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5 SEM TDC ZOOH (CBCS) C 11

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(Held in January/February, 2022)

ZOOLOGY

(Core)

Paper : C-11

(**Molecular Biology**)

Full Marks : 53

Pass Marks : 21

Time : 3 hours

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

1. Fill in the blanks : 1×5=5

(a) The diameter of A-DNA is _____.

(b) In *E. coli*, the origin of replication is known as _____.

(c) _____ subunit of RNAP holoenzyme initiates transcription in prokaryotes.

(2)

- (d) During translation, amino acids are attached to the ____ end of the respective tRNA molecules.
- (e) Lactose acts as an ____ of *lac* operon.
2. Explain precisely any *two* of the following : 4×2=8
- (a) DNA polymerase-III
- (b) Repair of DNA molecule
- (c) RNA interference
3. Write explanatory notes on any *two* of the following : 4×2=8
- (a) Wobble hypothesis
- (b) tRNA structure and function
- (c) Processing of mRNA
- (d) Okazaki fragment
4. Describe the structure of DNA double-helix model. Explain the synthesis of lagging strand of DNA with suitable diagram(s). 4+4=8

Or

Explain with suitable diagram(s) the experiment that conclusively proved that DNA replicates in semiconservative way. Why is DNA replication said to be semi-discontinuous? 6+2=8

(3)

5. What are the sequence elements found in the promoter of genes transcribed by RNA pol II? Write a short note on General Transcription Factors (GTFs) and their roles in transcription of mRNA in eukaryotes. 3+5=8

Or

Write short notes on Rho-dependent and Rho-independent termination of prokaryotic transcription. How transcription in prokaryotes differ from eukaryotes? 4+4=8

6. Write the biochemical reaction catalyzed by aminoacyl-tRNA synthetase. Write a note with suitable diagram on the formation of initiation complex in bacterial protein biosynthesis. 3+5=8

Or

Elaborate the process of elongation of protein synthesis in prokaryotes. 8

7. If *E. coli* is grown in a medium containing both glucose and lactose, which carbon source will it prefer and why? Explain your answer with reference to operon concept using suitable diagrams. 1+5+2=8

Or

What is operon? Describe the structure of tryptophan operon. Add a note on eukaryotic transcription activators and repressors. 1+4+3=8

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