Final Exam Practice Worksheet

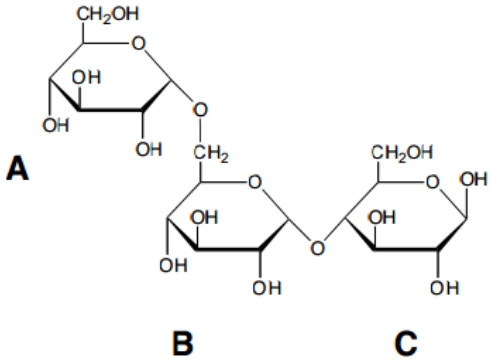
1. Panose is a trisaccharide that is being considered as a possible sweetener by the food industry.

   a) Name the monosaccharides present in the molecule.

   molecule A _____

   molecule B _____

   molecule C _____



   b) Name the glycosidic bonds present in the molecule

   connects A and B _____

   connects B and C _____

   c) Is the structure drawn as α or β panose?

   d) Would panose be classified as a reducing sugar?

2. Describe each of the following solutions as isotonic, hypotonic, or hypertonic. Indicate whether a red blood cell placed in each solution will undergo hemolysis, crenation, or no change.

   a) 5% (m/v) glucose solution _____

   b) 0.2% (m/v) NaCl solution _____

   c) 1.0% (m/v) glucose solution _____

   d) 1.2 % (m/v) NaCl solution _____

3. What type of interaction (nonpolar/hydrophobic, polar/hydrophilic, salt bridge, disulfide bridge) would you expect between the R groups of the following amino acids in the tertiary structure of a protein?

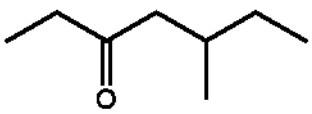
   a) cysteine and cysteine _____

   b) aspartic acid and lysine _____

   c) tyrosine and water _____

   d) leucine and isoleucine _____

4. Name the following molecules:

a) 

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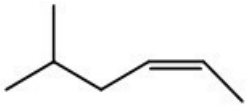
b) 

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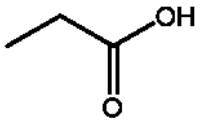
c) 

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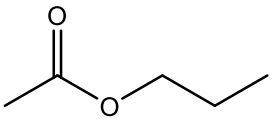
d) 

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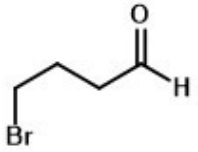
e) 

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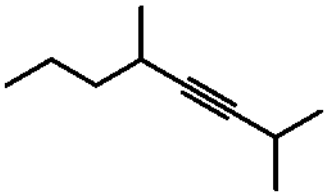
f) 

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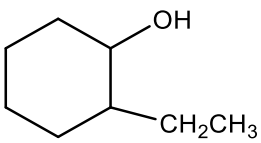
g) 

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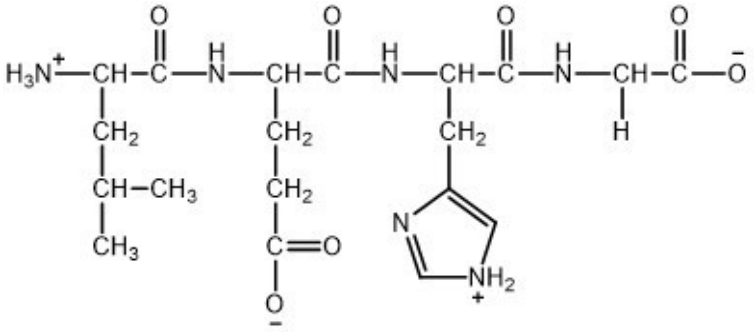
5. Write the name of the following peptide using the one-letter abbreviation for each amino acid.

