

Chem 250

In-class Quiz #2

This quiz is composed of **20** questions.

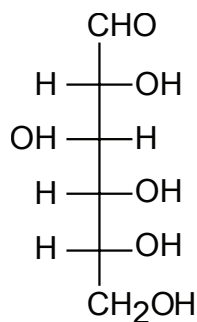
As discussed in the course syllabus, honesty and integrity are absolute essentials for this class. In fairness to others, dishonest behavior will be dealt with to the full extent of University regulations.

I hereby state that all answers on this exam are my own and that I have neither gained unfairly from others nor have I assisted others in obtaining an unfair advantage on this exam.

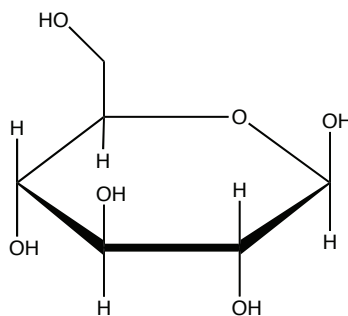
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PERIODIC TABLE OF THE ELEMENTS

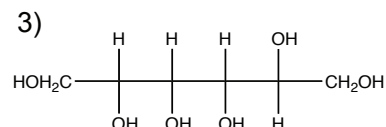
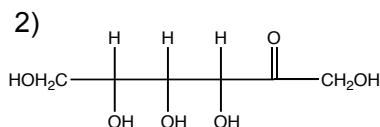
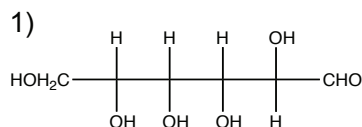
1A	2A	3B	4B	5B	6B	7B	8B	8B	8B	1B	2B	3A	4A	5A	6A	7A	8A
1 H 1.008																	2 He 4.003
3 Li 6.939	4 Be 9.012											5 B 10.81	6 C 12.01	7 N 14.01	8 O 16.00	9 F 19.00	10 Ne 20.18
11 Na 22.99	12 Mg 24.31											13 Al 26.98	14 Si 28.09	15 P 30.97	16 S 32.07	17 Cl 35.45	18 Ar 39.95
19 K 39.10	20 Ca 40.08	21 Sc 44.96	22 Ti 47.90	23 V 50.94	24 Cr 52.00	25 Mn 54.94	26 Fe 55.85	27 Co 58.93	28 Ni 58.71	29 Cu 63.55	30 Zn 65.39	31 Ga 69.72	32 Ge 72.61	33 As 74.92	34 Se 78.96	35 Br 79.90	36 Kr 83.80
37 Rb 85.47	38 Sr 87.62	39 Y 88.91	40 Zr 91.22	41 Nb 92.91	42 Mo 95.94	43 Tc (99)	44 Ru 101.1	45 Rh 102.9	46 Pd 106.4	47 Ag 107.9	48 Cd 112.4	49 In 114.8	50 Sn 118.7	51 Sb 121.8	52 Te 127.6	53 I 126.9	54 Xe 131.3
55 Cs 132.9	56 Ba 137.3	57 La 138.9	72 Hf 178.5	73 Ta 181.0	74 W 183.8	75 Re 186.2	76 Os 190.2	77 Ir 192.2	78 Pt 195.1	79 Au 197.0	80 Hg 200.6	81 Tl 204.4	82 Pb 207.2	83 Bi 209.0	84 Po (209)	85 At (210)	86 Rn (222)
87 Fr (223)	88 Ra 226.0	89 Ac 227.0	104 Unq (261)	105 Unp (262)	106 Unh (263)	107 Uns (262)	108 Uno (265)	109 Une (266)									



D-glucose

 β -D-Glucose

For questions 1 to 3, consider the following (for each question, answer (4) if “none of the above” applies):



1. (5 points) Which of the above is a ketose sugar?

(2) Ketose means that it has a ketone (Ch 20)

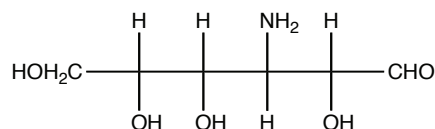
2. (5 points) Which of the above cyclizes to a sugar with a 5-membered ring?

