E. coli* and confers heat resistance to the host. Hence the host when transformed can safely grow at 45°C . Schematically indicate the various steps of cloning a foreign gene into this plasmid. How would you screen the transformed *E. coli* carrying the plasmid ?

OR

25. Indicate three main properties of restriction enzymes highlighting their role in r-DNA technology.

Section D

26. (a) What is meant by the term proteomics ?
(b) Name some of the important branches of proteomics. (c) Why is the study of proteome relevant in the age of genomics ?

OR

26. The microarray technique can be used to compare gene products between normal and cancer cells. Explain the principle involved in this technique with a relevant diagram.

27. Suggest the essential steps involved in raising a chimeric mouse using stem cell technology. Also state any two characteristics of stem cells.

OR

27. Indicate two limitations of vegetative propagation of plants. How does micropropagation overcome these ? Briefly outline the steps of micropropagation.

28. Describe briefly five protein-based commercial products with their uses.

- End of Question Paper -