HW07 - Diet & Nutrition

1 6 points

Select the true statements.

- [ ] Malnourished and undernourished mean the same thing
- [ ] Malnourishment is fundamentally a problem of too few calories
- [ ] You can be simultaneously malnourished and underweight
- [ ] Undernourishment is fundamentally a problem of too few calories
- [ ] You can be simultaneously malnourished and overweight

2 4 points

A carbohydrate used for directly fueling metabolic processes is typically a _____, while a carbohydrate used for energy storage is typically a _____.

- ○ polysaccharide, monosaccharide
- ○ cellulose, fructose
- ○ monosaccharide, polysaccharide
- ○ β-D glucose, D-glucose

3 6 points

Plants and animals naturally produce which of the following? (select all that apply)

- [ ] Free fatty acids
- [ ] Monounsaturated fats
- [ ] Cis fatty acids
- [ ] Trans fatty acids

4 5 points

An amino acid has a phenol functional group on its side chain. This side chain is characterized as...

- ○ nonpolar, acidic
- ○ nonpolar, neutral
- ○ polar, neutral
- ○ polar, basic
- ○ nonpolar, basic

5 5 points

The polar amino acid side chains are divided into which set of subcategories?

- ○ combustible, nutritional
- ○ acidic, basic, and neutral
- ○ hydrophilic and hydrophobic

6 5 points

An amino acid has a methyl group side chain. Which of the following best characterizes the amino acid?

- ○ polar, hydrophilic
- ○ nonpolar, hydrophobic
- ○ nonpolar, hydrophilic
- ○ polar, hydrophobic

7 5 points

What functional group is present on the **side chain** of all basic amino acids?

- ○ a nonpolar methyl group
- ○ an amine
- ○ a carboxylic acid
- ○ a phenol

8 5 points

Which two amino acids have amide functional groups on their side chain?

- ○ aspartate and glutamate
- ○ tryptophan and leucine
- ○ asparagine and glutamine
- ○ aspartate and arginine
- ○ arginine and lysine

9 6 points

Consider the alanine molecule in the human body. What is the charge on nitrogen, oxygen, and the overall alanine molecule?

- ○ 0, -1, -1
- ○ +1, -1, +2
- ○ 0, 0, 0
- ○ +1, +1, 0
- ○ +1, -1, 0
- ○ +1, -1, -2
- ○ 0, +1, +1
- ○ +1, +1, +2

10 6 points

Choose the correct statements from below:

- [ ] Oleic acid is a trans fatty acid.
- [ ] The main oil component of olive oil is a trans fat.
- [ ] Oleic acid is a cis mono-unsaturated fatty acid.
- [ ] A main oil component of olive oil is oleic acid
- [ ] The carbon chains on oleic acid are on the same side of the double bond.

11 4 points

Which functional group is fundamental to a fatty acid?

- ○ amide
- ○ nitrile
- ○ carboxylic acid
- ○ aldehyde
- ○ amine

12 6 points

Which component of saturated fatty acids is worth noting with respect to the health risk associated with their consumption?

- ○ A more branched structure in the fatty acid chain causes the fat to have a greater viscosity/thickness.
- ○ A more linear structure in the fatty acid chain results in more regions of overlap, causing a greater viscosity/thickness in the body

13 4 points

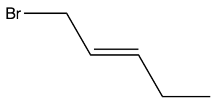
Hydrogenating oils have which of the following **two** impacts on a fatty acid chain?

- [ ] creates a more viscous oil
- [ ] creates a healthier, less viscous mixture
- [ ] creates more branching in the fatty acid molecule
- [ ] reduces branching in the fatty acid molecule

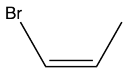
14 4 points

Select the type of double bond present on each molecule:

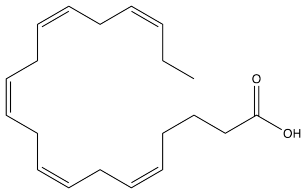
Molecule A:



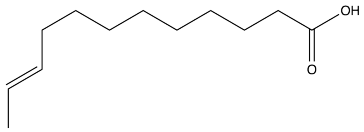
Molecule B:



Molecule C:



Molecule D:

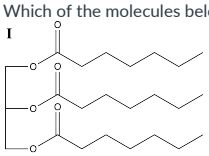


Molecule A has a choose your answer... double bond. Molecule B has a choose your answer... double bond. Molecule C looks pretty complex, but all the double bonds on the carbon chain are choose your answer... double bonds. Molecule D has only one double bond on its carbon chain and it is choose your answer... .

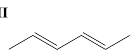
15 5 points

Which of the molecules below have *cis* functionalities?

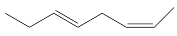
I



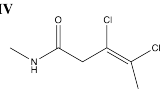
II



III



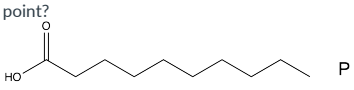
IV



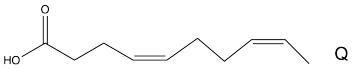
- ○ III and IV
- ○ II and III
- ○ I and II
- ○ I and IV

16 5 points

Which of the two fatty acids pictured below would be expected to have a higher melting point?



P

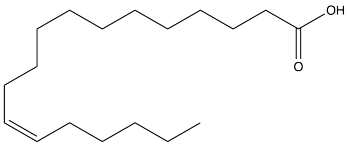


Q

- ○ Q
- ○ P

17 5 points

The following fatty acid comes from natural sources. Which of the following statements explains the relationship between its structure and the impact it has on our health?



- ○ This is the healthier form of fatty acid because it is **more** dense and less likely to clog arteries of the long term.
- ○ This is the healthier form of fatty acid because it is **less** dense and less likely to clog arteries of the long term.
- ○ This is the unhealthy form of fatty acid because it is **more** dense and more likely to clog arteries of the long term.
- ○ This is the unhealthy form of fatty acid because it is **less** dense and more likely to clog arteries of the long term.

18 5 points

Which formula below could be a triglyceride?

- ○ $C_{18}H_{38}$
- ○ $C_{27}H_{50}O_6$
- ○ $C_{20}H_{40}O_2$

19 4 points

A mass of cellulose can provide _____ combustion heat energy as/than an equal mass of starch.
The same mass of cellulose provides _____ nutritive calories to humans compared to the starch.

- ○ equal, no
- ○ less, fewer
- ○ equal, more
- ○ less, no
- ○ more, fewer
- ○ more, more

20 5 points

Which of the following macronutrients provides the most calories per gram?

- ○ carbohydrates
- ○ fats
- ○ protein
- ○ water