



Highlander Help

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Good Luck!

120:360 - Biochemistry
Spring 2013

Exam 3 sample questions

1) Which of the following is a reaction of gluconeogenesis?

- ~~a) glucose-6-phosphate + ADP → glucose + ATP~~ ✓
- ~~b) glucose-6-phosphate → glucose + Pi~~ ✓
- ~~c) fructose-1,6-bisphosphate + ADP → fructose -6-phosphate + ATP~~
- ~~d) fructose-1,6-bisphosphate → fructose -6-phosphate + Pi~~ ✓
- e) both b and d

2) Which of the following Krebs Cycle intermediates is an α -keto carboxylic acid?

- ~~a) citrate~~
- ~~b) succinate~~
- ~~c) fumarate~~
- ~~d) malate~~ ✓
- e) oxaloacetate

3) In electron transport Coenzyme Q is reduced from the quinone to the hydroquinone by electrons from complex I. This reduction involves

- ~~a) $Fe^{3+} \rightarrow Fe^{2+}$~~ ✓
- ~~b) $Cu^{2+} \rightarrow Cu^+$~~
- ~~c) O_2~~
- ~~d) electrons only~~
- e) electrons and protons

4) Which of the following is activated when it is phosphorylated by a protein kinase?

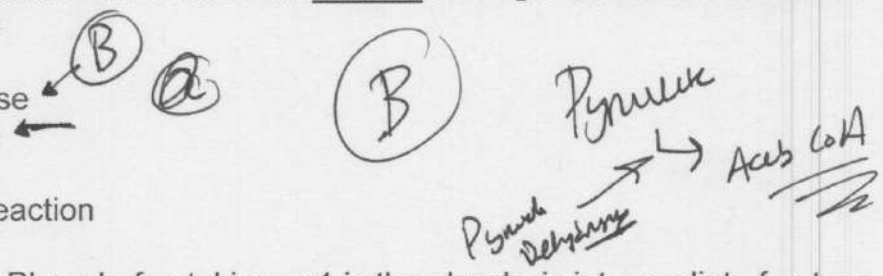
- a) glucagon
- b) glycogen
- c) glycogen phosphorylase ✓
- d) glycogen synthetase
- e) all of the above

5) During the part of a **transamination** reaction in which pyridoxal phosphate is converted to pyridoxamine phosphate, _____ is also converted to _____

- a) ammonia; glutamic acid
- b) an α -amino acid; an α -keto acid ✓
- c) an α -keto acid; an α -amino acid
- d) ammonia; carbamoyl phosphate
- e) carbamoyl phosphate; urea

6) The first step in the catabolism of the amino acid alanine to CO_2 is transamination to the α -keto acid. The second step is

- ~~a) a glycolysis reaction~~
- ~~b) pyruvate dehydrogenase~~
- ~~c) a Krebs Cycle reaction~~
- ~~d) a β -oxidation reaction~~
- ~~e) an electron transport reaction~~



7) The product of the enzyme Phosphofructokinase-1 is the glycolysis intermediate fructose-1,6-bisphosphate. The product of the enzyme Phosphofructokinase-2 is

- ~~a) also fructose 1,6-bisphosphate~~
- ~~b) fructose 2,6-bisphosphate~~
- ~~c) glucose 1,6-bisphosphate~~
- ~~d) glucose 2,6-bisphosphate~~
- ~~e) fructose 6-phosphate - [$\alpha(1-4)$] - fructose-1-phosphate (a disaccharide)~~

8) In the Krebs Cycle reaction in which it is a substrate, citrate behaves as if it were a chiral molecule because

- ~~a) of the structure of the binding site of the enzyme for citrate~~
- ~~b) the other substrate of the reaction is a chiral molecule~~
- ~~c) it has a carbon with 4 different substituent groups~~
- ~~d) it is asymmetric~~
- ~~e) it has both D and L isomers~~

9) Which of the following Krebs Cycle reactions includes substrate level GTP synthesis?

- ~~a) citrate \rightarrow isocitrate~~
- ~~b) isocitrate \rightarrow α -ketoglutarate~~
- ~~c) α -ketoglutarate \rightarrow succinyl coA~~
- ~~d) succinyl coA \rightarrow succinate~~
- ~~e) succinate \rightarrow fumarate~~

10) A cofactor which is oxidized during fatty acid biosynthesis is

- ~~a) Lipoic acid~~
- ~~b) coQ~~
- ~~c) coA~~
- ~~d) NADH~~
- ~~e) NADPH~~

11) In non-heme iron protein components of electron transport, the iron atoms are coordinated to _____ atoms of the protein.

