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3 (Sem-4/CBCS) BOT HC 1

2024

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. Choose the correct answer of the following :

1×7=7

- (a) What is the main component of the smooth colonies of *Diplococcus pneumoniae* ?
- (b) Define hnRNA.
- (c) What is spliceosome ?
- (d) Give one example of promoter which helps in transcription.
- (e) What is cot curve ?

Contd.

(f) Which of the following codons acts as stop codon in the transcription process ?

(i) AUG

(ii) UAA

(iii) AAA

(g) What is denaturation of DNA ?

2. Answer the following questions briefly :

$2 \times 4 = 8$

(a) What do you mean by 'Gene Expression' and how transcription regulation in prokaryotes takes place through operon concept ?

(b) What are the differences between euchromatin and heterochromatin ?

(c) Define Wobble hypothesis giving stress on the economy of tRNA molecule.

(d) Mention the characters of eukaryotic RNA polymerases.

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

$5 \times 3 = 15$

(a) "The whole world can be called as RNA world." Justify.

- (b) Describe the process of rolling circle replication in prokaryotes.
- (c) Discuss Avery, MacLeod and McCarty experiment and prove that DNA is genetic material.
- (d) What is guide RNA and how does it help in RNA editing ?
- (e) Define transcription and mention different steps of prokaryotic transcription.

4. Answer the following questions : **(any three)**

10×3=30

(a) What do you mean by central dogma of protein synthesis process ? Describe the process of synthesis of protein in eukaryotes.

2+8=10

(b) Define operon. How is transcription regulated in Lac-operon for the metabolism of lactose in bacteria ?

2+8=10

(c) Elaborate the Watson and Crick's model of DNA structure. What are the salient features of chloroplast DNA ?

7+3=10

(d) What are the differences between prokaryotic and eukaryotic ribosomes? Explain the different sites of a ribosome with suitable diagram. $5+5=10$

(e) What is replica? Describe unidirectional and bidirectional replication of DNA. What are the enzymes involved in DNA replication? $2+6+2=10$

(f) Write detailed notes on the following : $5 \times 2 = 10$

(i) Heat shock proteins;

(ii) Peptide hormones.
