BIOTECHNOLOGY
Model paper 12th class

All questions are compulsory 70 marks

5 x 1mark

Q.No.1:- Given the following DNA strand: 5'-TCTAATGGAGCT, write down the complementary strand, ----------. Indicate the directions by properly labeling the 5' end.

Q.NO.2:- Which gene transfer method is most commonly used in plants?

Q.NO.3:- What is the IUPAC code for 'G' or 'C'?

Q.NO.4:- Write one therapeutic application of monoclonal antibody.

Q.NO.5:- Rapid multiplication of plants by tissue culture techniques is referred to as----------

7 x 2marks

Q.NO.6:- A DNA molecule is formed by linking the ----------of one nucleotide to the----------of the neighboring nucleotide.

Q.NO.7:- Which transformation method(s) uses (A) mechanical means of introducing DNA into cells? (B) Biological means?

Q.NO.8:-. What is the unique feature of the structure of DNA or protein that causes the macromolecules to migrate when an electrical field is applied to the gel?

Q.NO.9:-. An E. coli cell produces at least 2000 different proteins. One of these is our enzyme of interest produced at a level of 3000 molecules per cell under optimum conditions. If we have to purify 1g of this intra-cellular enzyme, estimate how many cells of bacteria will be required theoretically? It is given that the molecular weight of the enzyme of interest is 1,00,000.

Q.NO 10:- Can you suggest one reason why the sequences of bacterial replication origins are A-T rich?

Q.NO 11:- In what way Golden rice is different from the normal rice?

Q.NO 12:- Write two important features of cultured animal cells?

Short Answer Questions **12 x 3marks**

Q.NO.13:-. Given the following DNA sequence, 5' ACGTGCCTCG 3' Coding strand

3' TGCACGGAGC 5'

(a) Which strand is the sense strand? Antisense strand?

(b) What is the sequence of mRNA after transcription?

(c) What is the sequence of the antisense RNA?

Q.NO 14:- Give examples of pairs of amino acids that form (A) electrostatic interactions, (B) hydrogen bonding, (C) hydrophobic interactions.

Q.NO 15:- Why is it that genomic libraries are used for isolating genes in bacteria? Why are cDNA libraries not used for prokaryotes?

Q.NO 16:- E. coli is a rod shaped bacteria about 2 μm long and 1 μm 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.

Q.NO 17:- For hybridization, the DNA bound to the membrane is first denatured. What is denaturation? How do you denature DNA on a membrane?

Q.NO 18:- Briefly explain how the serine residue in some enzymes can become acidic (reactive).Also suggest how you can confirm that a serine residue is involved in the catalysis.

Q.NO 19:- Frozen cells should be thawed as rapidly as possible during their revival. Why? What is the role of DMSO in cryopreservation?

Q.NO 20:- Why is Agrobacterium described as 'natural genetic engineer of plants'?

Q.NO 21:- How are monoclonal antibodies different from polyclonal antibodies?

Q.NO 22:- What is the role of serum for culturing animal cells?

Q.NO 23:- Is the concept of hybridization applicable to Western blot? Explain your answer?

Q.NO 24:- What were the surprises revealed from genome sequencing?

3 x 5marks

Q .No.25:- Define: primary structure, secondary structure, tertiary structure, and quaternary structure, of a protein. What are the major forces involved in the formation of each structural organization?

Or

What are the unique features and properties of a cosmid that make it desirable as a cloning vector?

Q .No.26:- What are the different types of molecules on which sequence data is obtained and deposited in the database?

Or

Describe the methods used for the measurement and quantitative evaluation of microbial growth?

Q. No.27:- How are plant cells converted to protoplasts? Why are protoplasts more amenable to produce somatic cell hybrids and cybrids?

Or

What are stem cells? Describe the application of embryonic stem cell technology?