

**M.Sc. ZOOLOGY
SECOND SEMESTER
MOLECULAR BIOLOGY AND BIOCHEMISTRY
MSZ-202**

**SET
C**

[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

- All digestive enzymes belong to the class:
 - Oxidoreductase
 - Hydrolase
 - Isomerase
 - Lyase
- Induced fit hypothesis was proposed by:
 - Koshland
 - Kuhne
 - Emil Fischer
 - Michaelis
- Select the correct formula for Gibbs free energy.
 - $\Delta G = \Delta T - EAS$
 - $\Delta G = \Delta S - T\Delta E$
 - $\Delta G = \Delta E - S\Delta T$
 - $\Delta G = \Delta E - T\Delta S$
- Chemical reaction that requires more energy to break the bonds of reactants is called:
 - Exergonic reaction
 - Endergonic reaction
 - Coupled reaction
 - Redox reaction
- Chemiosmotic hypothesis is based on:
 - Energy of covalent intermediate
 - Conformational change in protein
 - Hydrogen ion gradient
 - None of these
- Mention the part that is not involved in Krebs cycle.
 - Acetylation
 - Dehydrogenation
 - Oxidative Phosphorylation
 - Decarboxylation
- From where are the two amino groups of Urea derived?
 - Both derived from ammonia
 - Both derived from aspartate
 - One from ammonia and one from aspartate
 - None of the above
- All 17 carbon atoms of cholesterol are derived from:
 - Acetyl CoA
 - Acetoacetyl CoA
 - Propionyl CoA
 - Succinyl CoA
- The EMP pathway in eukaryotes usually takes place in:
 - Nucleus
 - Lysosome
 - Mitochondria
 - Cytoplasm
- The free fatty acids are transported by blood association with:
 - β -lipoprotein
 - Albumin
 - Globulin
 - Hemoglobin

11. Which of the following statements is incorrect?
- | | |
|--|--|
| a. The holoenzyme includes the sigma factor | b. The core enzyme includes the sigma factor |
| c. It requires Mg ²⁺ for its activity | d. It requires Zn ²⁺ for its activity |
12. Synthesis of peptide bond is catalyzed by:
- | | |
|-----------------------|-----------------------|
| a. A site of ribosome | b. P site of ribosome |
| c. 23S rRNA | d. tRNA |
13. The main function of tRNA with regards to protein synthesis is:
- | | |
|-------------------------------|--|
| a. Proofreading | b. Identifies amino acids and transports them to ribosomes |
| c. Inhibits protein synthesis | d. All of the above |
14. During the post transcriptional modification, the 5' end of mRNA is capped with:
- | | |
|----------------------|----------------------|
| a. 7 methylguanosine | b. 7 methyladenosine |
| c. 5 methylguanosine | d. 5 methyladenosine |
15. In eukaryotes, transcription begins only when:
- | | |
|--------------------------------|---|
| a. RNA Strand is available | b. Core Promoter Sequence is available or present |
| c. RNA Polymerase is available | d. None of the above |
16. A bacteria culture growing in a medium containing ¹⁵NH₄Cl is switched to a medium containing ¹⁴NH₄Cl for three generations (Resulting into eight fold increase in its population). What is the molar ratio of hybrid DNA (¹⁵N-¹⁴N) to light DNA (¹⁴N-¹⁴N) at this point?
- | | |
|--------|--------|
| a. 2/6 | b. 3/5 |
| c. 4/4 | d. 1/7 |
17. Which of the following statement structure of DNA is/are INCORRECT from the following?
- P. DNA is a long, thread like macromolecule and is made up of large number of deoxyribonucleotide.
- Q. Each deoxyribonucleoside is composed of a nitrogenous base, sugar and a phosphate group.
- R. A-DNA and B-DNA are right handed
- | | |
|-----------|------------|
| a. Q, R | b. Only Q |
| c. Only R | d. P, Q, R |
18. In methyl-directed mismatch repair in E. coli the daughter strand containing the mismatched base is nicked by:
- | | |
|------------------------|---------------------------|
| a. Mut H- endonuclease | b. Uvr ABC - endonuclease |
| c. AP- endonuclease | d. 3' to 5' exonuclease |
19. Ethidium bromide acts as mutagen by?
- | | |
|--|--|
| a. Substituting adenine by its structural analogue | b. Chemical modification of base |
| c. Production of interstrand cross-links in DNA | d. Intercalating between DNA bases interfering with proper base stacking |
20. If in a double stranded DNA has 40% AT content, what will be the percentage of G residues?
- | | |
|--------|-------------------------|
| a. 60% | b. 15% |
| c. 30% | d. Cannot be calculated |

(Descriptive)

Time : 2 hr. 30 mins.

Marks : 50

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

1. What is translocation? Describe the mechanism of translation in prokaryotes with neat labeled diagram. 2+8=10
2. What is the function of a primer in the process of DNA replication? Explain with proper illustrations the mechanism of replication in both leading and lagging strand of prokaryotic DNA. 2+8=10
3. How is the daughter strand of DNA distinguished from the parent strands in mismatch repair system? Explain with proper diagram the repair mechanism of a mismatched DNA. 4+6=10
4. State the property of degeneracy of genetic code with examples. Differentiate between rho dependent and rho independent termination. State briefly the capping and tailing process of eukaryotic Mrna. 2+4+2+2=10
5. What is Urea Cycle? Explain the steps of Urea Cycle and write the significance of Urea Cycle. 2+6+2=10
6. Explain regulatory steps of Glycolysis. What is the fate of pyruvate? 8+2=10
7. Derive Michaelis-Menten equation in Enzyme Kinetics. Mention important significance of Michaelis constant. 8+2=10
8. Write about the source of electrons used in electron transport system. Explain various steps electron transport system. 2+8=10

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