Exam.Code:0436
Sub. Code: 3472

2053

M.Sc. (Biotechnology) Second Semester
MBIO-201: 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. Write in brief:-

(a) Multiplex PCR

(b) Cre/lox recombination

(c) Role of Rho factor

(d) Hyper methylation of promoter

(e) Proto-oncogenes with examples

(f) Difference between Non-defective and Acute transforming virus

(g) Phagemids

(h) Microsatellites (8x2)

UNIT - I

II. a) Discuss the importance of Agarose gel electrophoresis in molecular biology? To separate DNA fragments less than 20 bp can we use this technique? Explain with reasons?

b) Describe the enzymes and accessory proteins required for initiation of replication in eukaryotes?

c) Discuss the role of RecA, RecB and RecC proteins in DNA repair mechanism? (5,5,6)

III. a) Explain with examples why in genomes of higher eukaryotes the relation between the size of genome and number of genes is lost?

b) What is a replicon? Describe the enzymes and accessory proteins required for initiation of replication in prokaryotes?

c) Mention the different criteria for designing of primers for PCR. (6,6,4)

UNIT - II

IV. a) Mention the structure of bacterial RNA polymerase and how does it find the promoter sequences to initiate transcription? Does sigma factor play a role in transcriptional regulation and how?

b) Eukaryotic translation uses a complex of many initiation factors. Discuss in detail. What these factors are and how do they control the initiation of translation. (2x8)

P.T.O.

V. a) Discuss the molecular mechanism of capping and polyadenylation of primary m-RNA and why is this modification necessary in eukaryotes?

b) What are the termination factors of translation that recognizes the termination codons and how do they process an effective termination of translation?

c) What is epigenetics? Enumerate the types of post translational modifications occur in Histone proteins which can regulate gene expression? (5,5,6)

UNIT - III

VI. a) Differentiate between oncogenes and tumour suppressor genes? Discuss the structure and involvement of p53 in causing cancer?

b) Discuss the molecular mechanism of Antisense molecules in gene silencing? How antisense technology used in medicine? (2x8)

VII. a) Discuss the oncogenic effect of translocations?

b) Discuss the regulation of Rb protein in causing cancer?

c) What are ribozymes? Mention the structure and biochemistry of hammerhead ribozymes? (6,5,5)

UNIT - IV

VIII. a) How are genomic libraries created and mention the methods of clones selection?

b) Discuss the methods applied for physical mapping? Mention the difference between Physical and genetic mapping? (2x8)

IX. a) Discuss the various strategies for sequencing of genomes? What is pyrosequencing?

b) Differentiate between RFLP, RAPD and AFLP? How are they used in genetic mapping? (2x8)

x-x-x