

- (b) What are transcription factors ? Describe the major transcription factors involved in the initiation of transcription by RNA Polymerase II. 4
- (c) What is an inducible operon ? Explain with an example. 4
6. (a) How does eukaryotic translation differ from prokaryotic translation ? Elaborate the differences. 4
- (b) Write a short note on homologous recombination. 4
7. Answer any *two* of the following :
- (a) Enlist and briefly explain the important features of Genetic Code. 4
- (b) How do the following regulatory mechanisms affect transcription of genes in eukaryotes ? 4
- (i) Acetylation of histones
- (ii) Methylation of genes
- (c) What is “Catabolite Repression” ? How is the lac operon positively regulated by it ? 4

Subject Code—52536

B. Sc. EXAMINATION

(Reappear Batch 2017)

(Third Semester)

BIOTECHNOLOGY

VII

Molecular Biology

Time : 3 Hours

Maximum Marks : 40

Note : Attempt *Five* questions in all. Q. No. 1 is compulsory. Attempt *four* questions from Unit I and Unit II, selecting *two* questions from each Unit. All questions carry equal marks.

(Compulsory Question)

1. State whether the following statements are True or False : 1×8=8

- (a) Genes in prokaryotes tend to be grouped together in operons, with several genes under the control of a single regulatory region.
- (b) RNA polymerase in prokaryotes recognizes the promoter sequence with the help of beta subunit.
- (c) Genetic code is overlapping.
- (d) Mitochondrial DNA is single stranded.
- (e) In *E. coli* transcription is coupled with translation.
- (f) Lac operon is an inducible operon.
- (g) DNA rich in GC pairs melts at a higher temperature.
- (h) Z-DNA is right handed.

Unit I

- 2. (a) Draw a well-labelled diagram of Watson and Crick model of DNA structure. 4
- (b) Differentiate between eukaryotic and prokaryotic DNA replication. 4

- 3. (a) What are transposons ? Explain the different classes of transposons. 4
- (b) Which is the smallest RNA among the three major types of RNA i.e. mRNA, rRNA and tRNA ? Describe its structure. 4
- 4. (a) DNA replication is semi-conservative. What does it mean and how it was first proved that DNA replication is semi-conservative ? 4
- (b) Describe the nucleosome model of eukaryotic chromatin packaging in the nucleus. 4

Unit II

- 5. Answer any *two* of the following :

- (a) How is eukaryotic mature mRNA different from pre-mRNA ? Enlist and explain briefly the major post-transcriptional modifications of eukaryotic mRNA. 4