

**B.Tech. / M.Tech. (Integrated) DEGREE EXAMINATION, DECEMBER 2024**

First Semester

**21BTB102T - INTRODUCTION TO COMPUTATIONAL BIOLOGY**

(For the candidates admitted from the academic year 2024 - 2025)

Note:

(i) **Part - A** should be answered in OMR sheet within first 40 minutes and OMR sheet should be handed over to hall invigilator at the end of 40th minute.

(ii) **Part - B & Part - C** should be answered in answer booklet.

Time: 3 hours

Max. Marks: 75

**PART - A (20 x 1 = 20 Marks)**

Marks BL CO PO

Answer ALL Questions

- |  |   |   |   |   |
|--|---|---|---|---|
| 1. Hydrogen bonds in proteins are responsible for                          | 1 | 1 | 1 | 4 |
| A) alpha helix   |   |   |   |   |
| B) peptide formation   |   |   |   |   |
| C) primary structure   |   |   |   |   |
| D) main chain  |   |   |   |   |
| 2. The organelle that disappears during cell division                      | 1 | 1 | 1 | 4 |
| A) mitochondria  |   |   |   |   |
| B) nucleolus   |   |   |   |   |
| C) lysozyme  |   |   |   |   |
| D) ribosomes   |   |   |   |   |
| 3. Diploid cell has _____ chromosomes.                                     | 1 | 1 | 1 | 4 |
| A) 23  |   |   |   |   |
| B) 24  |   |   |   |   |
| C) 46  |   |   |   |   |
| D) 92  |   |   |   |   |
| 4. _____ has chromosomes in the centre of the cell.                        | 1 | 1 | 1 | 4 |
| A) telophase   |   |   |   |   |
| B) metaphase   |   |   |   |   |
| C) prophase  |   |   |   |   |
| D) cytokinesis   |   |   |   |   |
| 5. The rough draft of human genome was published through                   | 1 | 1 | 2 | 4 |
| A) HGP   |   |   |   |   |
| B) HHF   |   |   |   |   |
| C) HMM   |   |   |   |   |
| D) MHM   |   |   |   |   |
| 6. The blueprint for the construction of a protein is                      | 1 | 1 | 2 | 4 |
| A) tRNA  |   |   |   |   |
| B) rRNA  |   |   |   |   |
| C) mRNA  |   |   |   |   |
| D) gRNA  |   |   |   |   |
| 7. A molecule containing sugar, phosphate and a nitrogenous base is called | 1 | 1 | 2 | 4 |
| A) Nucleotide  |   |   |   |   |
| B) amino acid  |   |   |   |   |
| C) lipid   |   |   |   |   |
| D) nucleoside  |   |   |   |   |
| 8. Production of glucagon is because of                                    | 1 | 1 | 2 | 4 |
| A) Hyperglycemia   |   |   |   |   |
| B) Hyperkalemia  |   |   |   |   |
| C) Hyperkalemia  |   |   |   |   |
| D) Hypoglycemia  |   |   |   |   |
| 9. A sequence of amino acid bonded together by _____ bonds.                | 1 | 1 | 3 | 5 |
| A) hydrogen  |   |   |   |   |
| B) glycosidic  |   |   |   |   |
| C) peptide   |   |   |   |   |
| D) ester   |   |   |   |   |
| 10. PDB was established in 1972 at _____                                   | 1 | 1 | 3 | 5 |
| A) BNL   |   |   |   |   |
| B) CSDB  |   |   |   |   |
| C) RCSB  |   |   |   |   |
| D) EBI   |   |   |   |   |

11. \_\_\_\_\_ determines the propensity or intrinsic tendency of each residue to be in the helix, strand and  $\beta$ -turn conformation. 1 1 3 5  
 A) Chou Fasman B) GOR  
 C) PHD D) HDD
12. The secondary structure prediction methods can be either Abinitio or \_\_\_\_\_. 1 1 3 5  
 A) neural networks, B) homology-based  
 C) machine learning D) datamining
13. Transmission of an electrical signal from one neuron to the next happens at the \_\_\_\_\_. 1 1 4 1  
 A) synapse B) neurotransmitter  
 C) axon D) dendrite
14. \_\_\_\_\_ division allows conservation of energy. 1 1 4 1  
 A) sympathetic B) parasympathetic  
 C) CNS D) PNS
15. \_\_\_\_\_ disease is due to loss of dopamernergic neurons. 1 1 4 1  
 A) parkinson's B) alzheimer's  
 C) multiple sclerosis D) myalgia
16. \_\_\_\_\_ is also sometimes called knowledge discovery in databases. 1 1 4 1  
 A) machine learning B) Data mining  
 C) neural network D) deep learning
17. All blood cells arise from a pluripotent stem cell found in \_\_\_\_\_. 1 1 5 1  
 A) heart B) liver  
 C) bone marrow D) heart
18. \_\_\_\_\_ produces immunological memory. 1 1 5 1  
 A) active B) passive  
 C) biological D) immunology
19. Antibodies are made from \_\_\_\_\_ cells. 1 1 5 1  
 A) B B) T  
 C) NK D) APC
20. \_\_\_\_\_ is an agranular leukocyte. 1 1 5 1  
 A) basophil B) eosinophil  
 C) monocyte D) leukocytes

**PART - B (5 x 8 = 40 Marks)**  
 Answer ALL Questions

21 a. Give a note on genetic algorithms

(OR)

b. Explain the characteristics of a eukaryotic cell

22 a. Write a detailed note on carbohydrates with illustrated examples

(OR)

b. Write about genomics with a special note on comparative genomics

23 a. Write on the classification of proteins

(OR)

b. Write on different structure databases and their structure visualization.

Marks BL CO PO

8 1 1 4

8 1 1 4

8 1 2 4

8 1 2 4

8 1 3 5

8 1 3 5

24 a. Explain the type of glial cells and their functions

8 1 4 1

(OR)

b. Explain in detail about artificial neural networks

8 1 4 1

25 a. Write about the different immune cells and their characteristics

8 1 5 1

(OR)

b. Write on cell-mediated immunity

8 1 5 1

**PART - C (1 x 15 = 15 Marks)**

**Marks BL CO PO**

Answer ANY ONE Question

26. Explain what is the sequence of events that happens in the body when immunization is done

15 3 5 1

27. Design a neural network that you would predict cancer risk.

15 3 4 1

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