

CORE-XI (MOLECULAR BIOLOGY)

I. Answer the following questions . [1]

1. The function of β subunit of polymerase is

- a. Template binding
- b. Catalytic binding
- c. Promoter binding
- d. Cation binding

2. Which of the σ factors is heat stable?

- a. σ^{54}
- b. σ^{70}
- c. σ^{28}
- d. σ^{32}

3. The mRNA codon of valine is

- a. GUC
- b. UGG
- c. CCA
- d. TTG

4. True replication of DNA is due to

- a. Phosphate backbone
- b. Hydrogen bonding
- c. Complementary base pairing rule
- d. None

5. Which of the following statements is not applicable to viruses?

- a. The virus replicates in a bacterial host
- b. The protein coat of a virus does not enter the host cell
- c. The genetic material is DNA or RNA
- d. Virus replicate autonomously in the absence of host

6. Mode of DNA replication is

- a. Conservative and bidirectional
- b. Semiconservative and unidirectional
- c. Semiconservative and bidirectional
- d. Conservative and unidirectional

7. Which enzyme is used to join nicks in the DNA strand?

- a. Primase
- b. DNA polymerase
- c. DNA ligase
- d. Endonuclease

8. Which enzyme is used in the unwinding of DNA?

- a. Ligase
- b. Topoisomerase
- c. Helicase
- d. Exonuclease

9. Which of the following processes does not occur in prokaryotes?

- a. Transcription
- b. Splicing
- c. Translation
- d. Replication

10. cDNA is synthesised from RNA by the enzyme

- a. DNA polymerase
- b. DNA synthetase
- c. DNA convertase
- d. Reverse transcriptase

11. Which of the following base-pairing rule is correct?

- a. Adenine with guanine and thymine with cytosine
- b. DNA base pairing is non-specific
- c. Adenine with cytosine and guanine with thymine
- d. Adenine with thymine and guanine with cytosine

12. DNA synthesis can be measured by estimating the incorporation of radiolabelled

- a. Thymine
- b. Guanine
- c. Cytosine
- d. Adenine

13. How many RNA polymerases are present in a bacterial system?

- a. 4
- b. 2
- c. 1
- d. 3

14. During DNA replication the synthesis of the leading strand of DNA results in fragments known as

- a. Okazaki fragments
- b. Satellite segments
- c. Kornberg segment
- d. Double-helix segment

15. Short strands of ——- primer are used in DNA replication.

- a. DNA
- b. RNA
- c. Histone
- d. Protein

Answer Key

1- b	2- d	3- a	4- c	5- d
6- c	7- c	8- c	9- b	10- d
11- d	12- a	13- c	14- a	15- b

II. Answer the following questions in 2-3 sentences. [1.5]

- 1) What is gene silencing?
- 2) Define miRNA.
- 3) Define siRNA.
- 4) What is RNA interference?
- 5) What do you understand by fidelity of protein synthesis?
- 6) What is aminoacyl tRNA synthetase?
- 7) What do you mean by charging of tRNA?
- 8) Give the proteins involved in initiation of polypeptide chain.
- 9) Give the proteins involved in elongation of polypeptide chain.

- 10) Give the proteins involved in termination of polypeptide chain.
- 11) What do you understand by inducible and repressible operon system?
- 12) Give the operon concept.
- 13) Give the significance of cot curve.
- 14) What are the features of denatured DNA?
- 15) What are the types of RNA polymerase?
- 16) Give some functions of RNA polymerase.
- 17) What happens at telomeres during replication? Also name the enzyme used to copy telomeres during replication.
- 18) How does the direct repair mechanism repair pyrimidine dimer?
- 19) What is dimerization of pyrimidines?
- 20) Give some features of genetic code.

III. Answer the following questions in 75 words. [2]

- 1) What is a cot curve?
- 2) What are transcription factors?
- 3) Give the regulation of transcription.
- 4) What is genetic code?
- 5) What do you understand by degeneracy of genetic code?
- 6) What is wobble hypothesis?
- 7) What are inhibitors of protein synthesis?
- 8) Give the difference between prokaryotic and eukaryotic translation.
- 9) Give the structure of globin mRNA.
- 10) What are split genes?
- 11) Give the concept of introns and exons.
- 12) What is exon shuffling?
- 13) What is RNA editing?
- 14) State about processing of tRNA.
- 15) What are activators?
- 16) What are repressors?
- 17) What are enhancers?
- 18) What are silencer elements?

IV. Answer the following questions in 500 words. [6]

- 1) Give the salient features of DNA and RNA.
- 2) Give the Watson and Crick model of DNA.
- 3) Explain denaturation and renaturation of DNA.
- 4) Give an account in replication in prokaryotes and eukaryotes.
- 5) Give the mechanism of DNA replication.
- 6) What are the different types of replications found in DNA?
- 7) What is RNA priming?
- 8) State about the replication of circular and linear dsDNA.
- 9) How are telomeres replicated?

- 10) State about pyrimidine dimerization and mismatch repair.
- 11) What do you know about RNA polymerase and transcription unit?
- 12) Give the mechanism of transcription in prokaryotes and eukaryotes.
- 13) State about synthesis of rRNA and mRNA.
- 14) Give the process of protein synthesis in prokaryotes.
- 15) Describe the process of translation.
- 16) Give the splicing mechanism. What is alternative splicing?
- 17) State about the regulation of transcription in prokaryotes.
- 18) Give an account on lac operon and tryptophan operon.
- 19) Give the regulation of transcription in eukaryotes.