

2026

ZOOLOGY — HONOURS**Paper : DSCC-7****(Molecular Biology)****Full Marks : 75***The figures in the margin indicate full marks.**Candidates are required to give their answers in their own words as far as practicable.**Answer question nos. 1, 2 and any four from the rest.***1. Answer any ten questions :****2×10**

- (a) Define RNA priming.
- (b) Mention the function of helicase.
- (c) State the importance of REC A protein.
- (d) Mention the functions of HDAC.
- (e) What is meant by Shine-Dalgarno Sequence?
- (f) Write the significance of pulse-chase experiment.
- (g) Write any two functions of DNA polymerase I.
- (h) 'Eukaryotic genes are split genes.'— Explain.
- (i) Mention the function of Peptidyl transferase.
- (j) Define 'Gratuitous Inducer'.
- (k) Write the significance of amino-acylation of a tRNA molecule.
- (l) Which membrane is commonly used in blotting techniques? Why blocking is done in Western blotting?
- (m) What is the role of DNA glycosylase in base excision repair?
- (n) What triggers the SOS repair system in *E. coli*?
- (o) What is spliceosome?

2. Write short notes on any three from the following :**5×3**

- (a) Structure of eukaryotic telomere
- (b) Methyl capping
- (c) Reverse transcriptase PCR
- (d) Nucleotide excision repair
- (e) Structure of tryptophan operon.

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3. (a) Distinguish between constitutive and inducible gene expression.
 (b) Describe the events of lagging strand synthesis during replication.
 (c) Comment on probes used in Southern blotting and the antibodies used in Western blotting. 2+4+(2+2)
4. (a) "3' end of primer is most important in PCR."— Explain.
 (b) Describe the basic steps of allele specific PCR with neat diagrammatic presentation.
 (c) Mention the basic principle of Western blot. 3+5+2
5. (a) Explain briefly any two characteristic features of Genetic code.
 (b) Explain the principle and steps involved in Southern blotting. (2+2)+(2+4)
6. (a) Define 'open promoter complex', 'close promoter complex' and 'promoter clearance' with neat diagram.
 (b) Explain the process of 'rho'-dependent transcription termination. (2+2+2)+4
7. (a) Describe the structure and function of Ori C.
 (b) Mention two advantages of Western blot over Southern blot.
 (c) Discuss the role of attenuator in tryptophan operon control. (2+3)+2+3
8. (a) With neat diagram explain two different negative control of Lac operon.
 (b) A partial diploid strain of *E. coli* ($\text{lac } 1^+ \text{ lac } O^+ \text{ lac } Z^- \text{ lac } Y^+ / \text{lac } I^s \text{ lac } O^+ \text{ lac } Z^+ \text{ lac } Y^+$) has normal operators and normal promoters. Explain with reason, the fate of beta-galactosidase and permease production in the presence of the inducer. (2½+2½)+(2½+2½)
9. Mention the function of following chemicals in gel electrophoresis : 2×5
 - (a) Molecular weight marker
 - (b) Loading dye
 - (c) SDS in PAGE
 - (d) Ethidium bromide
 - (e) Beta mercaptoethanol.
