

Additional Multiple Choice Review Questions for Quiz 4 CHE 4310

1. From the abbreviated name of the compound Gal(β 1,4)Glc, we know that:
 - A. C-4 of glucose is joined to C-1 of galactose by a glycosidic bond.
 - B. the compound is a D-enantiomer.
 - C. the galactose residue is at the reducing end.
 - D. the glucose is in its pyranose form.
 - E. the glucose residue is the β anomer.

2. Starch and glycogen are both polymers of:
 - A. fructose.
 - B. glucose 1-phosphate.
 - C. sucrose.
 - D. α -D-glucose.
 - E. β -D-glucose.

3. Which of the following best describes the cholesterol molecule?
 - A. Amphipathic
 - B. Nonpolar, charged
 - C. Nonpolar, uncharged
 - D. Polar, charged
 - E. Polar, uncharged

4. The role of an enzyme in an enzyme-catalyzed reaction is to:
 - A. bind a transition state intermediate, such that it cannot be converted back to substrate.
 - B. ensure that all of the substrate is converted to product.
 - C. ensure that the product is more stable than the substrate.
 - D. increase the rate at which substrate is converted into product.
 - E. make the free-energy change for the reaction more favorable.

5. Which one of the following statements is true of enzyme catalysts?
 - A. They bind to substrates, but are never covalently attached to substrate or product.
 - B. They increase the equilibrium constant for a reaction, thus favoring product formation.
 - C. They increase the stability of the product of a desired reaction by allowing ionizations, resonance, and isomerizations not normally available to substrates.
 - D. They lower the activation energy for the conversion of substrate to product.
 - E. To be effective they must be present at the same concentration as their substrates.

6. Which of these statements about enzyme-catalyzed reactions is *false*?

- A. At saturating levels of substrate, the rate of an enzyme-catalyzed reaction is proportional to the enzyme concentration.
- B. If enough substrate is added, the normal V_{\max} of a reaction can be attained even in the presence of a competitive inhibitor.
- C. The rate of a reaction decreases steadily with time as substrate is depleted.
- D. The activation energy for the catalyzed reaction is the same as for the uncatalyzed reaction, but the equilibrium constant is more favorable in the enzyme-catalyzed reaction.
- E. The Michaelis-Menten constant K_m equals the $[S]$ at which $V = 1/2 V_{\max}$.

7. The double-reciprocal transformation of the Michaelis-Menten equation, also called the Lineweaver-Burk plot, is given by

$$1/V_0 = K_m / (V_{\max} [S]) + 1/V_{\max}$$

To determine K_m from a double-reciprocal plot, you would:

- A. multiply the reciprocal of the x-axis intercept by -1.
- B. multiply the reciprocal of the y-axis intercept by -1.
- C. take the reciprocal of the x-axis intercept.
- D. take the reciprocal of the y-axis intercept.
- E. take the x-axis intercept where $V_0 = 1/2 V_{\max}$.

8. The anaerobic conversion of 1 mol of glucose to 2 mol of lactate by fermentation is accompanied by a net gain of:

- A. 1 mol of ATP.
- B. 1 mol of NADH.
- C. 2 mol of ATP.
- D. 2 mol of NADH.
- E. none of the above.

9. In glycolysis, fructose 1,6-bisphosphate is converted to two products with a standard free-energy change (ΔG°) of 23.8 kJ/mol. Under what conditions (encountered in a normal cell) will the free-energy change (ΔG) be negative, enabling the reaction to proceed to the right?

- A. If the concentrations of the two products are high relative to that of fructose 1,6-bisphosphate.
- B. The reaction will not go to the right spontaneously under any conditions because the ΔG° is positive.
- C. Under standard conditions, enough energy is released to drive the reaction to the right.
- D. When there is a high concentration of fructose 1,6-bisphosphate relative to the concentration of products.
- E. When there is a high concentration of products relative to the concentration of fructose 1,6-bisphosphate.

10. Which one of the following statements about gluconeogenesis is *false*?

- A. For starting materials, it can use carbon skeletons derived from certain amino acids.
- B. It consists entirely of the reactions of glycolysis, operating in the reverse direction.
- C. It employs the enzyme glucose 6-phosphatase.
- D. It is one of the ways that mammals maintain normal blood glucose levels between meals.
- E. It requires metabolic energy (ATP or GTP).

11. The steps of glycolysis between glyceraldehyde 3-phosphate and 3-phosphoglycerate involve all of the following *except*:

- A. ATP synthesis.
- B. catalysis by phosphoglycerate kinase.
- C. oxidation of NADH to NAD⁺.
- D. the formation of 1,3-bisphosphoglycerate.
- E. utilization of Pi.

12. When the linear form of glucose cyclizes, the product is a(n):

- A. anhydride.
- B. glycoside.
- C. hemiacetal.
- D. lactone.
- E. oligosaccharide.