BIOCHEMISTRY 2EE3 Dr. B. S. Zhorov

1 hour February Test 2000

THIS EXAMINATION CONSISTS OF 4 PAGES AND 24 QUESTIONS. YOU ARE RESPONSIBLE FOR ENSURING THAT YOUR COPY OF THE PAPER IS COMPLETE. BRING ANY DISCREPANCY TO THE ATTENTION OF THE INVIGILATOR.

YOUR PAPER WILL BE MARKED BY OPTICAL SCANNING. IT IS YOUR RESPONSIBILITY TO ENSURE THAT OMR EXAMINATION SHEET IS PROPERLY COMPLETED. YOUR EXAMINATION RESULT DEPENDS UPON PROPER ATTENTION TO THE FOLLOWING INSTRUCTIONS.

- Print your name, student number, course name, section number, and the date in the space provided at the top of side 1 of the form. Then the sheet MUST be signed in the space marked SIGNATURE.
- Mark your student number in the space provided on the sheet on side 1 and fill in the corresponding circles underneath.
- Mark only ONE choice from the alternatives (a,b,c,d) provided for each question. The question number is to the left of the circles. Make sure that the number of question on the scan sheet is the same as the question number on the test paper.
- Pay particular attention to the Marking Directions on the form.
- Begin answering questions using the first set of circles, marked "1".
- Each question is worth one mark for a correct answer, and a zero mark for an incorrect answer. An unmarked question is considered an incorrect answer.

Questions

1. Water molecules interact with proteins via:

a) Hydrogen bonds b) Dipole-dipole forces
c) van der Waals forces d) All of the above

2. Which of the following amino acids has an ionizable side-chain?

a) Leucine b) Histidine c) Proline d) None of the above

3. X. A linear tetrapeptide has four peptide bonds.
   Y. Tripeptide Ala-Leu-Arg has three ionizable groups.

a) Only X is correct
c) Both X and Y are correct
b) Only Y is correct
d) Neither X nor Y is correct

4. The tertiary structure of a protein refers to the:

a) Presence of alpha-helices and beta-sheets
b) Unique three dimensional folding of the macromolecule
c) Sequence of amino acids
d) Subunit composition of the protein

5. G-protein coupled receptors are:

a) Voltage-gated ion channels
c) Integral membrane proteins
b) Ligand-gated ion channels
d) None of the above

6. X. Apoenzymes accelerate chemical reactions.
   Y. Apoenzymes lower the activation energy for chemical reactions.

a) Only X is correct
c) Both X and Y are correct
b) Only Y is correct
d) Neither X nor Y is correct

7. A flat arrow in a computer-generated diagram of a protein designates:

a) an alpha-helix
b) a beta-sheet
c) a reverse turn
d) none of the above

8. X. A polypeptide chain growing at a ribosome is attached to an aminoacyl-tRNA.
   Y. During protein synthesis, the ribosome moves from the 5' end to the 3' end of mRNA.

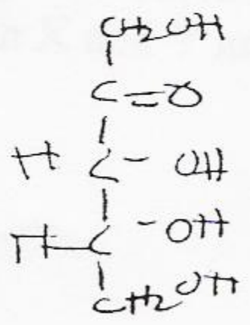
a) Only X is correct
c) Both X and Y are correct
b) Only Y is correct
d) Neither X nor Y is correct

9. The tRNA anticodon matching the mRNA codon GCU is:

a) CGA
b) CGT
c) AGT
d) UCG

10. X. Anomers of glucose freely interconvert in solution.
    Y. Anomeric carbon of D-ribulose is a chiral center.

a) Only X is correct
c) Both X and Y are correct
b) Only Y is correct
d) Neither X nor Y is correct



11. X. Amylopectin is a branched polysaccharide.
Y. Lactose is a linear polysaccharide.

a) Only X is correct
b) Only Y is correct
c) Both X and Y are correct
d) Neither X nor Y is correct

12. X. Triacylglycerols are components of biological membranes
Y. Oleic acid has completely saturated side chain.

a) Only X is correct
b) Only Y is correct
c) Both X and Y are correct
d) Neither X nor Y is correct

13. X. Integral membrane proteins do not have ionizable amino acids on their surface.
Y. Peripheral membrane proteins are hydrophilic molecules.

a) Only X is correct
b) Only Y is correct
c) Both X and Y are correct
d) Neither X nor Y is correct

14. X. Coenzyme A is a carrier of acyl groups.
Y. Coenzyme NADH incorporates a fragment derived from the vitamin niacin.

a) Only X is correct
b) Only Y is correct
c) Both X and Y are correct
d) Neither X nor Y is correct

15. X. All coenzymes have fragments derived from vitamins.
Y. All vitamins are precursors of coenzymes.

a) Only X is correct
b) Only Y is correct
c) Both X and Y are correct
d) Neither X nor Y is correct

16. X. Action potential propagates from the body of a neuron to dendrites.
Y. Intracellular concentration of Na^+ is higher than that of K^+.

a) Only X is correct
b) Only Y is correct
c) Both X and Y are correct
d) Neither X nor Y is correct

17. X. Glycine is a standard amino acid.
Y. Glycine is a neurotransmitter.

a) Only X is correct
b) Only Y is correct
c) Both X and Y are correct
d) Neither X nor Y is correct

18. X. Bungarotoxin blocks nicotinic acetylcholine receptors.
Y. Tetrodotoxin blocks voltage-gated Na^+ channels.

a) Only X is correct
b) Only Y is correct
c) Both X and Y are correct
d) Neither X nor Y is correct

19. X. The active site of lysozyme includes two acidic residues.
Y. The substrate conformation does not change upon binding to lysozyme.

a) Only X is correct
b) Only Y is correct
c) Both X and Y are correct
c) Neither X nor Y is correct

20. A chemical process is spontaneous if:

a) $\Delta H > T\Delta S$ b) $\Delta H < T\Delta S$ c) $\Delta H = T\Delta S$ d) None of the above

21. X. The triple-helix structure of collagen is stabilized by H-bonds between the helices.
Y. Myoglobin does not contain beta-sheets.

a) Only X is correct
b) Only Y is correct
c) Both X and Y are correct
d) Neither X nor Y is correct

22. X. Trypsin is a serine protease specific for basic residues preceding the scissile bond.
Y. Sickle-cell anemia is the result of Glu^6 to Val^6 mutation in myoglobin.

a) Only X is correct
b) Only Y is correct
c) Both X and Y are correct
d) Neither X nor Y is correct

23. X. The rate enhancement in an enzyme-catalyzed reaction does not depend on temperature.
Y. Enzymes lower the free energy barriers for both the forward and reverse reactions.

a) Only X is correct
b) Only Y is correct
c) Both X and Y are correct
c) Neither X nor Y is correct

24. In the experiments by Miller and Urey (1953), the mixture of following gases was used as a model of the primordial atmosphere:

a) $CH_4 + NH_3 + H_2O + O_2$
b) $CH_4 + O_2 + H_2O + H_2$
c) $CO_2 + NH_3 + H_2O + H_2$
d) $CH_4 + NH_3 + H_2O + H_2$

THE END