

# 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
- $\beta$ -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

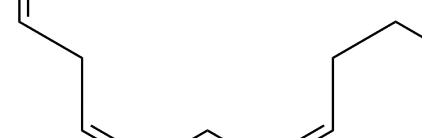
Hydrogenating oils have which of the following **two** impacts on a fatty acid chain?

- 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

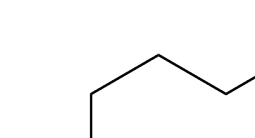
14 4 points

Select the type of double bond present on each molecule:

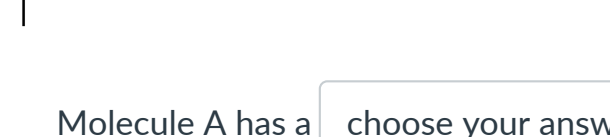
Molecule A:



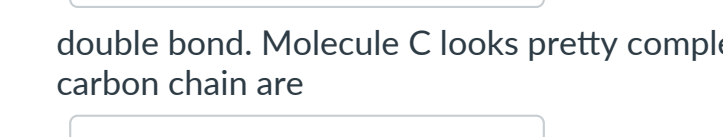
Molecule B:



Molecule C:



Molecule D:



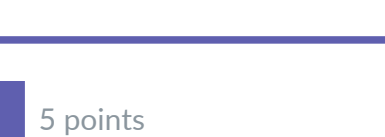
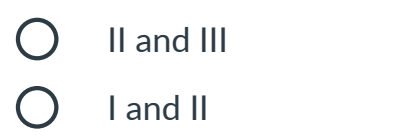
Molecule A has a  double bond. Molecule B has a

double bond. Molecule C looks pretty complex, but all the double bonds on the carbon chain are

double bonds. Molecule D has only one double bond on its carbon chain and it is

15 5 points

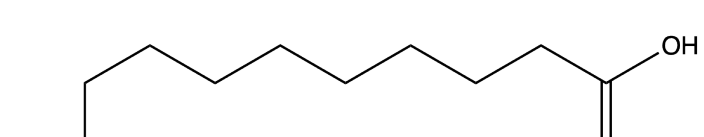
Which of the molecules below have *cis* functionalities?



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

16 5 points

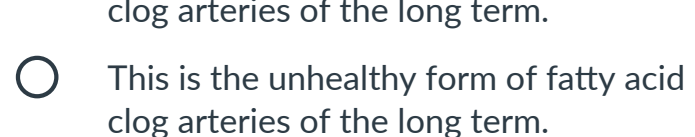
Which of the two fatty acids pictured below would be expected to have a higher melting point?



- 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