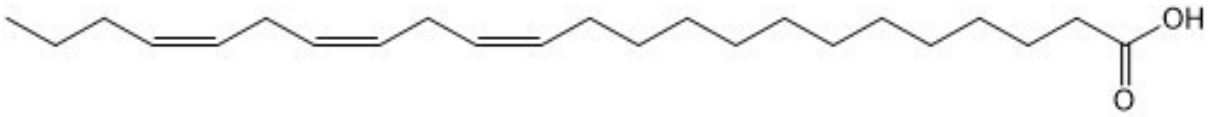


6. Using the following piece of DNA, give the mRNA and amino acid sequences for which it codes.

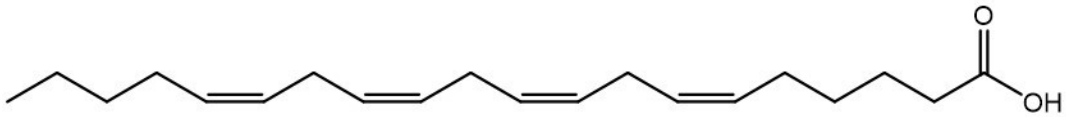
DNA	A	T	A	T	G	A	T	C	T	T	A	T	C	T	A	A	A	C	C	G	A	T	C	G
mRNA																								
Amino Acids (3-letter)																								
Peptide name using 1-letter abbreviations																								

7. Provide the carbon designation of the following molecules using the omega and delta systems:

a)



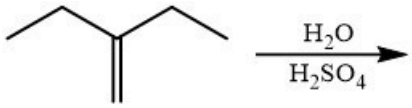
b)



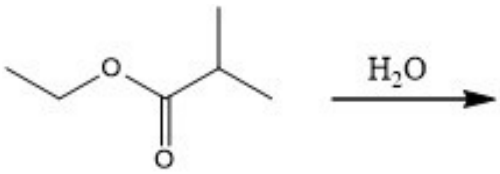
8. Draw the major organic product of the following reactions:

a)

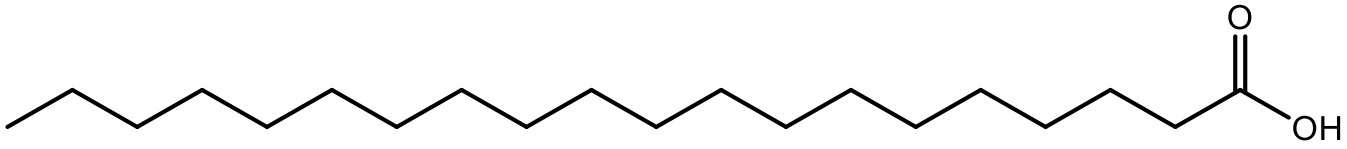
b)



c)



9. Calculate the total number of ATP produced from the complete oxidation of the following fatty acid.



ANSWER KEY

1.
   a. molecule A – α-D-glucose
      molecule B – α-D-glucose
      molecule C – β-D-glucose
   b. connects A and B – α(1→6)
      connects B and C – α(1→4)
   c. This is β-panose based on the conformation of the glucose with the free anomeric carbon.
   d. Yes, it is a reducing sugar because it has a free anomeric carbon.

2.
   a. isotonic – no change
   b. hypotonic – hemolysis
   c. hypotonic – hemolysis
   d. hypertonic – crenation

3.
   a. disulfide bridge
   b. salt bridge
   c. polar/hydrophilic (or hydrogen bonding)
   d. nonpolar/hydrophobic

4.
   a. 5-methyl-3-heptanone
   b. cis-5-methyl-2-hexene
   c. propanoic acid
   d. propyl ethanoate
   e. 4-bromobutanal
   f. 2,5-dimethyl-3-octyne
   g. 2-ethylcyclohexanol

5. LEHG

6.

DNA	A	T	A	T	G	A	T	C	T	T	A	T	C	T	A	A	A	C	C	G	A	T	C	G
mRNA	U	A	U	A	C	U	A	G	A	A	U	A	G	A	U	U	U	G	G	C	U	A	G	C
Amino Acids (3-letter)	Tyr			Thr			Arg			Ile			Asp			Leu			Ala			Ser		
Peptide name using 1-letter abbreviations	YTRIDLAS																							

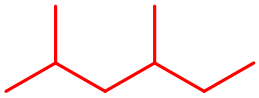
7.

a. [23,3], ω-4
   [23,3], $\Delta^{13,16,19}$

b. [20,4], ω-5
   [20,4], $\Delta^{6,9,12,15}$

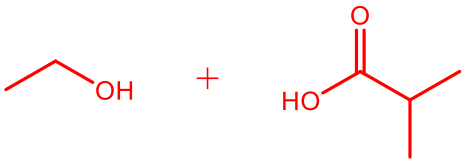
8.

a.



b.

c.



9. 134 ATP

20 C

Fatty acid activation	-2 ATP
9 turns of β-oxidation cycle (1 NADH and 1 $FADH_2$) =	9 x 4 ATP
10 acetyl-CoA in the citric acid cycle (3 NADH, 1 $FADH_2$, 1 GTP) =	10 x 10 ATP