

Sl. No. of Ques. Paper : 1325

F-7

Unique Paper Code : 2161503

Name of Paper : Fundamentals of Molecular Biology

Name of Course : B.Sc. (Hons.) Botany (FYUP)

Semester : V

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. Question No. 1 is compulsory.

Answer all parts of a question together.

Draw diagrams wherever necessary.

1. (a) Give major contributions of the following scientists (any five) :

(i) John Cairns

(ii) Avery et. al.

(iii) Arthur Kornberg

(iv) Paul Zamecnik

(v) Marshall Nirenberg

(vi) Temin and Baltimore.

1×5=5

(b) Define the following and comment in not more than five sentences (any five):

(i) Introns

(ii) Replicon

(iii) Helicase

(iv) Promoter

(v) Anticodon

(vi) Pribnow box.

1×5=5

(c) Expand the following and mention their most important role (any five):

(i) SSBP

(ii) TFIID

(iii) ARS

(iv) TBP

(v) CTD

(vi) ORC.

1×5=5

- (d) From the given nucleotide sequence of DNA, identify the template strand and give the sequence of the transcript:

5'-ATTGACCTTAGA-3'

3'-TAACTGGAATCT-5'

- (e) What is the molecular basis of squamous cell carcinoma in human beings? 2

- (f) Give possible reasons for the following (any four):

(i) The origin of replication contains AT-rich sequences

(ii) Split genes are present only in eukaryotes

(iii) DNA synthesis occurs only in 5' to 3' direction

(iv) Eukaryotes have multiple origins of replication

(v) Sixty four codons code for 20 amino acids.

2×4=8

2. (a) Give a detailed account of initiation of transcription in prokaryotes. 8

- (b) Describe the Hershey and Chase experiment conducted to prove that DNA is the genetic material. 4

3. (a) Discuss the mechanism of spliceosome-mediated splicing. 7

- (b) How does telomerase help in replicating the ends of linear chromosome? 5

4. Write short notes on any *three* of the following:

(a) Enzymes involved in DNA replication

(b) Fraenkel-Conrat experiment

(c) Exon shuffling

(d) Discovery of mRNA.

4×3=12

5. Differentiate between any *four* of the following:

(a) Group I *v/s* Group II introns(b) Pyrophosphorolytic *v/s* Hydrolytic editing(c) Rho-dependent *v/s* Rho-independent termination

- (d) RNA Polymerase I *v/s* RNA Polymerase II
- (e) Continuous *v/s* Discontinuous replication of DNA. 3×4=12
6. (a) Discuss any two key experiments that led to the deciphering of genetic code. 6
- (b) What are guide RNAs? How do they help in RNA editing? 6
7. (a) Discuss the role of elongation factors in eukaryotic transcription. 7
- (b) Elaborate on the organization of genome in bacteria. 5