2022

BOTANY — HONOURS

Paper : CC-11

(Cell and Molecular Biology)

Full Marks : 50

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

1. Answer ***any five*** questions from the following : 2×5

(a) State the chemical composition of chromatin.

(b) What are blunt and staggered cuts?

(c) What is meant by end-replication problem?

(d) Name one gene present in cpDNA and in mtDNA.

(e) What is nuclear lamina? State its function.

(f) What is riboswitch? Mention its function.

(g) Mention a reason why the concept of RNA world came into existence. Write the full form of PNA.

(h) Mention the role of mutated p^{53} gene in cell cycle.

2. Answer ***any two*** questions from the following : 5×2

(a) Explain ribosome biogenesis in eukaryotes.

(b) Write down the process of PCR and its application.

(c) Briefly explain the endosymbiotic theory of origin in eukaryotic cell.

(d) Explain the processing of mRNA in eukaryotes.

3. Answer ***any three*** questions from the following :

(a) What is an operon? Distinguish between an inducible and a repressible operon. Explain the mechanism of negative control in *lac*-operon with suitable diagram. 2+3+5

(b) Enumerate the different checkpoints in yeast cell-cycle. What is MPF? Explain its role in cell-cycle regulation. 3+2+5

(c) Define genetic code. Write the properties of genetic code with examples and exceptions. Discuss the binding technique of decipherance of codons. 1+5+4

(d) Discuss the roles of protooncogenes and tumor suppressor genes in cancer development. Name the main types of cancer. Mention the different stages of cancer onset. Mention the names of carcinogenic agents. 5+1+2+2

(e) Describe with neat diagrams the mechanism of transcription of RNA in prokaryotes. State the role of helicase, gyrase and SSB protein in DNA replication. 7+3

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