Examination	:	End Semester Examination – Nov/Dec 2024
Name of the Course	:	B.Tech. (IT & Mathematical Innovations)
Name of the Paper	:	Flow of Information in Living System
Unique Paper Code	:	3124002003 (GE)
Semester	:	III
Duration	:	2 hours
Maximum Marks	:	60

Instruction to students:

*Attempt **any four** questions from the following.*
All questions carry equal marks (15 marks).
Each question has subparts. The mark division is indicated in the right hand margin.
Give schemes/diagrams wherever applicable.

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1. Schematically present the structure of bacterial RNA polymerase. Describe the initiation, elongation and termination of transcription in prokaryotes. Add a note on the function of RNA Pol I, II and III in eukaryotes. [5+7+3]
2. With suitable diagrams describe process of replication of DNA. Add a note on the semi-discontinuous mode of replication. [10+5]
3. Schematically present the DNA structure. Describe why the DNA has a hydrophobic core and the phosphates face outside. [10+5]
4. Schematically present how the RNAs are processed. [15]
5. A researcher isolates 100 microgram of eukaryotic ds DNA. Given that the eukaryotic DNA is 2 meter long, each nucleotide has an average mass of 330 Da and the distance between two subsequent bases are 0.34 nm, calculate the following: [7.5x2]
   A. Number of base pairs in the DNA
   B. Number of moles the DNA corresponds to
6. Differentiate between any two of the following: [7.5x2]
   A. Sense DNA and Antisense DNA
   B. DNA and RNA
   C. Exon and Introns
   D. Codon and Anticodon
7. Write short notes on any two of the following: [7.5x2]
   a. Ribosomes
   b. Promoter
   c. Lac operon
   d. Chromatin

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