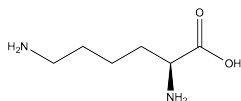


## HW08 - Chemistry of Nutrition & Booze

1 3 points

What is the net charge of the following amino acid in the bloodstream?

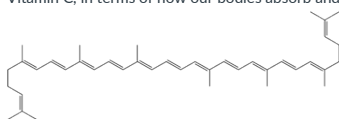


Note: you might not have seen the "wedge" for a while, but the bond connecting to the bottom -NH<sub>2</sub> group is just a regular single bond. The wedge shows that the 3D geometry is coming out of the page.

- +2  
 -2  
 0  
 +1  
 -1  
 +3

2 3 points

Lycopene is a compound responsible for red color in many vegetables, most notably tomatoes. Its molecular structure is below. Does lycopene behave more like Vitamin A or Vitamin C, in terms of how our bodies absorb and store it?



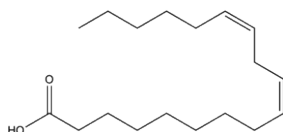
- Vitamin C  
 Vitamin A

3 3 points

How many Calories are in 90 grams protein?

4 3 points

Which choice best describes the molecule shown below?



- This is a fatty acid with *trans* double bonds. This molecule is likely derived from industrial synthesis.  
 This is a fatty acid with *trans* double bonds. This molecule is likely derived from natural sources.  
 This is a fatty acid with *cis* double bonds. This molecule is likely derived from natural sources.  
 This is a fatty acid with *cis* double bonds. This molecule is likely derived from industrial synthesis.

5 4 points

Below is the label from a can of spray oil, like one would use to coat a pan before baking or cooking. Is this truly a zero calorie product?

Nutrition Facts	
Serving Size 1/3 second spray (0.25g)	
Servings Per Container About 557	
Amount Per Serving	
<b>Calories 0</b>	Calories from Fat 0
% Daily Value*	
<b>Total Fat</b> 0g	<b>0%</b>
Saturated Fat 0g	<b>0%</b>
Trans Fat 0g	
Polysaturated Fat 0g	
Monounsaturated Fat 0g	
<b>Cholesterol</b> 0mg	<b>0%</b>
<b>Sodium</b> 0mg	<b>0%</b>
<b>Total Carbohydrate</b> 0mg	<b>0%</b>
<b>Protein</b> 0g	

Not a significant source of dietary fiber, sugars, vitamin A, vitamin C, calcium, and iron.

\*Percent daily values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:

	2,000	2,500
Total Fat	Less than 65g	80g
Sat Fat	Less than 20g	25g
Cholesterol	Less than 300mg	300mg
Sodium	Less than 2,400g	2,400g
Total Carb	300g	375g
Dietary Fiber	25g	30g

- Yes, this is made from Olestra  
 No, there is less than 1 Cal, so it is rounded down.  
 Yes, the only calories are from fiber, which doesn't count  
 No, there are a few fat calories, but the label rounded down.

6 6 points

Match the mineral class to the mass units that best represent the necessary daily intake of that class.

Microminerals	_____	▼
Trace minerals	_____	▼
Macrominerals	_____	▼

Possible answers

mg   
  oz   
  kg   
  µg   
  g

7 2 points

Which of these pairs represent the same unit of mass?

- mg, mcg  
 µg, mcg  
 microgram, mg

8 3 points

Vitamins are generally divided into which two groups?

- Water soluble and fat soluble  
 Microminerals and Macrominerals  
 Lipids and triglycerides  
 Letter and Numeric

9 8 points

Using the macronutrient info, how many Calories do you expect to see (per serving) for this product? Assume the dietary fiber does not add any Calories.

