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3 (Sem-5 /CBCS) ZOO HC 1
2021

(Held in 2022)

ZOOLOGY

(Honours)

Paper : ZOO-HC-5016

(Molecular Biology)

Full Marks : 60

Time : Three hours

**The figures in the margin indicate
full marks for the questions.**

1. Choose the correct answer : $1 \times 7 = 7$

(a) Which of the following is not a post-transcriptional modification ?

- (i) Splicing
- (ii) 5' capping
- (iii) 3' adenylation
- (iv) Glycosylation

(b) In the carbon skeleton of the pentose sugar in DNA, the attachment point of a base to form a nucleoside is

- (i) C_1
- (ii) C_2

Contd.

(iii) C_3

(iv) C_5

(c) The DNA binding protein that initiates the transcription of bacterial genes is called

- (i) operator
- (ii) sigma factor
- (iii) repressor
- (iv) promoter

(d) Which of the following amino acids has the greatest number of codons?

- (i) Proline
- (ii) Leucine
- (iii) Tryptophan
- (iv) Aspartic acid

(e) Tryptophan operon in *E. coli* is an example of

- (i) inducible operon
- (ii) positively regulated operon
- (iii) repressible operon
- (iv) All of the above

(f) In the process of DNA synthesis in *E. coli*, the RNA primers are excised by the exonuclease activity of

- (i) DNA polymerase I

(ii) DNA polymerase II

(iii) DNA polymerase III

(iv) DNA ligase

(g) During elongation of polypeptide chain in translation, the peptide bonds are formed by the enzyme

- (i) peptidyl transferase
- (ii) peptidyl ligase
- (iii) aminoacyl tRNA synthetase
- (iv) peptidyl polymerase

2. Write short notes on the following : **(any four)**
2×4=8

- (a) Degeneracy of the genetic code
- (b) Riboswitches
- (c) rho-independent termination
- (d) RNA splicing
- (e) Watson-Crick model of DNA.

3. Answer **any three** from the following questions : 5×3=15

- (a) Write the salient features of B-form of DNA. 5
- (b) What do you mean by gene silencing? Write the role of silencers in the process of transcription. 2+3=5

(c) What is pyrimidine dimerization?
Explain the photoreactivation repair of
thymine dimers in DNA. 1+4=5

(d) Write a note on replication of telomeres. 5

(e) Citing proper examples, write the role of
inhibitors of protein synthesis. 5

4. Briefly explain the mechanism of DNA
replication in prokaryotes. 10

Or

What do you mean by a promoter site?
Explain the mechanism of transcription in
prokaryotes with suitable diagrams. 2+8=10

5. What is the difference between prokaryotic and
eukaryotic ribosome? Briefly explain the
assembly of a prokaryotic ribosome and
discuss about the functional sites or active
sites of a ribosome. 1+(5+4)=10

Or

Explain the mechanism of protein synthesis in
prokaryotes. 10

6. Give an illustrative account on the regulatory
mechanism of *lac* operon in *Escherichia*
coli. 10

Or

Write the role of activators and enhancers in
transcription regulation of eukaryotes. 5+5=10