Total number of printed pages–4

3 (Sem–4/CBCS) BOT HC 1

2025

BOTANY

(Honours Core)

Paper : BOT–HC–4016

(Molecular Biology)

Full Marks : 60

Time : Three hours

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

1. Give short answers of the following : 1×7=7

   (a) What is gene silencing ?

   (b) Define nucleosome.

   (c) Who proposed the Central Dogma theory ?

   (d) What is alternative splicing ?

   (e) Which genetic code is called as start codon ?

(f) Name the bond which is formed between t-RNA and amino acid.

(g) Which type of RNA polymerase synthesizes mRNA in eukaryotes ?

2. Answer the following questions briefly : 2×4=8

(a) Distinguish between exon and intron.

(b) What do you mean by Okazaki fragments ?

(c) "Genetic Code is degenerate." Justify the statement.

(d) What are the differences between constitutive and facultative heterochromatin ?

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

(a) Discuss the role of different enzymes in DNA replication.

(b) Is mitochondrial inheritance part of Mendelian inheritance ? Mention the salient features of mitochondrial DNA.

(c) Write the properties of genetic code.

(d) Distinguish between purine and pyrimidine.

(e) Write the salient features of Watson and Crick model of DNA.

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

(a) Describe the mechanism of protein synthesis in prokaryotes. Point out the role of different RNAs in this process. 7+3=10

(b) Give a comparative account on the Trp operon and Lac operon for the metabolism of tryptophan and lactose in bacteria.

(c) Give a detailed note on the chief antibiotics which inhibit protein synthesis. How is transcription regulated ? 5+5=10

(d) Discuss the role of Griffith and Avery in establishing the fact that 'DNA is a genetic material'. 5+5=10

(e) Why is semi-conservative mode of DNA replication essential for genetic stability ? With labelled diagram, describe semi-conservative replication process of DNA. 3+7=10 (*f*) Write an account on the following : 5×2=10

(*i*) Structure of prokaryotic RNA polymerase

(*ii*) Charging of t-RNA during translation
