Indian Association for the Cultivation of Science
(Deemed to be University under *de novo* Category)
Master's/Integrated Master's-PhD Program/Integrated Bachelor's-Master's Program/PhD Course
Mid-Semester Examination-Autumn 2024

Subject: BIS1101 ***Subject Code(s): Molecules of life***
Full Marks: 25 ***Time Allotted: 2 h***

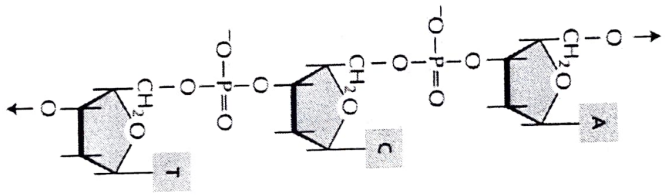
Answer Part A and Part B separately

PartA

1 All naturally occurring α–amino acids (except glycine) are optically active due to the presence of chiral carbon atom. These have either D- or L-configuration. D-form means that, the amino (–NH2) group is present towards the right hand side. L-form shows the presence of (–NH2) group on the left hand side. Why do you suppose that only L-amino acids and not a random mixture of L- and D-amino acids are used to make proteins? **2**

2 A segment of DNA from the interior of a single strand is shown in Figure Below. What is the polarity of this DNA from left to right? Write the sequence of DNA fragment in the figure below **2**

Figure-1



3 What is the difference between essential and non-essential amino acids. Give few examples. **2**

4 Compare and contrast the activity of DNA Vs RNA polymerases. **2**

5 Describe the isoelectric point on the amino acids. Which property of the solution affects the net charge of an amino acid? **2**

6 Describe the cycle of translation and the role of initiation elongation and release factors **3**

PartB

Answer any six questions

1. Mention the key difference between nuclear lamina and nuclear matrix. 2
2. Name two membrane-less sub nuclear organelles with their main functions. 2
3. How are proteins imported into the nucleus? Illustrate with diagram. 2
4. Define nucleosome? Mention how linker histone is associated. 2

5. What is mRNA cap? What is the main function of a cap in an mRNA molecule? 2
6. How secretory proteins and lumenal domains of membrane proteins pass from the cytoplasm to the ER lumen. 2
7. Why ribosome and endoplasmic reticulum is absent in mature RBC but not in immature RBC. 2
8. Mention how Smooth endoplasmic reticulum detoxify xenobiotics? 2
9. What is unfolded protein response? What is the role of smooth endoplasmic reticulum in such response? 2
10. Why lysosomal proteins are highly glycosylated ? 2