Chemistry 141 Name key

Dr. Cary Willard

Quiz 1a (20 points) August 26, 2013

1. (3 points) What is wrong with the expression “That is just a theory,” if by theory the speaker is referring to a scientific theory?

Scientific theories are backed by extensive data and have a high probability of being correct. Often people will refer to any idea, tested or not, as a theory. This does not meet the scientific definition of a theory. Scientific theories cannot be considered absolute truths however because science allows anything to be questioned and tested.

1. (6 points) Rolls of aluminum foil are 524 mm wide and 0.018 mm thick. What maximum length of aluminum foil can be made from 250.0 lb of aluminum if the density of aluminum is 2.70 g/mL?

1st find the volume of a 1cm length of the aluminum foil

$$\frac{volume}{cm Al}=52.4 cm×0.0018 cm×1 cm=0.094\_{3} cm^{3}=\frac{0.094\_{3} mL Al}{cm Al}$$

2nd find volume aluminum available

$$volume Al=250.0 lb Al×\frac{454 g Al}{1 lb Al}×\frac{1 mL Al}{2.70 g Al}=4.20×10^{4}mL Al$$

3rd find length of foil produced

$$length Al foil=4.20×10^{4}mL Al×\frac{1 cm Al}{0.094\_{3} mL Al}×\frac{1 in Al}{2.54 cm Al}×\frac{1 ft Al}{12 in Al}=15000 ft Al foil$$

1. (3 points) Classify a beaker of flavorful mashed potatoes as as homogeneous or heterogeneous and justify your choice.

Depends on perspective. Looking at a beaker of mashed potatoes and tasting any spoonful they will all be equally tasty and delicious thus rendering them as a homogeneous mixture. Looking more closely at the potatoes you will see bits of different herbs and spices thus rendering them as a heterogeneous mixture.

1. (8 points) On the new Grossmont temperature (oGC)scale, water freezes at 42oGC and boils at 158oGC. On another new temperature scale, the Cuyamaca (oCC) scale, water freezes at 75oCC and boils at 390oCC. If a sample of alcohol has a boiling point of 118oGC, what is its boiling point in oC(Celsius) and what is its boiling point in oCC?

158oGC

42oGC

118oGC

116oGC

390oCC

75oCC

315oCC

100oC

0oC

100oC

1st determine how many oGC above the freezing point of water

 118oGC is 76oGC above the freezing point of water at 42oGC

2nd Convert oGC into oC and oCC

$$76°GC×\frac{100℃}{116°GC}=65℃ above FP$$

$$76°GC×\frac{315^{o}CC}{116°GC}=206°CC above FP$$

3rd adjust for the zero point

$$65℃+0℃=65℃$$

$$206℃C+75℃C=281℃C$$

Chemistry 141 Name key

Dr. Cary Willard

Quiz 1b (20 points) August 26, 2013

1. (3 points) What is wrong with the expression “That is just a theory,” if by theory the speaker is referring to a scientific theory?

Scientific theories are backed by extensive data and have a high probability of being correct. Often people will refer to any idea, tested or not, as a theory. This does not meet the scientific definition of a theory. Scientific theories cannot be considered absolute truths however because science allows anything to be questioned and tested.

1. (6 points) Rolls of aluminum foil are 524 mm wide and 0.018 mm thick. What maximum length of aluminum foil can be made from 350.0 lb of aluminum if the density of aluminum is 2.70 g/mL?

1st find the volume of a 1cm length of the aluminum foil

$$\frac{volume}{cm Al}=52.4 cm×0.0018 cm×1 cm=0.094\_{3} cm^{3}=\frac{0.09.4\_{3} mL Al}{cm Al}$$

2nd find volume aluminum available

$$volume Al=350.0 lb Al×\frac{454 g Al}{1 lb Al}×\frac{1 mL Al}{2.70 g Al}=5.98×10^{4}mL Al$$

3rd find length of foil produced

$$length Al foil=5.89×10^{4}mL Al×\frac{1 cm Al}{0.09.4\_{3} mL Al}×\frac{1 in Al}{2.54 cm Al}×\frac{1 ft Al}{12 in Al}=20400 ft Al foil$$

1. (3 points) Classify a beaker of flavorful mashed potatoes as as homogeneous or heterogeneous and justify your choice.

Depends on perspective. Looking at a beaker of mashed potatoes and tasting any spoonful they will all be equally tasty and delicious thus rendering them as a homogeneous mixture. Looking more closely at the potatoes you will see bits of different herbs and spices thus rendering them as a heterogeneous mixture.

1. (8 points) On the new Grossmont temperature (oGC)scale, water freezes at 72oGC and boils at 158oGC. On another new temperature scale, the Cuyamaca (oCC) scale, water freezes at 55oCC and boils at 390oCC. If a sample of alcohol has a boiling point of 118oGC, what is its boiling point in oC(Celsius) and what is its boiling point in oCC?

158oGC

72oGC

118oGC

86oGC

390oCC

55oCC

335oCC

100oC

0oC

100oC

1st determine how many oGC above the freezing point of water

 118oGC is 46oGC above the freezing point of water at 62oGC

2nd Convert oGC into oC and oCC

$$46°GC×\frac{100℃}{86°GC}=53℃ above FP$$

$$46°GC×\frac{335^{o}CC}{86°GC}=179°CC above FP$$

3rd adjust for the zero point

$$53℃+0℃=53℃$$

$$179℃C+55℃C=234℃C$$