- ~~a) O~~
- ~~b) N~~
- ~~c) H~~
- ~~d) C~~
- ~~e) S~~

12) A molecule of urea contains 2 nitrogen atoms, both from glutamate. One comes via aspartate, the other comes via

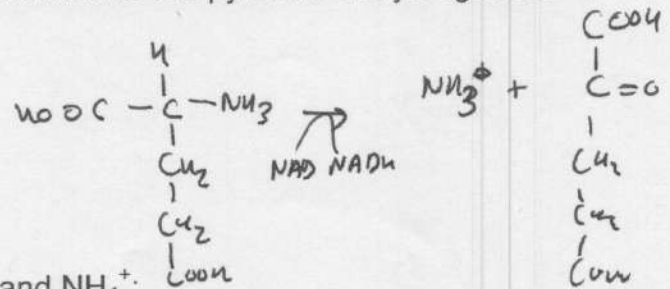
- a) ammonia
- b) pyridoxamine
- c) nitrate
- d) N_2
- e) NADH

13) Which of the following is likely to have the **largest** negative free energy of hydrolysis?

- a) glucose 6-phosphate
- b) fructose 6-phosphate
- c) succinyl-coA
- d) fructose 2, 6-bisphosphate
- e) they are all about the same

14) The reaction of the citric acid cycle that is most similar to the pyruvate dehydrogenase reaction is the conversion of:

- a) citrate to isocitrate.
- b) α -ketoglutarate to succinyl-CoA.
- c) succinyl-coA to succinate.
- d) fumarate to malate.
- e) malate to oxaloacetate.



15) The conversion of glutamate to an α -ketoacid and NH_4^+ :

- a) is an oxidative deamination.
- b) is a transamination
- c) requires ATP.
- d) produces ATP
- e) does not require any redox cofactors (i.e. NAD^+ or FAD).

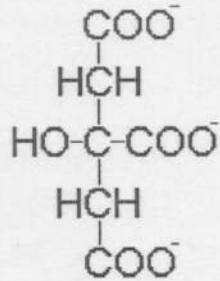
16) In order to examine the effects of the "Atkins Diet" on metabolism, rats were fed radioactively-labeled fatty acids but no carbohydrates. After a few days, radioactively-labeled acetoacetate was found in the blood (a so-called "ketone body"). This compound forms from acetyl-coA when there is low carbohydrate intake because _____ is diverted to make glucose by gluconeogenesis

- a) pyruvate
- b) oxaloacetate
- c) acetone
- d) acetyl-coA
- e) lactate

17) During fatty acid biosynthesis, the growing fatty acid chains are linked to the Acyl Carrier Protein (ACP) by a(n)

- a) ester to an OH of a protein serine
- b) thioester to an SH of a protein cysteine
- c) thioester to an SH of a coenzyme which is bound to the protein
- d) anhydride to a protein phosphate
- e) anhydride to a carboxyl of a protein glutamic acid

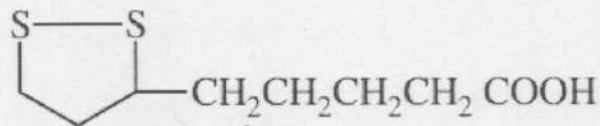
18) What is the name of the following molecule?



- a) citrate
- b) isocitrate
- c) succinate
- d) fumarate
- e) malate



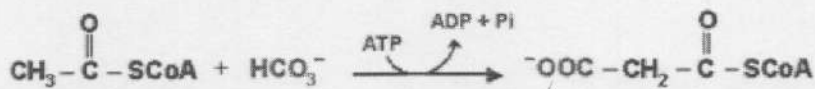
19) Which is the name of the following molecule?



- a) cystine
- b) coA
- c) coQ
- d) lipoic acid
- e) ACP



20) What metabolic process is the following reaction involved in?



- a) gluconeogenesis
- b) pyruvate dehydrogenase
- c) fatty acid biosynthesis
- d) fatty acid catabolism
- e) amino acid catabolism



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Spring 2013**

Exam 3 answers to sample questions

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