

Sl. No. of Ques. Paper : 2069 **GC-3**
Unique Paper Code : 32531327
Name of Paper : Molecular Biology
Name of Course : B.Sc. (Hons.) Microbiology (CBCS)
Semester : III
Duration : 3 hours
Maximum Marks : 75

(Write your Roll No. on the top immediately on receipt of this question paper.)

Question No. 1 is compulsory. Attempt five questions in all.
All questions carry equal marks.

1. (a) Define the following: (any five)
- (i) Denaturation
 - (ii) Replisome
 - (iii) Processivity
 - (iv) Spliceosome
 - (v) Translocation
 - (vi) Attenuation. 5×1=5
- (b) What will be the sequence of RNA molecule transcribed from the following DNA template:
- 5'-CTAGCTAGTAGCGAT-3' 2
- (c) Draw the chemical structure of 5' to 3' phosphate sugar backbone of a 5' AUC 3' RNA polynucleotide chain. 5
- (d) 30% of the nucleotides in a 300 base pair long DNA molecule are cytosines. Find out the percentage of other nucleotides. 3
2. Differentiate between the following: (any five)
- (i) A- and Z-DNA
 - (ii) Rho-dependent and Rho-independent termination
 - (iii) Class I and Class II Release Factors
 - (iv) Topoisomerase-I and Topoisomerase-II
 - (v) Rolling circle replication and Theta [θ] replication

- (vi) Inducible and repressible operon. 5×3=15
3. Write short notes on the following (any three):
- (i) Capping of mRNA
- (ii) Salient features of Prokaryotic promoter
- (iii) Alternative splicing
- (iv) Yeast mating type switching. 3×5=15
4. Write in brief the function of the following: (any fifteen)
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| (i) SSB | (ii) DNA Polymerase γ |
| (iii) Mut H | (iv) oxo-G DNA Glycosylase |
| (v) DROSHA | (vi) TBP |
| (vii) Shine-Dalgarno sequence | (viii) IF-2 |
| (ix) EF-G | (x) Streptomycin |
| (xi) UAG | (xi) Ori C |
| (xiii) Lac Permease | (xiv) 5' TTGACA 3' |
| (xv) 5' TTAGGG 3' | (xiv) σ factor |
| (xvii) 3' splice site | |
- 15×1=15
5. (a) A covalently closed circular DNA of 21000 base pairs has 08 negative super coils. Calculate the Linking Number (Lk). 4
- (b) Explain the role of Attenuator structure in the regulation of Tryptophan operon. 6
- (c) Schematically represent the experiment conducted to prove the semi-conservative mode of replication. 5
6. (a) Write the contribution of Mello and Fire. 1
- (b) Mutants of *E.coli* are unable to produce a functional photolyase, but have the ability to repair Thymine dimers. Explain the mechanism involved. 5
- (c) Write about the initiation of Translation in eukaryotes. 6
- (d) Mention any three modified nucleosides in t-RNA. 3