REV-01
BSZ/16/19

2022/12

SET B

B.Sc. ZOOLOGY
FIFTH SEMESTER
MOLECULAR BIOLOGY
BSZ-501

[USE OMR FOR OBJECTIVE PART]

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

Objective

Time: 30 mins. **Marks: 20**

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

1. Transformation is:
   a. Formation of DNA from RNA
   b. Foreign DNA entry by virus
   c. Genetic alternation of a cell
   d. None of the above

2. The units of 70S ribosome are:
   a. 40S and 30S ribosome
   b. 50S and 40S ribosome
   c. 30S and 50S ribosome
   d. None of the above

3. One end of tRNA matches genetic code in three-nucleotide sequences known as:
   a. Codon
   b. Genetic code
   c. Blunt ends
   d. Anticodon

4. Which of the following is the initiating codon?
   a. AUG
   b. GUG
   c. Both (a) & (b)
   d. AUA

5. Which of the following RNA molecule convert information stored in the nucleic acid to protein?
   a. mRNA
   b. snRNA
   c. rRNA
   d. tRNA

6. Name the protein, which is responsible for the formation of RNA primer?
   a. Topoisomerase
   b. Gyrase
   c. Helicase
   d. Primase

7. Which of the following reactions is required for proofreading during DNA replication by DNA polymerase III?
   a. 5′ to 3′ exonuclease activity
   b. 3′ to 5′ exonuclease activity
   c. 3′ to 5′ endonuclease activity
   d. 5′ to 3′ endonuclease activity

8. The enzyme used to join bits of DNA is:
   a. DNA polymerase
   b. DNA ligase
   c. Endonuclease
   d. Primase

9. Write the sequence of the mRNA molecule synthesized from a DNA template strand having the sequence 5′ATTCGCGA 3′.
   a. UAAGCGCU
   b. UAACCGGU
   c. TAAGCGCT
   d. TAACGCGU

10. A unit consisting of a base bonded to a sugar is referred to as:
    a. Nucleoside
    b. Nucleotide
    c. Glycoside
    d. Pentose sugar

11. Hershey and Chase's experiment was based on the principle:
    a. Transformation
    b. Translation
    c. Transduction
    d. Transcription

12. The site of synthesis of mRNA from DNA in case of prokaryotes, takes place in the:
    a. Cytoplasm
    b. Nucleus
    c. Ribosome
    d. All of the above

13. Which of the following facts is true for transcription?
    a. The entire molecule of DNA is transcribed
    b. Only selected regions of DNA is transcribed
    c. The primary transcript are active RNA molecules
    d. All of the above

14. Mark the statement which is INCORRECT about the transcription unit?
    a. It is a transcribed segment of DNA
    b. Eukaryotes have monocistronic transcription unit
    c. Prokaryotes also have a monocistronic transcription unit
    d. Immediate product of transcription is primary transcript

15. The nitrogenous base that is never found in the genetic code:
    a. Adenine
    b. Guanine
    c. Thymine
    d. Cytosine

16. The Watson and Crick model of DNA generally refers to which form of DNA?
    a. A DNA
    b. Z DNA
    c. B DNA
    d. All of the above

17. Semi-conservative DNA replication was first demonstrated in:
    a. *Drosophila melanogaster*
    b. *Escherichia coli*
    c. *Streptococcus pneumonae*
    d. *Drosophila melanogaster*

18. Which of the following is true about DNA polymerase?
    a. It can synthesize DNA in the 5′ to 3′ direction
    b. It can synthesize DNA in the 3′ to 5′ direction
    c. It can synthesize mRNA in the 3′ to 5′ direction
    d. It can synthesize mRNA in the 5′ to 3′ direction

19. Name the protein, which is used for termination of replication?
    a. DnaC
    b. SSB
    c. Tus protein
    d. DNA polymerase

20. The backbone of nucleic acid structure is constructed by:
    a. Peptide bonds
    b. Hydrogen bond
    c. Phosphodiester bridges
    d. Crlycosiclic bond

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Descriptive

Time : 2 hr. 30 mins. Marks : 50

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

1. Explain with well labeled diagrams the steps of transcription in prokaryotes. Write about few scopes of Molecular biology. 7+3=10
2. What are promoters? Explain the type of promoters found in prokaryotes. What is the role of sigma factors in transcription? 2+5+3=10
3. How Griffith did prove his experiment? What is the difference between transcription and transformation? 7+3=10
4. Explain with example the redundancy of genetic code. Explain Wobble hypothesis with an example. 5+5=10
5. a) Explain in details the structure of Watson & Crick DNA model. 6+4=10
   b) Write differences between Purine and Pyrimidine.
6. Explain the mechanism of Protein synthesis in Prokaryotes with illustrative diagram. 10
7. What are Okazaki fragments? Describe with illustration, the mechanism of replication in both leading and lagging strand. 2+8=10
8. What do you mean by semiconservative model of DNA replication? Explain the Meselson-Stahl experiment to demonstrate semiconservative model of DNA replication. 3+7=10

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