3 (Sem–4/CBCS) BOT HC 1

2022

BOTANY

(Honours)

Paper : BOT–HC–4016

(Molecular Biology)

Full Marks : 60

Time : Three hours

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

1. Answer ***any seven*** of the following as directed : 1×7=7

   (a) Whose experimental findings confirmed that DNA is the genetic material ?

   (i) Avery, MacLeod and McCarty

   (ii) Griffith

   (iii) Alfred D. Hershey and Martha Chase

   (iv) None of the above

   (Choose the correct answer)

(b) Z-form DNA shows

(i) right handed coiling

(ii) left handed coiling

(iii) both left and right handed coiling

(iv) None of the above

(Choose the correct answer)

(c) Transcription is the transfer of genetic information from

(i) DNA to RNA

(ii) DNA to mRNA

(iii) mRNA to tRNA

(iv) tRNA to mRNA

(Choose the correct answer)

(d) mRNA is a _____ RNA.

(genetic/non-genetic)

(Put the correct answer)

(e) The sequence of sense strand of DNA is same as that of

(i) rRNA

(ii) mRNA

(iii) template DNA strand

(iv) tRNA

(Choose the correct answer)

(f) The genetic code for methionine is

(i) UAA

(ii) AUG

(iii) AAU

(iv) AAG

(Choose the correct answer)

(g) Self-splicing occurs for rare introns that form a

(i) hnRNA

(ii) mRNA

(iii) ribozyme

(iv) splicesome

(Choose the correct answer)

(h) Mitochondrial DNA shows

(i) paternal inheritance

(ii) maternal inheritance

(iii) both paternal and maternal inheritance

(iv) None of the above

(Choose the correct answer)

(i) A _____ is the basic structural unit of DNA packaging in eukaryotes, which consists of a segment of DNA wound around eight _____ proteins.

(Fill in the blanks)

(j) RNA primers are synthesized with the help of

(i) RNA polymerase

(ii) topoisomerase

(iii) primase

(iv) ligase

(Choose the correct answer)

2. Answer ***any four*** of the following questions briefly : 2×4=8

(a) What is 'Cot curve'?

(b) What is gene silencing?

(c) What are the functions of DNA polymerase I and DNA ligase in DNA replication?

(d) What are exons and introns?

(e) What is splicesome?

(f) What is central dogma in molecular biology?

(g) How does transcriptional control differ in prokaryotes and eukaryotes?

(h) What are enhancers?

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

(a) Write the difference between constitutive and facultative heterochromatin.

(b) How does nuclear DNA differ from organelle DNA?

(c) Write a note on the properties of genetic code.

(d) Distinguish between denaturation and renaturation of DNA.

(e) Describe with experimental evidence that 'DNA replicates in a semi-conservative way'.

(f) Discuss on fidelity of translation.

(g) Write a short note on Arthur Kornberg's enzyme.

(h) Write a brief note on genetic and non-genetic RNA.

4. Answer ***any three*** of the following questions : 10×3=30

(a) With the help of neat labelled diagram describe the structure of DNA. Point out the salient features of the double helic. 6+4=10

(b) Describe the rolling circle mechanism of DNA replication with a neat diagram.

(c) Discuss the detail the *three* main steps involved in the process of transcription in prokaryotes.

(d) Who proposed adaptor hypothesis of central dogma ? Explain on what basis the adaptor hypothesis was framed. 2+8=10

(e) How many structural genes are present in a lac operon ? Explain why the lac operon is considered as inducible operon. 3+7=10

(f) What are different types of DNA ? Describe the structure of B-form DNA with a neat diagram.

(g) What are split genes? Write a short note on group I and group II intron splicing.

(h) What are ribozymes? Describe the structure and function of ribozymes.
