

**B.Sc. BOTANY
SIXTH SEMESTER
MOLECULAR BIOLOGY AND BIOINFORMATICS
BSB-601**

**SET
B**

[USE OMR SHEET FOR OBJECTIVE PART]

Duration: 3 hrs.

Full Marks: 70

Time: 30 mins.

Marks: 20

(Objective)

Choose the correct answer from the following:

1 × 20 = 20

- In which year did the SWISSPROT protein sequence database begin?
 - 1988
 - 1987
 - 1986
 - 1988
- Which of the following are not the applications of bioinformatics?
 - Drug designing
 - Data storage and management
 - Understand the relationship between organism
 - None of the above
- Lac operon is an example of:
 - Only positive regulation
 - Both positive and negative regulation
 - Only negative regulation
 - Sometimes positive sometimes negative
- Which of these acts as an inducer of the lac operon?
 - Allolactose
 - Lactose
 - Galactose
 - Glucose
- How many types of histone molecules are found in nature?
 - 3
 - 4
 - 5
 - 6
- Which of the following is incorrect with respect to mutation?
 - Sudden
 - Continuous
 - Change in chromosomes and genes
 - Leads to variation in DNA
- Genetic code is:
 - The sequence of nitrogenous bases in mRNA molecule that codes for a protein
 - A triplet code
 - Non-overlapping
 - All of these
- How can base analogs cause mutations?
 - DNA polymerase randomly inserts nucleotides across from them, causing insertions
 - These 'decoy' nucleotides are put into DNA instead of normal nucleotides and can then shape-shift, causing mispairing
 - They get incorporated into the DNA instead of normal nucleotides and stop the DNA chain from growing
 - They chemically change the structure of nucleotide bases, causing mispairing

9. Amino acids with aromatic side chain are:
 - a. Tryptophan, asparagine, tyrosine
 - b. Tryptophan, threonine, tyrosine
 - c. Phenylalanine, tryptophan, serine
 - d. Phenylalanine, tryptophan, tyrosine
10. Polyploidy can be induced by the application of:
 - a. Auxin
 - b. Kinetin
 - c. Colchicine
 - d. Ethylene
11. Which of the following is an example of Homology and similarity tool?
 - a. BLAST
 - b. RasMol
 - c. EMBOSS
 - d. PROSPECT
12. Which of the following scientists created the first Bioinformatics database?
 - a. J.D. Watson
 - b. Richard Durbin
 - c. Margaret Dayhoff
 - d. Michael J. Dunn
13. Alignment method suitable for aligning closely related sequence is:
 - a. Multiple sequence alignment
 - b. Pairwise alignment
 - c. Global alignment
 - d. Local alignment
14. In the presence of lactose, how long does it take for the lac operon to be expressed?
 - a. When lactose equals glucose concentration
 - b. When glucose is more than lactose concentration
 - c. As long as lactose is more than glucose concentration
 - d. As long as lactose is more than galactose concentration
15. Nucleosome is made up of.....
 - a. DNA, histone core protein
 - b. DNA, histone core protein, linker H1
 - c. RNA, histone core protein
 - d. RNA, histone core protein, linker H1
16. Euploidy is a chromosomal variation in.....
 - a. Structure
 - b. Position
 - c. Number
 - d. Size
17. What is the substitution of a purine base with a pyrimidine base known as?
 - a. Deletion
 - b. Transition
 - c. Addition
 - d. Transversion
18. Translation occurs in the:
 - a. Nucleus
 - b. Cytoplasm
 - c. Nucleolus
 - d. Mitochondria
19. The simplest amino acid is:
 - a. Glycine
 - b. Alanine
 - c. Asparagine
 - d. Tyrosine
20. During translation, the role of enzyme peptidyl transferase is:
 - a. Transfer of phosphate group
 - b. Amino acid activation
 - c. Peptide bond formation between adjacent amino acids
 - d. Binding of ribosome subunits to mRNA

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(Descriptive)

Time : 2 hr. 30 mins.

Marks : 50

[Answer question no.1 & any four (4) from the rest]

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|------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| 1. Define BLAST. Describe briefly the process involved in BLAST analysis and how to interpret the BLAST output. | 2+4+4=10 |
| 2. Describe the regulation of lac operon with a suitable diagram. | 10 |
| 3. Write short notes on the following:
a) Global Alignment
b) Local Alignment
c) Pairwise Alignment
d) Multiple Sequence Alignment | 2.5+2.5+2.5+2.5=10 |
| 4. Describe briefly about the structure and function of a gene.
Write the difference between A and B DNA. | 5+5=10 |
| 5. Write short notes:
a) Tautomerism
b) Base Analogs
c) Chemical mutagens
d) Physical mutagens | 2.5+2.5+2.5+2.5=10 |
| 6. Describe amino acid structure and classification with necessary diagrams. | 5+5=10 |
| 7. What is translation? Explain co-translational translocation of proteins with diagrams. | 2+8=10 |
| 8. What is ploidy? What are the different types of ploidy? Explain polyploidy in crop improvement with examples. | 2+3+5=10 |

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