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M.Sc. (Semester-II) Examination, June-2025

(Backlog)

ZOOLOGY

[Paper : Third]

(Structure and Function of Genes)

Time Allowed : Three Hours

Maximum Marks : 70

Note : Question paper is divided into **four** sections. Attempt question of **all four** sections as per direction. Distribution of marks is given in each section.

SECTION-A

(Objective Type Questions)

Note : Attempt **any ten** questions. Each question carries **1** mark.

[10×1=10]

1. (A) Fill in the blanks :

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(1)

[P.T.O.]

- (i) The enzyme responsible for removal of supercoiling is _____.
- (ii) The nucleic acid synthesis takes place in _____ direction.
- (iii) L-Shaped Clover Leaf model of t-RNA is given by _____.
- (iv) Discontinuous DNA synthesis occurs in _____ strand of DNA.

(B) Choose the correct options :

- (v) The first biochemical systems were probably centred on which type of biomolecule?
 - (a) Carbohydrate
 - (b) Protein
 - (c) DNA
 - (d) RNA
- (vi) Shine-dalgarno sequence is present in the :
 - (a) hn RNA
 - (b) mRNA

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(2)

- (c) t RNA
- (d) Si RNA
- (vii) Which of the following is a character of ORF?
 - (a) Contagious
 - (b) 3-nucleotide codons
 - (c) Introns
 - (d) Non-overlapping
- (viii) Which of the following is an example of site specific recombination ?
 - (a) Crossing over during meiosis
 - (b) Gene Conversion
 - (c) Integration of bacteriophage λ -genome into the E.Coli chromosome.
 - (d) Insertion of a transposon into a new site in a genome
- (ix) The site at which DNA replication is initiated is called :

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(3)

[P.T.O.]



- (a) Enhancer
 - (b) Initiator
 - (c) Origin of replication
 - (d) Promoter
- (x) Codon-anticodon interaction occurs by :
- (a) Covalent bonds
 - (b) Electrostatic interactions
 - (c) Hydrogen bonds
 - (d) Hydrophobic interactions
- (xi) Which of the following sequence module is not a basal promoter element ?
- (a) CAAT Box
 - (b) GC Box
 - (c) Octamer module
 - (d) TATA Box

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- (xii) Which of the following RNA polymerase is responsible for the transcription of protein coding gene in eukaryotes?

- (a) RNA polymerase-I
- (b) RNA polymerase-II
- (c) RNA polymerase-III
- (d) RNA polymerase-IV

SECTION-B

(Very Short Answer Type Questions)

Note: Attempt **any five** questions. Each question carries 2 marks. (Word limit 25-30 words) : [5×2=10]

2. (i) Proteome diversity
- (ii) t-RNA
- (iii) Histone Proteins
- (iv) RNA polymerase

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[P.T.O.]



- (v) Non-coding RNA
- (vi) Alternative splicing
- (vii) Evolution of genetic materials

SECTION-C

(Short Answer Type Questions)

Note: Attempt **any five** questions. Each question carries **4** marks.(Word limit 250 words) [4×5=20]

3.
 - (i) Transcription factors
 - (ii) Structure of chromatin
 - (iii) Supercoiling of DNA
 - (iv) Evolution of introns
 - (v) Catalytic RNA
 - (vi) Pre-mRNA Processing
 - (vii) DNA replication

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SECTION-D

(Essay Type Questions)

Note: Attempt **any three** questions. Each question carries **10** marks.(Word limit 500 words) [3×10=30]

4.
 - (i) Describe the mechanism of DNA recombination in Prokaryotes.
 - (ii) Explain the mechanism of DNA repair in detail.
 - (iii) Explain the positive and negative regulation of gene expression in prokaryotes.
 - (iv) Explain the mechanism of translation and its control in detail.

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