

Five Year Integrated M.Sc. Examination, 2022
Semester - III
Paper LS-2-3-1
(Fundamental Processes)

Time: 3 hours

Full Marks: 60

Questions are of values as indicated in the margin.

Question No. 1 is compulsory.

1. Write short notes on **any ten** of the following: **10x2 = 20**

- a. Genetic code
- b. Wobble hypothesis
- c. Importance of replication fork in DNA replication
- d. Role of P, A and E sites during translation
- e. Inhibitors of protein synthesis in prokaryotes
- f. Key consensus sequences in bacterial promoters
- g. Role of enhancers in transcription
- h. Role of operator sequences in transcription
- i. Transcription factors in eukaryotes
- j. Biogenesis of miRNAs
- k. RNA polymerases in eukaryotes
- l. Regulation of genes for lytic cycle in virulent phage

Answer **any two** from Question no.s 2 to 4. **2x5 = 10**

2. Provide the experimental evidences that prove semi-conservative mode of DNA replication. (5)
3. Describe any two processes of post-translational modifications of proteins citing examples. (5)
4. State the function of Lac repressor protein. How does the presence of glucose in the medium regulate the expression of *lac* operon in bacterial cells? (2+3=5)

Answer **any three** from Question no.s 5 to 9. **3x10 = 30**

5. Mention the different enzymes required for DNA replication and their role in the DNA replicative process. Add a note on the synthesis of leading and lagging DNA strands. (5+5=10)
6. Describe the importance of tRNAs in translation. How is prokaryotic translation initiated? Discuss the role of initiation factors (IFs) in the initiation of prokaryotic protein synthesis. (2+4+4=10)
7. Explain the process of homologous and site-specific recombination. (5+5=10)
8. Describe the structure of *trp* operon in *E. coli*. How can tryptophan function as a co-repressor? Explain the mechanism of attenuation of *trp* operon. (2+3+5=10)
9. What is the function of sigma factor in bacterial transcription? Discuss sigma cycle. How is transcription terminated in bacteria? (3+2+5=10)

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