REV-01
MSZ/09/15

2025/05

SET A

M.Sc. ZOOLOGY
SECOND SEMESTER (REPEAT)
MOLECULAR BIOLOGY AND BIOCHEMISTRY
MSZ-202

[USE OMR FOR OBJECTIVE PART]

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

Objective

Time: 30 min. **Marks: 20**

Choose the correct answer from the following: *1X20=20*

1. What type of bond links the sugar molecule to the phosphate group in DNA?
   a. Glycosidic bond
   b. Phosphodiester bond
   c. Hydrogen bond
   d. Covalent bond

2. What is the role of histones in DNA structure?
   a. DNA replication
   b. Transcription regulation
   c. Chromatin formation
   d. DNA repair

3. Which protein binds to single-stranded DNA and prevents secondary structure formation?
   a. Single-strand DNA-binding protein (SSB)
   b. Helicase
   c. Primase
   d. DNA polymerase

4. What is the primary function of helicase in DNA replication?
   a. Unwinding double-stranded DNA
   b. Synthesizing new DNA strands
   c. Repairing damaged DNA
   d. Sealing gaps between Okazaki fragments

5. What type of DNA damage is caused by ultraviolet (UV) light?
   a. Oxidation
   b. Alkylation
   c. Pyrimidine dimers
   d. Depurination

6. Which sequence is commonly found in the promoter region of eukaryotic genes?
   a. Shine-Dalgarno sequence
   b. Kazak sequence
   c. TATA box
   d. AUG codon

7. The anticodon region of a t RNA molecule is responsible for-
   a. Binding the ribosome
   b. Recognizing the corresponding mRNA codon
   c. Catalyzing peptide bond formation
   d. Breaking down RNA

8. What modification happens to eukaryotic pre-mRNA before it becomes mature mRNA?

a. Addition of a 5′ cap
b. Removal of introns (splicing)
c. Addition of a poly-A tail
d. All of the above

9. During translation, the first aminoacyl-tRNA binds to which site of the ribosome?
a. P site
b. A site
c. E site
d. T site

10. Which molecule "charges" a t RNA with its corresponding amino acid?
a. Ribosome
b. Aminoacyl-tRNA synthetase
c. Peptidyl transferase
d. RNA polymerase

11. The two amino acids having R groups with a negative net charge are -
a. Aspartic acid and glutamic acid
b. Arginine and histidine
c. Cysteine and methionine
d. Proline and valine

12. Which of the following produces pyruvate?
a. Leucine
b. Isoleucine
c. Lysine
d. Alanine

13. The reaction by which CO_2 is removed from the COOH group of an amino acid is called-
a. Deamination
b. Decarboxylation
c. Both of these
d. None of these

14. Which of the following cell organelle have their own DNA?
a. Ribosomes
b. Endoplasmic reticulum
c. Golgi bodies
d. Mitochondria

15. In bioluminescence chemical energy is transformed into-
a. Motion
b. Temperature
c. Light
d. Electricity

16. Linear increase in velocity of enzyme with increase in Substrate concentration is the-
a. Zero order kinetics
b. First order kinetics
c. Second order kinetics
d. None of these

17. Select the correct form of Michaelis- Menton equation
a. $Km = S(\frac{Vmax}{V} - 1)$
b. $Km = \frac{V}{S}(\frac{Vmax}{S} - V)$
c. $Km = \frac{ES}{EI}(Vmax - 1)$
d. $Km = \frac{Vmax}{V} - S)$

18. The third digit in Enzyme Commission (EC) number in enzyme nomenclature indicates-
a. Super class
b. Class
c. Subclass
d. Sub-subclass

19. What is the first step in gluconeogenesis starting from pyruvate?

a. Pyruvate is converted to phosphoenol pyruvate
b. Pyruvate is converted to oxaloacetate
c. Pyruvate is converted to glucose
d. Pyruvate is converted to lactate

20. What is the primary purpose of the Pentose Phosphate Pathway?

a. To produce ATP
b. To produce NADH
c. To produce NADPH and ribose-5-phosphate
d. To break down fatty acids

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(Descriptive)

Time : 2 hrs. 30 min. Marks : 50

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

1. **Write note on any two of the following** 5+5=10
   - **a)** Mechanism of enzyme action
   - **b)** Oxidative Phosphorylation
   - **c)** Glycolysis
   - **d)** Genetic code

2. Why is it important in mismatch repair that the cell distinguish the parental strands from newly synthesized strands? Contrast the mechanism of nucleotide excision repair with illustrations. 4+6=10

3. Write mechanism of DNA replication in prokaryotes with illustrative diagram. 10

4. What is entropy & enthalpy? Explain how enzyme is produced & utilized in a living system. 2+4+4=10

5. Explain the entire process of translation of mRNA with neat labelled diagram. Write two differences between transcription and translation. 8+2=10

6. How is the hn RNA modified to final mRNA transcript? What is a spliceosome.? 8+2=10

7. What is the other name of Ornithine cycle and what is the importance of the cycle? Describe Ornithine cycle with a diagram. 1+1+8=10

8. Explain TCA cycle. Why TCA cycle is called amphibolic? 8+2=10

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