

[This question paper contains 3 printed pages.]

Sr. No. of Question Paper : 754 E Your Roll No.....

Unique Paper Code : 107485

Name of the Course : **B.Sc. (H) Botany, Zoology, Biochemistry,  
Bio-Medical, Microbiology, Anthropology**

Name of the Paper : MOLECULAR BIOLOGY II (MBHT-402)

Semester : IV

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 Question No. 1 which is compulsory.
3. Draw well labeled diagrams wherever necessary.

1. (a) List contributions of the following (any **five**):

(i) J. D. Watson

(ii) T. Svedberg

(iii) Jacob and Monod

(iv) Francis Crick

(v) Paul Zamenick

(vi) Mello and Fire

(1×5=5)

*P.T.O.*

(b) Match the following

**Column A**

- (i) Stop codon
- (ii) Adenylylation
- (iii) Dosage compensation
- (iv) CAP
- (v) RNA Polymerase

**Column B**

- (a) Translation
- (b) *lac* operon
- (c) Sigma factor
- (d) *Xist*
- (e) UAG

(1×5=5)

(c) Define the following terms (any five):

- (i) Promoter
- (ii) miRNA
- (ii) Holoenzyme
- (iv) Snurps
- (v) Polycistronic mRNA
- (vi) Exon

(1×5=5)

2. (a) Explain with diagrams the process of transcription in *E. coli*. (10)

(b) Justify the statement that “ribosome is a ribozyme”. (5)

3. Write short notes on any three:

- (a) Transcription factors in eukaryotes
- (b) Gene silencing by DNA methylation
- (c) Assembly of 48S pre-initiation complex
- (d) Exon shuffling

(3×5=15)

4. (a) Illustrate the steps of elongation in eukaryotic translation. (8)

- (b) Discuss various mechanisms of RNA editing. (7)
5. (a) Describe organization and regulation of tryptophan operon. (10)  
(b) Briefly describe “clover leaf structure” of tRNA with a well-labeled diagram. (5)
6. (a) Elaborate the role of eukaryotic activators in transcriptional regulation. (10)  
(b) Describe the post-transcriptional modifications of eukaryotic mRNA. (5)
7. Differentiate between any five of the following:
- (a) Group I and Group II introns
  - (b) Rho-dependent and Rho-independent termination
  - (c) Class I and Class II release factors
  - (d) Pyrophosphorolytic and hydrolytic editing
  - (e) Nonsense mediated RNA decay and nonstop mediated RNA decay
  - (f) Transcription and Translation (5×3=15)