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 : 1×7=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

(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