BIOL 1000 3.0 Section A
Test 2 Fall, 2012

This ENTIRE test package and scantron MUST be submitted to receive a grade

Your **STUDENT NUMBER** and **NAME** must be clearly indicated on this package and scantron sheet to receive a grade

Your **STUDENT NUMBER** must also be **BUBBLED CORRECTLY** in the scantron sheet to receive a grade

There are 25 Multiple Choice Questions (1 mark each) and 1 short answer question (6 marks). Choose the BEST answer for each question.

ELECTRONIC AIDS (e.g. calculators, phones iPods etc.) are **NOT PERMITTED.**

ONLY THE SCANTRON WILL BE GRADED SO MAKE SURE YOU FILL IN THE ANSWER TO EACH QUESTION ON THE SCANTRON BEFORE THE ALLOTTED TIME FOR THE TEST IS UP.
YOU WILL NOT BE PROVIDED EXTRA TIME TO DO SO.
HAND IN QUESTION BOOKLET WITH SCANTRON.

If you finish the test before the allotted time then please raise your hand and an invigilator will come and collect your test

GOOD LUCK!

Last name:	**Section**
First name:	**A_1**
Student number:	

1.An enzyme

A. Can make an exergonic reaction occur by lowering the energy of activation.
B. Can make an endergonic reaction occur by lowering the energy of activation.
C. Can increase the rate of an exergonic reaction by lowering ΔG .
D. All of the above.

2.A tetraploid cell has 20 chromosomes. What is n?

A. 4
B. 5
C. 10
D. 20
E. 40
F. None of the above.

3.What is the difference between simple and facilitated diffusion?

A. Facilitated diffusion requires energy whereas simple diffusion does not.
B. Simple diffusion moves a solute from an area of high concentration to low concentration whereas facilitated diffusion moves a solute from an area of low concentration to high concentration.
C. Facilitated diffusion requires a transport protein whereas simple diffusion does not.
D. A and C.

4.You are a scientist and are studying plant membrane lipids. You compare the lipid content of plant 1, which has been grown at 15^{o}C with a related plant, plant 2, that has been grown at 26^{o}C. What do you expect to find?

A. Plant 1 and plant 2 have similar levels of both saturated and unsaturated fats.
B. Plant 1 has higher levels of unsaturated fats than plant 2.
C. Plant 1 has higher levels of saturated fats than plant 2.
D. Plant 1 has higher levels of trans fats than plant 2.

5.A cell is placed in a solution of growth medium that has a solute concentration of 0.10 M. The internal solute concentration of the cell is 0.21 M. Which of the following statements is true?

A. The growth medium is hypertonic compared to the cytoplasm and the cell will shrink.
B. The growth medium is hypotonic compared to the cytoplasm and the cell will swell.
C. The growth medium is isotonic compared to the cytoplasm and the cell will shrink.
D. The growth medium hypertonic compared to the cytoplasm and the cell will swell.
E. The growth medium is isotonic compared to the cytoplasm and the cell will neither swell nor shrink.

6.You have discovered a new ion pump that moves chloride into the cell (note chloride concentrations are lower outside the cell than inside the cell). The pump also hydrolyzes ATP. What have you most likely discovered?

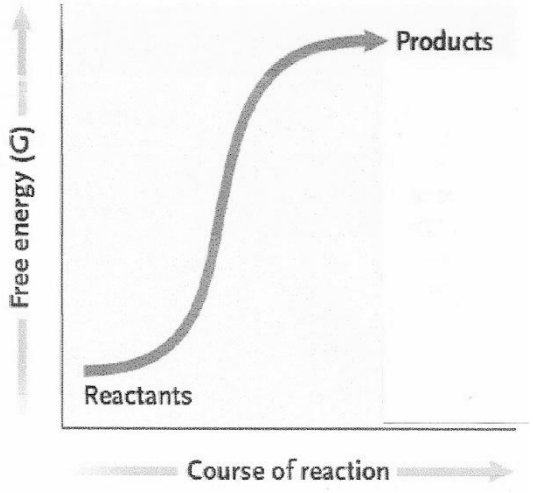
A. An ion channel.
B. A peripheral protein that uses ATP to flip from one side of the membrane to the other when it binds chloride.
C. A primary active transport protein.
D. A secondary active transport protein.

7.Where would you expect to find the sugar component of a glycoprotein in a vesicle released from the Golgi and destined for the cell surface?

A. It would be found extending inwards from the inner surface of the vesicle.
B. It would be found extending into the cytoplasm from the outer surface of the vesicle.
C. It would be found embedded in the hydrophobic region of the lipid bilayer.
D. Since there is no sugar in a glycoprotein I would not expect to see any sugar component.

8.How does water move across the cell membrane?

A. It diffuses across the lipid bilayer.
B. It is pumped across the bilayer by a protein channel that requires ATP.
C. It diffuses through special protein channels embedded in the membrane using passive transport.
D. A and C
E. B and C
F. A, B and C.



9. Which of the following best describes the graph above?

A. This is an exergonic reaction, catabolic, and the entropy of the products is greater than the reactants.
B. This is an exergonic reaction, anabolic, and the entropy of the products is lower than the reactants.
C. This is an endergonic reaction, catabolic, and the entropy of the products is greater than the reactants.
D. This is an endergonic reaction, anabolic, and the entropy of the products is lower than the reactants.
E. This is an exergonic reaction, anabolic, and the entropy of the products is greater than the reactants.
F. This is an endergonic reaction, anabolic, and the entropy of the products is greater than the reactants.

