[This question paper contains 4 printed pages.]

Sr. No. of Question Paper: 655 G Your Roll No.....

Unique Paper Code : 216/223/385

Name of the Paper : MBHT - 301 : MOLECULAR BIOLOGY - I

Name of the Course : B.Sc. (H) Anthropology, Biochemistry, Biological

Science, Bio-medical Science, Botany, Microbiology,

Zoology

Semester : III

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. Attempt five questions in all, including Q. No. 1, which is compulsory.

3. Illustrate your answers with appropriate diagrams wherever necessary.

1. (a) Give reasons:

- (i) Organellar DNA shows similarity with bacterial DNA
- (ii) Transfer RNA was referred as an adaptor molecule by Crick
- (iii) Linear DNA shows semi-discontinuous mechanism of replication
- (iv) RNA viruses do not follow Central Dogma
- (v) DNA polymerases cannot initiate a DNA strand de novo (5)
- (b) Define the following (Any five):
 - (i) Hyperchromicity

		(ii) Linking number	
		(iii) Thymine dimer	
		(iv) RNA primer	
		(v) Nuclear scaffold	
		(vi) T _m	(5)
	(c)	Fill in the blanks:	
		(i) A codon consists of nitrogenous bases.	
		(ii) enzyme joins broken phosphodiester backbone.	
		(iii) was the first Ribozyme isolated.	
		(iv) histone is not a part of core particle of nucleosome	: .
		(v) Proofreading is a unique activity shown by enzyme.	(5)
2.	(a)	Write short notes on:	
		(i) Clover leaf model of t-RNA	
		(ii) Rolling circle mechanism of DNA replication	
		(iii) Point mutations	(3×3=9)
	(b)	Illustrate DNA packaging in eukaryotes with the help of well diagrams.	labelled (6)
3.	Dif	ferentiate between the following:	
	(i) B-DNA and Z-DNA	

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- (ii) Purines and Pyrimidines (iii) Euchromatin and Heterochromatin (iv) Deamination and Depurination (v) Topoisomerase I and Topoisomerase II (a) Give a brief account of experiments, which helped in deciphering the Genetic Code.
- - (b) What is reassociation kinetics and how can it be used to plot the cot curve. Give its implications.

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- (c) Explain the key experiment that demonstrates the semi-conservative nature of DNA replication. $(5 \times 3 = 15)$
- 5. (a) How are the chromosome ends replicated, specially the lagging strand? (5)
 - (b) Give a detailed description of the events occurring at the Y- fork or replication fork in E. coli. (10)
- 6. (a) Describe any two experiments demonstrating DNA as the carrier of genetic information. (6)
 - (b) Explain Chargaff's base equivalence rule. (3)
 - (c) Compare and contrast three biological repair mechanisms of errors in DNA replication. (6)
- 7. (a) Explain organization of chromosomal and extra-chromosomal DNA in bacteria and genome in viruses. (8)

 $(3 \times 5 = 15)$

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(b) What is degeneracy and polarity in genetic code? (4)

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(c) A covalently closed circular DNA molecule (ccc DNA) of 360 bp size has 36 twists and 4 negative supercoils. Determine the linking number of this molecule.