STUDENT NAME _____

STUDENT NUMBER_____

Biochemistry and Biomedical Sciences 2EE3

Dr. B. S. Zhorov

50 min **2015 February Test** **SAMPLE ONLY**

THIS EXAMINATION CONSISTS OF **6** PAGES AND **25** 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 student number, name, date, and course name 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. **One mark will be subtracted for an incorrect student number.**
- **Fill in the VERSION CODE beside your student number.**
  THIS IS TEST VERSION 1. One mark will be subtracted for an incorrect test version.
- For each question, mark only ONE choice from the alternatives (a,b,c,d) provided. 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 marks for an incorrect answer. An unmarked question is considered an incorrect answer.

Questions

1. X. Collagen contains hydroxyprolyl residues.
   Y. Collagen structure is stabilized by H-binds between neighboring polypeptide chains.

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

2. An eukaryotic cell has

a) a nucleus
b) a cytoskeleton
c) membrane-enclosed organelles
d) all of the above

3. The number of different types of molecules in an animal cell may be as high as

a) 100 000
b) 1 000 000
c) 10 000
d) 1 000

4. X. Nicotinic acetylcholine receptor is an ion channel
Y. Nicotinic acetylcholine receptor is a transmembrane protein

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

5. X. Coenzymes stabilize tertiary structure of proteins.
Y. Coenzymes are involved in the chemical reactions in the enzymes active center.

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

6. At physiological pH, most of free amino acids are:

a) Cations
b) Anions
c) Zwitterions
d) Neutral molecules

7. Disulfide bond may be formed between the side chains of

a) two Met residues
b) two Cys residues
c) Cys and Met residues
d) all of the above

8. In globular proteins, nonpolar amino acids predominantly appear

a) in the protein core
b) at the surface of the protein
c) in the interface between subunits
d) all of the above

9. Myoglobin

a) is a fibrous protein
b) transports oxygen inside the cells
c) has a quaternary structure
d) none of the above

10. Collagen is

a) a fibrous protein
b) a triple-helix protein
c) a protein with nonstandard amino acids
d) all of the above

11. Complementary base pairing in the double-helix DNA is due to

a) van der Waals interactions
b) hydrogen bonds
c) hydrophobic interactions
d) ionic interactions

12. A double-helix DNA molecule has equal numbers of

a) adenine and thymine residues
b) adenine and cytosine residues
c) uracil and cytosine residues
d) guanine and uracil residues

13. X. The number of different tRNA molecules is equal to the number of standard amino acids.
Y. Anticodon of tRNA matches (is complementary to) a codon at mRNA.

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. Glucose is a ketose.
    Y. Glucose is a pentose.

    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. Lipids are components of biomembranes.
    Y. Lipids are biopolymers.

    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. Enzymes accelerate chemical reactions.
    Y. Enzymes lower the activation energy for chemical reactions.

    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. An axon transmits electrical signals from the neuron body towards another cell
    Y. A dendrite transmits electrical signals from another cell to the neuron body

    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. Acetylcholine is a neurotransmitter
    Y. Acetylcholine is the substrate of acetylcholinesterase

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

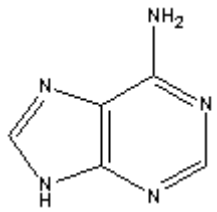
19. The strongest noncovalent interactions are:

a) Hydrogen bonds
b) Dipole-dipole interactions
c) van der Waals interactions
d) None of the above

20. A chemical process is spontaneous if:

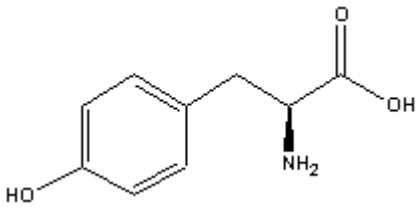
a) $\Delta H - T\Delta S < 0$
b) $\Delta H + T\Delta S > 0$
c) $\Delta H + T\Delta S < 0$
d) $\Delta H - T\Delta S = 0$

21. The structural formula below represents



a) Adenine
b) Guanine
c) Cytosine
d) None of the above

22. The structural formula below represents



a) Histidine
b) Phenylalanine
c) Tryptophan
d) None of the above

23. The element providing the largest contribution to the dry weight of the human body is:

a) Nitrogen
b) Carbon
c) Oxygen
d) Calcium

24. 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

25. Which properties of molecules were important for prebiotic evolution?

a) Ability of amino acids to self-perpetuate
b) Ability of monomers to polymerize
c) Ability of monomers to replicate
d) All of the above

THE END