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S. No. of Question Paper : 676

Unique Paper Code : 107485

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Name of the Paper : Molecular Biology-II

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

Semester : IV

Duration : 3 Hours

Maximum Marks : 75

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt five questions in all, including

Question No. 1 which is compulsory.

Draw well-labelled diagrams wherever necessary.

1. (a) Define the following :

5

(i) Transcription bubble

(ii) Trans-esterification

(iii) ORF

(iv) Catabolite repression

(v) Ribozyme.

P.T.O.

(b) State true/false :

(i) RNA polymerase does not need a primer for transcription initiation.

(ii) Dicer and Drosha recognize and cleave RNAs on the basis of sequence of their substrates.

(iii) Each aminoacyl-tRNA synthetase attaches a single amino acid to one or more tRNAs.

(iv) Group I introns release a lariat rather than a linear intron.

(v) Apo-repressors can bind directly to the operator site of the gene.

(c) Expand the following :

(i) TAF

(ii) RBS

(iii) Xist

(iv) STAT

(v) CAP

2. (a) Explain transcription initiation by RNA polymerase II. Illustrate your answer.

(b) Explain, with the help of suitable diagrams, the working of the *lac* operon in the following conditions :

(i) When only lactose is present

(ii) When only glucose is present

(iii) When both lactose and glucose are present

(iv) When both lactose and glucose are absent

3. Differentiate between the following (any three) :

(a) Spliceosome and ribosome

(b) mRNA and tRNA

(c) Alternative splicing and exon shuffling

(d) Translation initiation in prokaryotes and eukaryotes.

4. What is the role/significance of the following ?

(a) RRF

(b) Sigma factor in transcription

(c) rut sites

(d) tmRNA

(e) Leucine zipper domain.

5. (a) How are mRNAs that are incomplete or have a premature stop codon targeted and destroyed in eukaryotes? 8
- (b) Explain the spliceosome-mediated splicing reaction with the help of a well-labelled diagram only. 7
6. (a) Explain the various ways by which transcription is terminated in prokaryotes. 7
- (b) Discuss the various ways in which eukaryotic repressors regulate transcription. 8
7. Write short notes on the following (any three) : $3 \times 5 = 15$
- (a) RNA editing /
- (b) Combinatorial control
- (c) Riboswitches
- (d) RNA interference
- (e) Attenuation.