

63/1 (SEM-4) BOT HC 4086 (CC 8)

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BOTANY

Paper : CC-8

(Molecular Biology)

Full Marks : 60

Time : 3 hours

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

1. Choose the correct answer from the following : 1×5=5

(a) Which enzyme can cleave and join DNA molecule?

(i) Gyrase

(ii) DNA ligase

(iii) DNA polymerase

(iv) Primase

(b) If the length of one helix in a DNA is 44 Å, the type of DNA is

(i) A-DNA

(ii) B-DNA

(iii) C-DNA

(iv) Z-DNA

(2)

(3)

(c) The twenty different amino acids in the protein are normally coded by

- (i) 60 codons
- (ii) 61 codons
- (iii) 62 codons
- (iv) 63 codons

(d) mRNA is synthesized on DNA template in which direction?

- (i) 5'-3'
- (ii) 3'-5'
- (iii) Both of the above
- (iv) None of the above

(e) Split genes are present in

- (i) all the eukaryotes
- (ii) most of the eukaryotes and some archaeobacteria
- (iii) most of the eukaryotes and some eubacteria
- (iv) all organisms

2. Answer the following very short questions :

2×5=10

- (a) What is an organelle DNA? Why do organelles like mitochondria and chloroplast have their own DNA? 1+1=2
- (b) Differentiate between leading and lagging strands.
- (c) What are exons and introns?
- (d) Differentiate between denaturation and renaturation.
- (e) Why is tRNA called an adaptor molecule?

3. Answer any *five* of the following questions :

5×5=25

- (a) Briefly discuss the organization of DNA in prokaryotes.
- (b) Enumerate the differences between B-DNA and Z-DNA.
- (c) Write about the enzymes involved in DNA replication.
- (d) Distinguish between rolling circle model and θ model of DNA replication.

(4)

- (e) Write a note on degeneracy of code.
- (f) What is an operon? Write the structure of lac operon.
- (g) Elucidate the different post-translational modifications of protein.

4. Answer any *two* of the following questions :

10×2=20

- (a) Explain the process of translation in prokaryotes. Mention any four differences between prokaryotic and eukaryotic translations. 8+2=10
- (b) What are the different types of RNA? Discuss the structure and synthesis of mRNA. 2+8=10
- (c) Discuss the mechanism of gene regulation in tryptophan operon.

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