Nutrition Facts	
32 servings per container	
Serving size 1 1/4 cup (28g)	
Amount Per Serving	
<b>Calories</b>	
	% Daily Value*
Total Fat 8g	10%
Saturated Fat 1g	5%
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 680mg	30%
Total Carbohydrate 23g	8%
Dietary Fiber 5g	18%
Total Sugars 4g	10%
Includes 5g Added Sugars	10%
Protein 5g	10%

Not a significant source of vitamin D, calcium, iron, and potassium

\*The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

10 3 points

How many grams of fat would you calculate to be in a serving of this product?

Nutrition Facts	
32 servings per container	
Serving size 1 1/4 cup (28g)	
Amount Per Serving	
<b>Calories 130</b>	
	% Daily Value*
Total Fat	
Saturated Fat	
Trans Fat	
Cholesterol 5mg	2%
Sodium 180mg	8%
Total Carbohydrate 18g	7%
Dietary Fiber 1g	4%
Total Sugars 12g	24%
Includes 12g Added Sugars	24%
Protein 1g	2%

Not a significant source of vitamin D, calcium, iron, and potassium

\*The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

11 4 points

What is/are the risks associated with using sucrose instead of glycerol to support the fatty acids and make a non-digestible monster fat (Olestra)?

- loose stools
- anal leakage
- inhibition of vitamin absorption
- abdominal cramping

12 6 points

Which functional group in sucrose allowed it to be used in place of glycerol to make Olestra?

- carboxylic acid
- alcohol
- phenyl
- amine

13 3 points

Nutrition Facts	
10 servings per container	
Serving size 1 oz (28g (about 12 pieces))	
Amount per serving	
<b>Calories</b>	
	% Daily Value*
Total Fat 3g	10%
Saturated Fat 2g	10%
Trans Fat 0g	
Monounsaturated Fat 3g	
Multisaturated Fat 2.5g	
Cholesterol 0mg	0%
Sodium 410mg	18%
Total Carbohydrate 17g	6%
Dietary Fiber 1g	4%
Total Sugars 1g	
Includes 0g Added Sugars	0%
Protein 2g	
Vitamin D 0mcg	0%
Calcium 8mg	0%
Iron 0mg	0%
Potassium 1mg	0%

\*The % Daily Value tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

This is a nutrition label for a family size bag of chips from Walmart. How many Calories are found in 24 pieces (2 servings)?

14 5 points

Juliette is hoping to impress everyone with her pristine health after Lockdown 2.0. She realized that she feels best when she eats about 2200 Calories while exercising daily. Which ratio of macronutrients best gets her to 2200 Calories with a balance between fats, carbohydrates, and protein?

- 100 g fat, 100 g carbs, 100 g protein
- 72 g fat, 265 g carbs, 123 g protein
- 50 g fat, 300 g carbs, 200 g protein
- 65 g fat, 275 g carbs, 109 g protein
- 0 g fat, 250 g carbs, 300 g protein

15 5 points

You'll find below a simplified list of macronutrients in a few different foods/beverages. For each one, determine which macronutrient is contributing the most calories.

**Plain Cheesecake Slice**

Carbohydrates: 31 g  
Fats: 15 g  
Protein: 6 g

**One Cup of Avocado**

Carbohydrates: 12 g  
Fats: 21 g  
Protein: 2.9 g

**Gin and Tonic**

Carbohydrates: 12.1 g  
Fats: 0 g  
Protein: 0 g  
Alcohol: 13.5 g

**Margarita**

Carbohydrates: 24 g  
Fats: 0 g  
Protein: 0 g  
Alcohol: 13.5 g

**Brisket with BBQ Sauce**

Carbohydrates: 19 g  
Fats: 41 g  
Protein: 42 g

Plain Cheesecake Slice:  Avocado:

Gin and Tonic:

Margarita:  Brisket:

Carbohydrates  Protein  Fats  Protein  Fats

Carbohydrates  Fats  Protein  Alcohol  Carbohydrates

Alcohol  Fats  Protein  Carbohydrates  Carbohydrates

Fats  Protein

16 5 points

Nutrition Facts	
1 servings per container	
Serving size 1 slice	
Amount Per Serving	
<b>Calories</b>	
	% Daily Value*
Total Fat 90g	115%
Saturated Fat 55g	275%
Trans Fat 2.5g	
Cholesterol 300mg	100%
Sodium 400mg	17%
Total Carbohydrate 109g	46%
Dietary Fiber 5g	6%
Total Sugars 87g	6%
Includes 0g Added Sugars	0%
Protein 11g	22%

Not a significant source of vitamin D, calcium, iron, and potassium

\*The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

The nutrition label above is for a chocolate tuxedo cream cheesecake. Calculate the total number of Calories for 5 slices of cheesecake.

