REV-01
BSZ/03/08

2023/08

SET A

B.Sc. ZOOLOGY
FIFTH SEMESTER (SPECIAL REPEAT)
MOLECULAR BIOLOGY
BSZ-501

[USE OMR SHEET 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. In protein synthesis, translocation is initiated with the movement of-
   a. tRNA from P-site to the A-site
   b. dipeptidyl tRNA from A-site to P-site
   c. tRNA from A-site to P-site
   d. tRNA from P-site to E-site

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

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

4. 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

5. 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

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

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

8. In the case of a circular DNA synthesis how many replication forks are observed?
   a. 1
   b. 2
   c. 3
   d. 4

9. DNA helicase travels along.....
   a. Leading strand template in 3′→5′ direction
   b. Leading strand template in 5′→3′ direction
   c. Lagging strand template in 3′→5′ direction
   d. Lagging strand template in 5′→3′ direction

10. A nucleotide is formed of which of the following units?
    a. Nitrogen base and phosphate
    b. Nitrogen base, sugar and phosphate
    c. Nitrogen base and sugar
    d. Sugar and phosphate

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

12. The Pribnow box is situated..... bases from the starting point of transcription.
    a. + 10
    b. -10
    c. +35
    d. -35

13. During the post transcriptional modification, the 5'- end of m RNA is capped with:
    a. 7 methylguanisine
    b. 7 methyladenosine
    c. 5 methylguanosine
    d. 5 methyladenosine

14. The two subunits of 70 s ribosome in prokaryote are:
    a. 30 S and 40 S
    b. 60S and 40 S
    c. 30S and 50 S
    d. 60S and 10 S

15. The amino acid is attached to .....end of t RNA.
    a. 5 'end
    b. 3' end
    c. D arm
    d. Anticodon arm

16. The codon(s) that terminate(s) protein biosynthesis:
    a. UAA
    b. UAG
    c. UGA
    d. All of them

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

18. The intervening nucleotide sequences in m RNA that do not code for proteins are called:
    a. Exons
    b. Introns
    c. Nonsense codons
    d. None of the above

19. Who discovered DNA?
    a. Watson & Crick
    b. Friedrich Miescher
    c. Ronald Ross
    d. Gregor Johann Mendel

20. "Active factor is DNA which can cause transformation"-was a conclusion of which experiment?
    a. Avery, MacLeod and McCarty
    b. Griffith's Experiment
    c. Hershey and Chase
    d. None of the above

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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 illustrations how DNA was evidenced as a genetic material. What are retroviruses? 8+2=10
2. Explain in detail the structure of Watson & Crick DNA model. Explain the formation of Polynucleotide chain of DNA. 5+5=10
3. What is Protein synthesis? Explain the mechanism of protein synthesis in prokaryotes with proper illustration. 2+8=10
4. Why DNA replication is called semidiscontinuous replication? Describe with illustration, the mechanism of replication in Telomeric site of DNA. 2+8=10
5. What is codon and anti codon? Discuss briefly with examples the phenomenon of Wobble hypothesis. Explain the property of redundancy in genetic code. 2+4+4=10
6. What do you mean by semiconservative model of DNA replication? Explain the Meselson-Stahl experiment to demonstrate semiconservative model of DNA replication. Mention the use of CsCl salts in density gradient centrifugation? 3+5+2=10
7. What is a promoter sequence? Describe how RNA Polymerase takes part in transcription process with illustrations. 2+8=10
8. How is hnRNA different from the matured RNA? What is the significance of post transcriptional modification of mRNA in prokaryotes? 3+7=10

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