(d) Explain the mechanism which ensures that eukaryotic chromosomes are replicated only once per cell cycle (with illustration). (4)

5. (a) Illustrate the steps involved in spliceosome mediated RNA splicing. (6)

(b) Explain the regulation of gene expression by attenuation in tryptophan operon. (6)

6. (a) What will be the sequence of RNA transcribed from the following DNA template (2)

5' ATGTCTGGAGGCTAG 3'

(b) Draw the chemical structure of two modified bases found in tRNA. (3)

(c) Illustrate the process of mismatch repair of DNA in Prokaryotes. (3)

(d) Explain the steps involved in processing of pri-miRNA into miRNA. (4)

7. Write short notes on **any three** of the following :

(a) Pyrimidine dimerization

(b) Alternative Splicing

(c) Rho independent termination

(d) Lac Operon (3×4=12)

[This question paper contains 4 printed pages.]

27.12.2023(M)

Your Roll No.....

Sr. No. of Question Paper : 4337 **G**

Unique Paper Code : 32231501

Name of the Paper : Molecular Biology

Name of the Course : **B.Sc. (Hons) Zoology**

Semester : V

Duration : 3 Hours Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Question No. **1** is compulsory.
3. Attempt **five** questions in all.
4. Draw neat, labelled diagrams wherever necessary.

1. (a) Define the following terms : (1×5=5)

(i) Tautomerism

(ii) snRNPs

(iii) Polysome

(iv) Polymerase switching

(v) Replicator

(b) Differentiate between the following : (2×5=10)

(i) EF-Tu and EF-G

(ii) DNA pol α and DNA pol δ

(iii) Group I and Group II Introns

(iv) sRNA and siRNA

(v) Replisome and Replicon

(c) State the function of the following : (1×4=4)

(i) RRF

(ii) TFIID

(iii) RF-C

(iv) *Xist*

(d) State the most important contribution of the following scientists : (0.5×4=2)

(i) Fire and Mello

(ii) Hargobind Singh Khorana

(iii) Arthur Kornberg

(iv) Zamecnik and Hoagland

(e) Explain the following : (6)

(i) DNA polymerase is able to distinguish between deoxyribonucleotides and ribonucleotides.

(ii) The third base of codon can be recognised by more than one base at the first position of the anticodon.

(iii) Prokaryotic mismatch repair system is able to differentiate between parental DNA strand and newly synthesized strand.

2. (a) Describe the experiment conducted by Meselson and Stahl and explain its conclusion. (6)

(b) Describe the structure of double stranded B-DNA with suitable diagrams. (6)

3. (a) Illustrate the process of initiation of translation in Eukaryotes. (6)

(b) How many energy rich molecules are used per round of peptide bond formation? Name the steps where energy is consumed. (3)

(c) Ribosomes cannot discriminate between correctly and incorrectly charged tRNAs. Explain. (3)

4. (a) Illustrate the chemical reaction which leads to the synthesis of DNA. (2)

(b) What will be the consequence if helicase is not present during replication? (2)

(c) Describe the function of all the domains of DNA pol III. (4)

P.T.O.