17 4 points

Which macronutrient provides the most Calories in the nutrition label for frozen pizza below:

Nutrition Facts	
Serving size	1 Pizza (213g)
Amount per serving	
<b>Calories</b>	<b>650</b>
% Daily Value*	
Total Fat 34g	44%
Saturated Fat 12g	60%
Trans Fat 0.5g	
Cholesterol 60mg	20%
Sodium 1260mg	55%
Total Carbohydrate 63g	23%
Dietary Fiber 4g	14%
Total Sugars 3g	
Includes 0g Added Sugars	0%
Protein 24g	
Vitamin D 0mcg	0%
Calcium 510mg	40%
Iron 1.9mg	10%
Potassium 340mg	8%

\*The % Daily Value tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

Note: You may assume that dietary fiber provides 2 Cal/g

- Fats
- Protein
- Dietary fiber
- Carbohydrates

18 6 points

A highly recommended and semi-budget-friendly wine is a Ramspeck Pinot Noir. This wine comes in at 13.5% ABV. Using the conversions provided, calculate the total grams of ethanol in 6 glasses of Ramspeck.

1 wine glass = 12 oz (yes, this is bigger than a "normal" glass of wine)  
1 oz = 29.57 mL  
density of ethanol = 0.789 g/mL

19 4 points

Karen is on a new diet for what her friends call "Hot Girl Summer." She wants to consume 1800 Calories, with the majority of the Calories coming from protein and healthy oils. She wants 30% of her diet to come from carbohydrates. Which set of macros will fulfill her diet?

- 540 g carbs, 700 g protein, 560 g fat
- 120 g carbs, 65 g protein, 90 g fat
- 240 g carbs, 75 g protein, 90 g fat
- 135 g carbs, 135 g protein, 80 g fat
- 135 g carbs, 90 g protein, 150 g fat

20 6 points

Isiah is reflecting on his diet in 2021 and this is what a day in the life looked like:

- 324 g carbohydrates
- 67 g fats
- 151 g protein
- But then on top of all this, he threw down 3 margaritas per night, each consisting of 12 g sugar and 13.5 g alcohol

Based on the total number of Calories he consumed, what percentage of his diet were the 3 margaritas he drank each night? Report your answer as a whole number (round to the nearest percent).

21 3 points

The basic idea of distillation is that liquids can be separated based on...

- texture
- boiling point
- polarity
- charge balance

22 3 points

In a distillation of fermented mash, liquor distillers typically separate the first portion of distillate. The first portion...

- is too high in methanol content because methanol has a higher boiling point than ethanol
- is the most delicious, and distillers keep it for themselves.
- is too high in ethanol content and must be discarded
- is too high in methanol content because methanol has a lower boiling point than ethanol

23 4 points

Suppose you want to toast the end of the semester with some Johnnie Walker Blue Label. This whisky sits at 40% ABV. Using the conversions provided, calculate the total grams of ethanol in 1 glass(es) of Ramspeck.

1 glass = 1.52 oz  
1 oz = 29.57 mL  
density of ethanol = 0.789 g/mL

Answer to the nearest 0.01 g.

24 4 points

Post-brunch, you decide to calculate your macros. It's not pretty but it looks like this:

- 32 g protein
- 126 g carbs
- 22 g fats
- 16 g alcohol

What percent of the Calories you consumed came from the alcohol in the mimosas?

Answer to the nearest 0.1%.