(2) Attack is at the ketose, one shorter than if it attacked a terminal aldehyde (Ch 20)

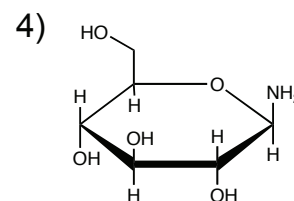
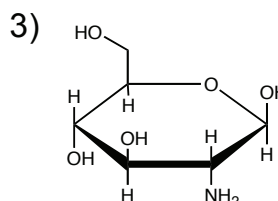
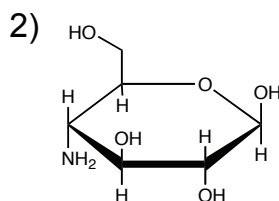
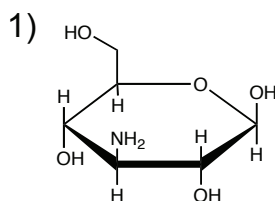
3. (5 points) Which of the above is incapable of forming a cyclic sugar?

(3) This contains neither an aldehyde nor a ketone, thus no attack (Ch 20)

4. (5 points) Consider the following molecule



Which of the following represents a cyclic form of this molecule (answer (5) for “none”)?



(1) See p 499 of text for help (Ch 20)

5. (5 points) In one complete cycle of the acyl carrier protein, how many carbons are added to the growing fatty acyl chain?

1) 1

2) 2

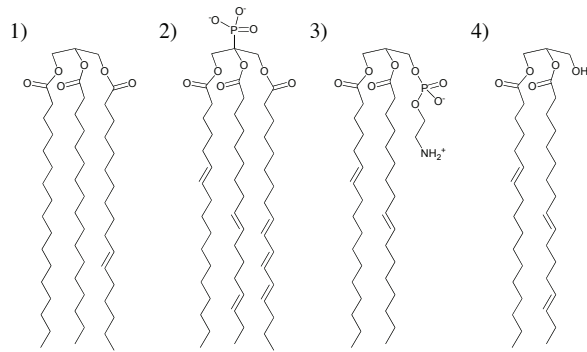
3) 3

4) 4

5) 8

(2) (Chapter 29)

For questions 6-7, consider the molecules at right (for each, answer (5) for “none”):



6. (5 points) Which is found in body fat?

**(1) a triglyceride
(Ch 21)**

7. (5 points) Which is found in a cell membrane?

(3) a phospholipid (Ch 21)

8. (5 points) The reactions of gluconeogenesis are simply the reactions of glycolysis run in reverse

- 1) True 2) False

(2) False (OWL 29.2) Perhaps the primary “key concept” we talked about in this section!

ask, are there 4 different atoms connected to each C? Yes, for only 1', 3', and 4'.

9. (5 points) The functional group common to NADPH, ATP, and Coenzyme A is:

- 1) triphosphate 2) triglyceride 3) testosterone 4) adenosine 5) nothing in common

(4) (Chapter 27) - a unifying concept for these molecules that require a “handle” to bind to an enzyme.

10. (5 points) In the Citric Acid cycle, succinate reacts with FAD. In this reaction, succinate:

- 1) isomerizes
2) is phosphorylated
3) is dephosphorylated
4) is oxidized
5) is reduced

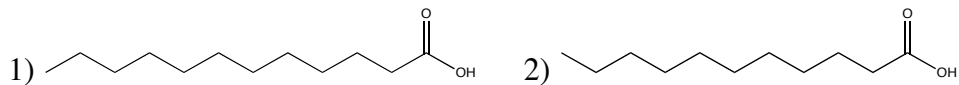
(4) (Chapter 27) – FAD is an oxidant – key concept!

11. (5 points) The negatively charged molecule carbonylcyanide-*p*-trifluoromethoxyphenylhydrazone (FCCP) binds to H^+ ions in the mitochondrial intermembrane space and transports them across the inner membrane to the matrix. FCCP thus is toxic because it:

- 1) prevents electron flow to dioxygen
- 2) leads to the build up of lactic acid
- 3) prevents synthesis of ATP via the proton translocating ATPase
- 4) leads to excess protonation of acetyl-CoA
- 5) inhibits phosphorylation of glucose

(3) (OWL 27.6) – H^+ gradient drives ATP synthesis in respiration – a key concept!

12. (5 points) Which fatty acid below is not of natural origin?



- 3) Neither are of natural origin
- 4) Both are of natural origin

(2) – 11 carbons – even number (Chptr21) – key concept.

