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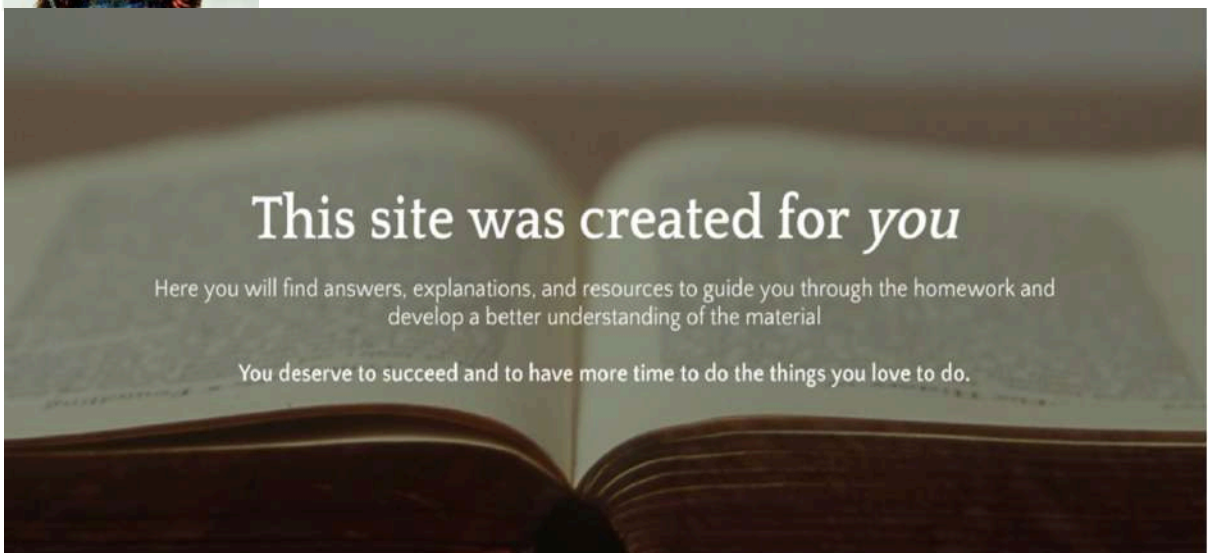

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Good Luck!

Sample questions for Exam 2

[Note: this is **part** of last year's exam]

Answers

1) A **net** change which occurs in the pyruvate dehydrogenase complex is the conversion of pyruvate and CoA to acetyl-coA and CO_2 and the conversion of

a) FAD to $FADH_2$

b) NAD^+ to NADH

c) oxidized lipoic acid to reduced lipoic acid

d) all of the above

e) none of the above

2) When a reversible reaction is at equilibrium, _____ is equal to zero.

a) ΔG

b) ΔG^o

c) Keq

d) all of the above

e) none of the above

3) Acetyl-coA is a molecule which contains 25 carbon atoms. When it is formed from glucose via glycolysis and pyruvate dehydrogenase, how many of the carbon atoms come from the glucose?

a) 0

b) 1

c) 2

d) 3

e) 25

4) Phosphorylation of the enzyme _____ results in a **decrease** in its activity.

a) glycogen phosphorylase

b) glycogen phosphorylase kinase

c) pyruvate kinase

d) all of the above

e) none of the above

5) A compound which contains a phosphoric acid-carboxylic acid anhydride is

a) fructose – 6 - phosphate

b) fructose – 1,6 – bis-phosphate

c) glyceraldehyde-3-phosphate

d) 1,3-bis-phosphoglycerate

e) none of the above

6) The activity of chymotrypsin would be expected to be decreased at low pH because of the loss of the negative charge on the R group of

a) phenylalanine

b) aspartate

c) serine

d) all of the above

e) none of the above

7) In general, treatment of an animal with the hormone glucagon stimulates

a) glycolysis

b) phosphorylation of proteins

c) digestion of proteins

d) glucose uptake by cells

e) none of the above

8) One reason for the large negative free energy of hydrolysis of ATP is the resonance stabilization of

a) ATP

b) ribose

c) Inorganic phosphate

d) All of the above

e) None of the above

9) In the pyruvate dehydrogenase complex, the cofactor which serves as a "swinging arm" is the

a) Lipoic acid

b) Thiamine pyrophosphate

c) FAD

d) Coenzyme A

e) None of the above

10) During catalysis by serine proteases such as chymotrypsin the **first** step involves cleavage of the peptide bond by a nucleophilic attack by _____ on the carbonyl carbon

a) H_2O

b) Serine hydroxyl group

c) Aspartate carboxyl group

d) Histidine imidizole group

e) None of the above

11) The large negative free energy of hydrolysis of phosphoenol pyruvate results mainly from its restricted

a) bond rotation

b) stereochemistry

c) tautomerization

d) resonance

e) none of the above

12) The reduction of NAD^+ occurs on the _____ moiety (part) of the molecule.

a) adenine

b) ribose

c) phosphate

d) nicotinamide

e) none of the above

13) In the following graph, **Curve #2** represents the results obtained when the rate of an enzyme-catalyzed reaction is measured as a function of substrate concentration in the absence of any modulators.

V_i 1 2

[S]

Curve 1 most likely represents the results in the presence of a(n)

a) allosteric inhibitor

b) competitive inhibitor

c) non-competitive inhibitor

d) allosteric activator

e) None of the above

14) In the anaerobic conversion of pyruvate to lactic acid, there is also a conversion of _____ to _____

a) pyruvate; CO_2

b) NADH; NAD^+

c) NAD^+; NADH

d) pyruvate; acetyl-CoA

e) None of the above

15) For the reaction

A $\rightleftharpoons$ B

the K_{eq} is 10^4. If a reaction mixture originally contains 1 mmole of A and no B, which of the following is true?

a) At equilibrium, there will be far more A than B.

b) $\Delta G^{o'}$ for the reaction will be large and positive.

c) The reaction will definitely proceed toward B at a very high rate.

d) The reaction will definitely proceed toward B but not necessarily at a high rate.

e) None of the above

16) In glycolysis, there is one reaction in which NAD^+ is reduced. Another substrate for this reaction is

a) glucose

b) glucose-6-phosphate

c) fructose-6-phosphate

d) dihydroxyacetone phosphate

e) none of the above

17) Which of the following is an enzyme which activates another enzyme?

a) glucagon

b) glycogen

c) glycogen phosphorylase

d) glycogen phosphorylase kinase

e) all of the above

18) An enzyme reaction is carried out with 2 different amounts of enzyme (but the same amount of substrate). What will be different in these 2 reactions?

a) Km

b) Vmax

c) Ki

d) all of the above

e) none of the above

19) For the reaction

$A \rightleftharpoons B$

Keq = kf/kr where kf and kr are the rate constants for the forward and reverse reactions respectively. Since an enzyme increases the rate constants why doesn't it change the Keq?

a) Actually an enzyme does change the Keq.

b) An enzyme changes both kf and kr proportionally

c) An enzyme doesn't really change the rate constants kf and kr, it only appears to (i.e. changes kapparent)

d) In an enzyme catalyzed reaction, Keq is really the same as Km

e) none of the above

20) During the pre-steady state of an enzyme-catalyzed reaction (i.e. before the steady state is reached) the concentration of ES is

a) constant

b) increasing

c) decreasing

d) equal to $[E]_{total}$

e) equal to the initial concentration of S

1. b
2. a
3. c
4. c
5. d
6. b
7. b
8. c
9. a
10. b
11. c
12. d
13. d
14. b
15. d
16. e
17. d
18. b
19. b
20. b