Exam.Code:0435
Sub. Code: 3468

2123

M. Sc. (Biotechnology) First Semester

MBIO-104: Molecular Biology

Time allowed: 3 Hours | Max. Marks: 80

NOTE: Attempt five questions in all, including Question No. I which is compulsory and selecting one question from each Unit.

x-x-x

I. Attempt the following:-

a) Diagrammatically represent the incompatibility of hydrogen bonding between A and C in DNA double helix.

b) How are the complimentary double stranded RNA designed for RNA interference experiments? Discuss its specific properties. Which techniques can be used to measure the gene expression? Discuss.

c) How Trp operon regulates the biosynthesis of tryptophan? Discuss in detail.

d) Differentiate between RAPD and AFLP (4x4)

UNIT - I

II. a) Discuss the mechanism for maintaining the ends of chromosome during replication.

b) How the 5'- 3' and 3' - 5' exonuclease activity of DNA polymerase helps in fidelity of DNA replication.

c) How the DNA synthesis is initiated on both the strands? (4,5,7)

III. a) Differentiate basic promoters and initiation of transcription in prokaryotes and eukaryotes? What is abortive transcription?

b) In *E. coli* precise spacing between the -35 and -10 conserved promoter elements has been found to be a critical determinant of promoter strength. Give reason.

c) Transcription and replication both need DNA as template. How is transcription initiated without the need of a primer by RNA polymerase but DNA polymerase needs a primer for replication? (8,4,4)

UNIT - II

IV. a) Discuss different types of post transcriptional modifications in eukaryotes.

b) How the gene expression is silenced by modification of DNA? Discuss.

c) What is alternate splicing and its importance? Elaborate with help of two examples. (8,4,4)

V. a) What is EF-Tu? What is its role? How it performs this specific function?

b) Differentiate the initiation of translation in prokaryotes and eukaryotic system.

c) Discuss the role of aminoacyl tRNA synthetase in charging of tRNA. (4,6,6)

P.T.O.

UNIT - III

VI. a) Discuss the functioning of lac operon. What is the role played by glucose in lac operon functioning? What will happen if

i) Only Glucose is present in the media

ii) Only Lacose is present in media

iii) Lactose and glucose both are present in the media

b) What is histone modification? What type of histone modifications take place and which enzyme is involved in that? (8,8)

VII. a) What is p53 and Why p53 is known as guardian of the genome? Discuss the various steps of cell cycle regulation by p53. How a normal cell or cell with damaged DNA regulates the expression of p53? Discuss.

b) What is chromatin remodeling? What type of protein complexes is required for de-condensation of chromatin? Discuss in detail. (8,8)

UNIT - IV

VIII. a) What is chain termination method of DNA sequencing? How it works? Discuss.

b) Discuss three different steps of PCR reaction. What is multiplex PCR and under which conditions it is used? How is it different from normal PCR? Discuss. (8,8)

IX. a) Which techniques are being used for physical mapping of genome? Discuss in brief

b) What is VNTR and what is its function? How can it be helpful in genome mapping? Discuss in detail.

c) How RFLP is used in genome mapping? (8,4,4)

x-x-x