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HAMM 21

M.Sc. (CBCS) DEGREE EXAMINATION,  
APRIL 2018.

Second Semester

Microbiology/Applied Microbiology

MOLECULAR BIOLOGY

(For those who joined in July 2012–2015)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. Z-DNA have a
- (a) Double helical nature
  - (b) Zig-Zag appearance
  - (c) Uracil base
  - (d) Single stranded nature

2. A polypeptide is encoded by a single
- (a) chromosome
  - (b) gene
  - (c) nucleotide
  - (d) nucleosome
3. Which of the following enzymes is not involved in DNA replication?
- (a) Helicase
  - (b) DNA polymerase
  - (c) Reverse transcriptase
  - (d) Topoisomerase
4. The nicks or gaps between Okazaki fragments are finally sealed by
- (a) Gyrase
  - (b) Primase
  - (c) Polymerase
  - (d) DNA ligase
5. Which of the following is the smallest among the RNA molecules?
- (a) mRNA
  - (b) tRNA
  - (c) rRNA
  - (d) None of the above
6. Which of the following enzymes is necessary for transcription to occur?
- (a) Protease
  - (b) RNA polymerase
  - (c) DNA polymerase
  - (d) Both DNA and RNA polymerase

7. The structure in a bacterium that indicates an active site for protein synthesis is
- a chromosome
  - a cell membrane
  - a flagellum
  - a polysome
8. Which site of the tRNA molecule binds to the mRNA molecule?
- Anticodon
  - Cotton
  - Amino acid
  - 5' end
9. In the zinc fingers motif, the spacing of the helical segments is performed by
- beta sheets
  - alpha sheets
  - helical clusters
  - an alpha helix
10. Which is not part of the lac operon?
- Repressor
  - Activator protein
  - Promotor
  - Structural gene

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Discuss in detail about the boiling and melting point of DNA.

Or

- (b) Write short notes on superhelicity of DNA.

12. (a) Give a detail account on replication of single stranded DNA.

Or

- (b) Describe about the inhibitors of DNA replication.

13. (a) Explain about different types of RNA polymerases in eukaryotes.

Or

- (b) Illustrate the polycistronic mRNA.

14. (a) Describe the significance of various factors involved in prokaryotic protein synthesis process.

Or

- (b) Explain the role of membrane bound ribosome in synthesis of exported proteins.

15. (a) Elaborately discuss about positive and negative regulations.

Or

- (b) Describe the structure and regulation of *lac* operon.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Describe in detail about replication proofreading process.

Or

- (b) Highlight the role of enzymes involved in DNA synthesis.

17. (a) Discuss in detail about the relationship between replication and cell cycle.

Or

- (b) Write an essay on an DNA repair pathway.

18. (a) Explain the structural features and function of rRNA, mRNA and tRNA.

Or

- (b) Elaborately discuss about prokaryotic transcription process.

19. (a) Discuss in detail about the salient features of genetic code.

Or

- (b) Describe about the role of inhibitors in protein synthesis process.

20. (a) Illustrate the regulation of gene expression in prokaryotes.

Or

- (b) Explain the following (i) *ara* operon (ii) *trp* operon.
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