REV-01
MSZ/06/12

2024/07

SET A

M.Sc. ZOOLOGY
SECOND SEMESTER [SPECIAL REPEAT]
MOLECULAR BIOLOGY AND BIOCHEMISTRY
MSZ-202

[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. 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

2. Synthesis of peptide bond is catalyzed by:
   a. A site of ribosome
   b. P site of ribosome
   c. 23S rRNA
   d. t RNA

3. 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

4. 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

5. 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

6. A bacteria culture growing in a medium containing $^{15}NH_4Cl$ is switched to a medium containing $^{14}NH_4Cl$ for three generations (Resulting into eight fold increase in its population). What is the molar ratio of hybrid DNA (^{15}N- ^{14}N) to light DNA (^{14}N- ^{14}N) at this point?
   a. 2/6
   b. 3/5
   c. 4/4
   d. 1/7

7. 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

8. 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

9. 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

10. 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

11. All digestive enzymes belong to the class:
   a. Oxidoreductase
   b. Hydrolase
   c. Isomerase
   d. Lyase

12. Induced fit hypothesis was proposed by:
   a. Koshland
   b. Kuhne
   c. Emil Fischer
   d. Michaelis

13. Select the correct formula for Gibbs free energy.
   a. $\Delta G=\Delta T-E\Delta S$
   b. $\Delta G=\Delta S-T\Delta E$
   c. $\Delta G=\Delta E-S\Delta T$
   d. $\Delta G=\Delta E-T\Delta S$

14. Chemical reaction that requires more energy to break the bonds of reactants is called:
   a. Exergonic reaction
   b. Endergonic reaction
   c. Coupled reaction
   d. Redox reaction

15. Chemiosmotic hypothesis is based on:
   a. Energy of covalent intermediate
   b. Conformational change in protein
   c. Hydrogen ion gradient
   d. None of these

16. Mention the part that is not involved in Krebs cycle.
   a. Acetylation
   b. Dehydrogenation
   c. Oxidative Phosphorylation
   d. Decarboxylation

17. From where are the two amino groups of Urea derived?
   a. Both derived from ammonia
   b. Both derived from aspartate
   c. One from ammonia and one from aspartate
   d. None of the above

18. All 17 carbon atoms of cholesterol are derived from:
   a. Acetyl CoA
   b. Acetoacetyl CoA
   c. Propionyl CoA
   d. Succinyl CoA

19. The EMP pathway in eukaryotes usually takes place in:
   a. Nucleus
   b. Lysosome
   c. Mitochondria
   d. Cytoplasm

20. The free fatty acids are transported by blood association with:
   a. β-lipoprotein
   b. Albumin
   c. Globulin
   d. Hemoglobin

-- --- --

Descriptive

Time : 2 hr. 30 mins. Marks : 50

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

1. Explain regulatory steps of Glycolysis. What is the fate of pyruvate? 8+2=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. What is translocation? Describe the mechanism of translation in prokaryotes with neat labeled diagram. 2+8=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. Write about the source of electrons used in electron transport system. Explain various steps electron transport system. 2+8=10
7. Derive Michaelis-Menten equation in Enzyme Kinetics. Mention important significance of Michaelis constant. 8+2=10
8. 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

= = *** = =