

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1055

I

Unique Paper Code : 2162013501

Name of the Paper : Molecular Biology of the Cell

Name of the Course : B.Sc. Botany NEP (UGCF-2022)

Semester : V

Duration : 2 Hours

Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **four** questions in all.
3. Question No. **1** is compulsory.
4. **All** parts of a question should be answered together.

1. (a) Define the following (**any five**) : (1×5=5)

(i) Codon

(ii) Split gene.

P.T.O.

- (iii) Inducer
- (iv) Primosome
- (v) Okazaki fragment
- (vi) Glycosylation

(b) Expand the following (**any five**) : (1×5=5)

- (i) ORF
- (ii) PCNA
- (iii) miRNA
- (iv) TBP
- (v) Tm
- (vi) CRP

(c) Answer the following in one word (**any five**) : (1×5=5)

- (i) Enzyme encoded by the *lacZ* gene.
- (ii) Sequence of 5' and 3' splice site.
- (iii) Enzyme involved in charging tRNA during protein synthesis.
- (iv) Give the percentage of adenine present in a DNA molecule having 30% guanine in its base composition.

(v) RNA polymerase subunit required to initiate transcription in prokaryote.

(vi) Name the enzyme involved in removal of RNA primer during eukaryotic DNA replication process.

2. Differentiate between the following (any five) :
(3×5=15)

(a) A- DNA and B- DNA

(b) Topoisomerase-I and Topoisomerase-II

(c) Denaturation and Renaturation of DNA

(d) Negative and Positive Gene Regulation in *Lac* Operon

(e) Monocistronic and Polycistronic RNA

(f) Prokaryotic and Eukaryotic Ribosome

3. Write short notes on (any three) : (5×3=15)

(a) Mechanism of splicing

(b) Attenuation in *Trp* operon

(c) Theta mode of DNA replication

(d) Central Dogma

(e) Transcription termination in eukaryotes

4. (a) With a well labeled diagram, discuss the mechanism of initiation in prokaryotic translation and compare it with that of eukaryote. (8)
- (b) Explain the salient features of genetic code. (5)
- (c) Name two unusual bases present in tRNA. (2)
5. Attempt **any two** of the following : (7.5×2=15)
- (a) With the help of a well labelled diagram, explain the mechanism of RNA interference.
- (b) How did Fraenkel – Conrat proved that RNA is genetic material in some viruses?
- (c) What are consensus sequences? Explain them with reference to prokaryotic and eukaryotic promoter regions.
6. (a) Discuss the mechanism of transcription termination in prokaryotes. (8)
- (b) With a well labelled diagram, discuss end replication in eukaryotes. (7)