

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 9591

Roll No.

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B.Tech.

(SEMESTER-IV) THEORY EXAMINATION, 2011-12

GENETICS & MOLECULAR BIOLOGY

Time : 3 Hours]

[Total Marks : 100

Note : Attempt all Sections.

Section – A

1. Attempt **all** parts of the following : **10 × 2 = 20**
- (a) What is Epistasis ? Give an example of epistasis.
 - (b) What are the relationships between genes, alleles and chromosomes ?
 - (c) Why is DNA preferred over RNA as the genetic material ?
 - (d) Define ORF and Transposons.
 - (e) What is DNA super coiling ? Why is it useful to bacteria ?
 - (f) Summarize what the central dogma tells us about the role of DNA and RNA and proteins.
 - (g) What is kissing chromosome ?
 - (h) What is the function of an insulator in gene cluster ?
 - (i) What is TATA box ?
 - (j) What are the transcription factors ?

Section – B

2. Attempt any **three** parts of the following : **3 × 10 = 30**
- (a) Explain the components of prokaryotic replication apparatus in detail.
 - (b) What are the common types of DNA damage ? Draw and describe the different DNA repair mechanism.

- (c) Explain the composition and structure of DNA and describe the process of tautomerization in DNA molecules.
- (d) Write down the post transcriptional modification features of polyadenylation and capping.
- (e) Explain hormonal control of gene expression in eukaryotes.

Section – C

Attempt **all** parts of the following :

5 × 10 = 50

3. 'Principle of independent assortment is just an expansion of principle of segregation'. – Comment.

OR

What are the classical and modern gene concepts ? Explain the rII locus in T₄ phage.

4. What are mutagens ? What are the different mechanisms by which mutation occur ? Give two examples and describe the process by which they bring about mutation.

OR

How DNA primers are synthesized ?

5. What is operon ? How does it regulate gene expression ?

OR

Explain the process and significance of reverse transcription.

6. Describe significant features of transcription in prokaryotes. Differentiate between Rho dependent and Rho independent methods of transcription termination.

OR

What is homologous recombination ? Explain with diagram how holiday junction is created during homologous recombination.

7. Differentiate between translation process in prokaryotes and eukaryotes.

OR

Describe the structure of t-RNA and its role in protein synthesis.