(PART-B : Descriptive)

Time : 2 hrs. 40 min. **Marks : 50**

[Answer question no.1 & any four (4) from the rest]

1. What is nucleotide? Explain the B form of DNA. 3+7=10

2. What is a Chargaff rule? Describe the Griffith's experiment to prove DNA to be the genetic material? 2+8=10

3. Explain the initiation of replication in an E.coli. How does a germline cell replicate the telomeric region? 5+5=10

4. What do you mean by transcription? Explain termination process in detail. 3+7=10

5. Calculate the number of adenine and Guanine in a DNA in which total nucleotide is found to be 3000. (Percentage of thymine is 20). 10

6. Explain the structure of tRNA. Illustrate translation initiation process. 5+5=10

7. Explain the role of topoisomerase in replication. Describe the properties of Prokaryotic DNA polymerases. 5+5=10

8. Write short notes on *any two* of the following: 5x2=10
   a. Photoreactivation repair of DNA
   b. Repressor proteins
   c. Structure of *lac* operon

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M.Sc. BIOTECHNOLOGY
SECOND SEMESTER
MOLECULAR BIOLOGY
MBT-201

(Use Separate Answer Scripts for Objective & Descriptive)

Duration : 3 hrs. **Full Marks : 70**

(PART-A : Objective)

Time : 20 min. **Marks : 20**

Choose the correct answer from the following: ***1×20=20***

1. Which of the following property is not associated with DNA polymerase 1?
   a. 5′ to 3′ exonuclease activity
   b. 5′ to 3′ endonuclease activity
   c. 3′ to 5′ exonuclease activity
   d. 5′ to 3′ polymerase activity

2. The DNA chain acting as template for RNA synthesis has the following order of bases, AGCTACGA. What will be the order of bases in mRNA
   a. 5′ TCGATGCT 3′
   b. 5′ TCGAUGCT 3′
   c. 5′ UCGUAGCU 3′
   d. 5′ UCGAAGCU 3′

3. Which of the following organelle does not have genetic material?
   a. Mitochondria
   b. Golgi complex
   c. Chloroplast
   d. Nucleus

4. Identify the odd one among the following?
   a. Ethidium bromide
   b. Proline
   c. Proflavin
   d. Dioxin

5. In the context of prokaryotic gene expression, which of the following is the most appropriate definition of an operator?
   a. A cluster of genes that are regulated by a single promoter.
   b. A DNA-binding protein that regulates gene expression.
   c. A non-coding, regulatory DNA sequence that is bound by RNA polymerase.
   d. A non-coding, regulatory DNA sequence that is bound by a repressor protein.

6. Which of the following bio-molecule has self repair mechanism?
   a. DNA, RNA and protein
   b. DNA and RNA
   c. DNA and protein
   d. DNA only

7. Which of the following dimmer formation is most common?
   a. Thymidine
   b. Cytidine
   c. Both a and b
   d. None of the above

8. Polysomes are
   a. Aggregates of ribosomes
   b. Aggregates of lysosomes
   c. mRNA molecule to which many ribosomes are attached simultaneously
   d. All of the above

9. *Kozak sequence* is required for the initiation of
   a. Transcription
   b. Translation
   c. Replication
   d. All of the above

10. Mode of DNA replication in *E.coli* is
   a. Conservative and unidirectional
   b. Semi-conservative and unidirectional
   c. Conservative and bidirectional
   d. Semi-conservative and bidirectional

11. N is present in purine at the positions
   a. 1,2,7,9
   b. 2,3,7,9
   c. 1,3,7,9
   d. 4,5,7,9

12. The Hershey and Chase experiment DNA was made radioactive by
   a. S^{32}
   b. P^{32}
   c. P^{35}
   d. S^{35}

13. In a polynucleotide chain.....is present at the 5^{th} carbon of 5′ region.
   a. Free hydroxyl
   b. Free phosphate
   c. Free OH of sugar
   d. Hydrogen

14. Primary transcript become functional after
   a. Replication
   b. Translation
   c. Post transcriptional modification
   d. Transcription

15. The Promoter recognition and transcription initiation is the function of
   a. Sigma factor
   b. Rho factor
   c. Initiation factors
   d. Releasing factors

16. RNA polymerases are
   a. DNA dependent DNA polymerase
   b. DNA dependent RNA polymerase
   c. RNA dependent RNA polymerase
   d. RNA dependent DNA polymerases

17. Coding strand of DNA is the
   a. Mis-strand
   b. Antisense strand
   c. Functional strand
   d. Sense strand

18. Binary complex is formed of
   a. DNA and RNA
   b. DNA and DNA polymerase
   c. RNA and RNA polymerase
   d. DNA and chromosome

19. mRNA is the product of
   a. RNA Polymerase II
   b. RNA Polymerase I
   c. RNA Polymerase III
   d. RNA polymerases

20. $M^7GpppNpNp$ is
   a. Cap 1
   b. Cap 3
   c. Cap 2
   d. Cap 0

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