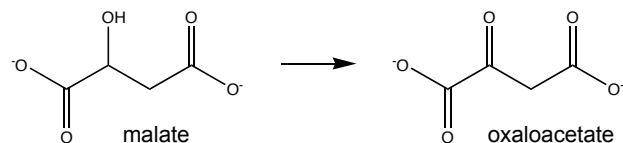
Do you remember why?

13. (5 points) ATP is often hydrolyzed in order to drive unfavorable reactions. Another important and very common role for ATP that does not involve hydrolysis is:

- 1) reduction of carboxylic acids
- 2) phosphorylation of alcohols
- 3) oxidation of alcohols
- 4) oxidation of primary amines
- 5) cyclization of sugars

(2) Chptr 27-28 – Remember we talked about two key roles for ATP?

14. (5 points) Which kind of enzyme catalyzes the following reaction in the Citric Acid cycle?



- 1) an isomerase
- 2) a dehydrogenase
- 3) a reductase
- 4) a kinase
- 5) none of these

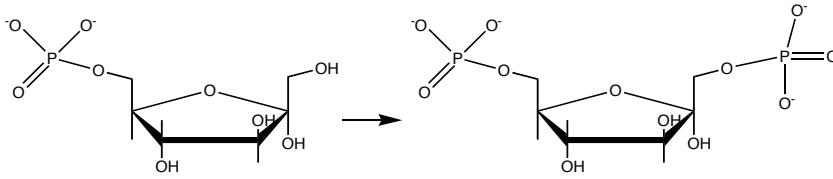
(2) the alcohol is oxidized/dehydrogenated to yield the ketone (Ch 27)

15. (5 points) The above reaction requires another player. That player is most likely

- 1) NAD^+
- 2) FADH
- 3) ATP
- 4) CoA-SH
- 5) none of these

(1) NAD^+ oxidizes things (Chapter 27)

16. (5 points) The third step in glycolysis is the following

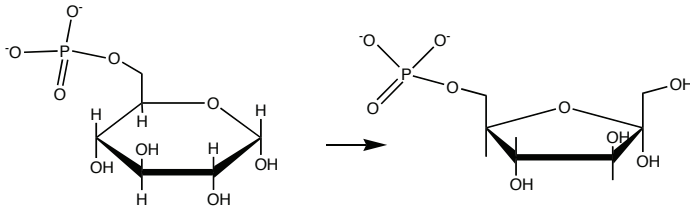


Which of the following enzymes catalyzes this reaction?

- | | |
|----------------------------|----------------------------|
| 1) aldolase | 2) phosphoglycerate mutase |
| 3) pyruvate kinase | 4) phosphofructokinase |
| 5) phosphohexose isomerase | |

(4) phosphorylates, so it must be a kinase. Substrate not pyruvate. (Ch 28)

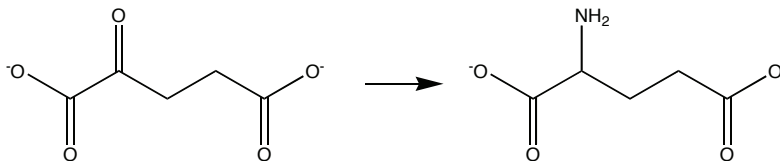
17. (5 points) The intermediates in the reaction below (the second step in glycolysis) contain what kind of functionalities?



- 1) ketone 2) aldehyde 3) both 4) neither

(3) The phosphohexose first opens up to the linear form of the sugar, which ends in an aldehyde. The C=O bond then migrates by one to form a ketone at the 2 position. Ring closure of that then results in the 5 membered ring. (Ch 28)

18. (5 points) We skipped “biosynthesis of amino acids” in Chptr 29, but given your knowledge of both organic and biochemistry, the following reaction likely requires what NH_4^+ and what other reagent?



- 1) ATP 2) NADH 3) NAD^+ 4) CoA-SH 5) none of these

(2) The ketone is reduced (in this case to an amine, rather than an alcohol, but the concept is the same) (Ch 29)

19. (5 points) In transitioning from the glycolytic pathway to the Citric Acid Cycle, acetyl-CoA serves what purpose?
- 1) it acetylates glucose
 - 2) it reduces NADH
 - 3) it delivers a “two carbon chunk” for processing in the cycle
 - 4) it carries electrons to the respiratory chain
 - 5) it does nothing. Why do we need to know about it anyway?

(3) See p 699 (Ch 27)

20. (5 points) What is the course number of this class?

1) 111

2) 250

3) 496

4) 728

(2)