10. Which of the following molecules will diffuse most easily across the membrane using simple diffusion?

A. water.
B. glucose.
C. oxygen.
D. sodium.
E. They should all move at the same rate.

11. Which of the following would best describe the structure of an integral membrane protein?

A. Beta-sheet secondary structure with hydrophilic R-groups facing outward.
B. Alpha-helix tertiary structure with hydrophilic R-groups facing outward.
C. Alpha-helix secondary structure with hydrophobic R-groups facing outward.
D. Beta-sheet primary structure with the hydrophobic backbone facing outward.

12. Which of the following statements about enzymes is true?

A. Allosteric control of enzyme activity is a form of competitive binding.
B. Allosteric inhibition involves conformational changes in protein.
C. Allosteric binding in enzymes always results in inhibition of the enzyme activity.
D. None of the above are true.
E. B and C are true.

13. The R-groups in the active site of an enzyme

A. Will not directly participate in the reaction catalyzed by the protein.
B. Will have the highest affinity for the products of the reaction.
C. Can be transiently altered during catalysis.
D. Are rare. Normally there are no R-groups in the active site.

14. Where does glycolysis occur in eukaryotes?

A. Glycolysis does not occur in eukaryotes.
B. In the intermembrane space of the mitochondrion.
C. In the cytosol/cytoplasm
D. Within the thykaloid membrane.

15. Phosphofructokinase catalyses a reaction early in glycolysis. A scientist studying respiration in a green aglae notices that over time its activity is decreasing rather than increasing. What is the best explanation for this observation?

A. ADP is binding to it competitively.
B. The cell is switching to fermentation.
C. NADH is being depleted.
D. ATP is binding to it allosterically.
E. NAD+ levels are too high and therefore pyruvate is accumulating.

16. During respiration, which of the following processes generates the most ATP from a molecule of glucose under normal physiological conditions?

A. Oxidative phosphorylation by ATP synthase.
B. Substrate level phosphorylation by ATP synthase.
C. Oxidative phosphorylation during glycolysis.
D. Substrate level phosphorylation during glycolysis.
E. Oxidative phosphorylation during the Citric Acid Cycle.
F. Substrate level phosphorylation during the Citric Acid Cycle.

17. What is the critical role played by fermentation reactions?

A. They generate ATP by substrate level phosphorylation.
B. They generate ATP by oxidative phosphorylation.
C. They generate NAD+ for glycolysis reactions.
D. They generate NADH for oxidative phosphorylation.

18. How does the role of oxygen differ in respiration and photosynthesis?

A. Oxygen is neither a reactant nor a product in photosynthesis.
B. Oxygen is the final electron acceptor in respiration and a product of photosynthesis.
C. Oxygen is the final electron acceptor in photosynthesis and a reactant in respiration.
D. Oxygen accepts electrons from NADH in respiration and accepts electrons from NADPH during photosynthesis.

19. A cell is treated with an ionophore which creates "holes" in the inner membrane of the mitochondria. What is likely to occur?

A. The electron transport chain will come to a halt.
B. The electron transport chain will speed up.
C. Glycolysis will be shut down and cells will switch to fermentation.
D. ATP synthase will slow or stop production of ATP.

20. What is a protein kinase?

A. An enzyme that adds a phosphate group onto another protein.
B. An enzyme that converts ATP to ADP.
C. A receptor that is allosterically regulated.
D. Another term for cyclin.

21. A diploid cell (for which n=3) is in G1. How many chromosomes and chromatids are in the cell?

A. 3 chromosomes, 3 chromatids.
B. 3 chromosomes, 6 chromatids.
C. 9 chromosomes, 18 chromatids.
D. 6 chromosomes, 6 chromatids.
E. 6 chromosomes, 12 chromatids.

22. A critical part of the cell cycle in animal cells is the duplication of centrioles. Why is this important and when does it happen?

A. It's important because it leads to the duplication of centromeres, and it happens in S phase.
B. It's important because it leads to the duplication of microtubule organizing centres, and it happens in prophase.
C. It's important because it allows the cell to create a bipolar spindle, and it happens in S phase.
D. It's important because it stimulates the cell to enter mitosis, and it happens at the end of G2 phase.

23. Which of the following statements about cyclic electron transport in photosynthesis is true?

A. It requires photosystem II but not Photosystem I.
B. It changes the direction of the proton motive force and reverses ATP synthase.
C. Its main function is to provide NADPH for the Calvin cycle without using the electron shuttles plastoquinone and ferridoxin.
D. It permits the light reactions to generate ATP in the absence of NADP+.

24. What is the difference between a centromere and a kinetochore?

A. The centromere organizes microtubules at the spindle poles; the kinetochore organizes microtubules at the chromosome.
B. The centromere is a region of DNA; the kinetochore is made of protein.
C. The centromere is built on the kinetochore during the S-phase.
D. The kinetochore connects the chromosome to the spindle; the centromere is a protein that holds the sister chromatids together after replication.

25. What is the role of cholesterol in the cell membrane?

A. No role: there is no cholesterol in membrane.
B. Cholesterol decreases fluidity at low temperatures by helping to align saturated lipid tails.
C. Cholesterol increases fluidity at low temperatures by decreasing the close packing of the fatty acid chains.
D. Cholesterol serves as the main site of attachment for sugars that form glycolipids.

26. You are writing version A.

A. Choose this answer.
B. Wrong
C. Wrong
D. Wrong

Don't forget to complete part B on the next page…

Part B Short Answer Question

Student Name_____ **ID** _____ **Lab Section** ____

1. Ion gradients are critical to life. List 3 different processes that require an ion gradient. For each example, include the name of the ion, gradient details (where it is established, location of high/low concentration) and what it is used for (6 marks). **Only writing in the box will be graded.**

Process 1
Ion

Gradient details

Function of gradient

Process 2
Ion

Gradient details

Function of gradient

Process 3
Ion

Gradient details

Function of gradient