

SAMPLE QUESTION PAPER II

1. What is the carbon part of BCAA used as? (1)
2. What function does the enzyme DNA Ligase perform? (1)
3. Under what conditions, continuous culture is most suitable? (1)
4. What are the single letter IUPAC codes for alanine, glycine, tryptophan, tyrosine, serine, methionine? (3)
5. Who proposed the concept of the famous "cell theory"? (1)
6. Define: Subunit, domain, and quaternary structure in proteins. (3)
7. What is molecular evolution? What are the observations regarding protein sequence variations vis-à-vis evolution? (3)
8. What are the DNA probes? (2)
9. What is the consequence if a protein is incorrectly folded? Give an example to illustrate your answer. (2)
10. Give two examples of plants grown using callus culture. (1)
11. What would happen if naked viral DNA is introduced into a bacterial cell? (2)
12. What are the differences between Batch culture and Fed Batch culture? (3)
13. Differentiate between functional and structural genomics? (3)
14. What are the disadvantages of using E. Coli for production of eukaryotic proteins? (3)
15. Differentiate between roller bottle and spinner cultures? (3)
16. Recombinant insulin is produced at 100 mg/L by E. Coli at a cell concentration of 1 g/L. Calculate the volume of reactor (size of fermenter) needed for producing 1 kilogram of insulin in these conditions. (3)
17. How frequently will a sequence GATC occur in the human genome theoretically? (3)
18. What is BLAST and what are the principles involved in it? (3)
19. Give the applications of the following: (a) Structural Proteomics, (b) Functional Proteomics, (c)

Isoelectric Focussing, (d) Expression Proteomics, (e) Two-dimensional Gel Electrophoresis, (f) Edman Sequencing, and (g) Mass spectrometry.

20. What are the conventions adopted by the Database 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? (4)

21. How can DNA cut with a staggered cutting enzyme be joined (cloned)? (5)

22. Write a short note on the history of bioinformatics?

23. E. coli is a rod shaped bacteria about 2 micrometer long and 1 micrometer in diameter. The average density of a cell is 1.28 g/ml. Approximately 13.5% of the wet weight of E. coli is soluble protein. Estimate the number of molecules of a particular enzyme per cell if the enzyme has a molecular weight of 100,000 and represents 0.1% of the total soluble protein. (Answer: 1626 molecules/cell) (5)

24. Which types of dyes are used for DNA sequencing? (1)

25. What is the use of Coulter counter? (1)