Chemistry 141 Name key

Dr. Cary Willard

Quiz 1a (20 points) January 27, 2011

All work must be shown to receive credit.

1. (5 points) What is wrong with the expression, “That is just a theory” if by theory you mean a scientific theory?

A scientific theory has been tested extensively and has much evidence to support it. It is not just an idea someone had, but has been thoroughly tested and all of the data support the theory.

1. (5 points) Classify each of the following as a pure substance or a mixture. If it is a pure substance, classify it as an element or a compound. If it is a mixture, classify it as homogenous or heterogeneous. Justify your choices.
	1. Beach sand

Homogeneous mixture – If you look at a spoonful of beach sand from anywhere on the beach, it will look like all of the other sand.

Heterogeneous mixture – If you look at a spoonful of beach sand you will see bits of shell, sand, and dried seaweed in the sample. Also, different spoonfuls of sand will differ from each other.

Pure substance – compound – A sample of beach sand will be composed of bits of tumbled quartz, a compound made of silicon and oxygen.

* 1. Sucrose (Table Sugar)

Pure substance - compound

1. (5 points) The Toyota Prius, a hybrid electric vehicle has an EPA gas mileage rating of 52 mi/gal in the city. How many kilometer can the Prius travel on 63.0 L of gasoline?

$$?km=63.0 L×\frac{1.06 qt}{1 L}×\frac{1 gal}{4 qt}×\frac{52 mi}{1 gal}×\frac{5280 ft}{1 mi}×\frac{12 in}{1 ft}×\frac{2.54 cm}{1 in}×\frac{1 m}{100 cm}×\frac{1 km}{1000 m}=1400km$$

1. (5 points) The density of mercury is 13.6 g/mL. If a fish tank with a volume 2.00 ft3 were filled with mercury, calculate the mass of mercury (in lb) in the fish tank. (Would you be able to lift the tank?)

$?lb=2.00 ft^{3}×\left(\frac{12 in}{1 ft}\right)^{3}×\left(\frac{2.54 cm}{1 in}\right)^{3}×\frac{1 mL}{1 cm^{3}}×\frac{13.6 g}{1 mL}×\frac{1 lb}{454 g}=1700 lb Hg$

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1. (5 points) What is wrong with the expression, “That is just a theory” if by theory you mean a scientific theory?

A scientific theory has been tested extensively and has much evidence to support it. It is not just an idea someone had, but has been thoroughly tested and all of the data support the theory.

1. (5 points) Classify each of the following as a pure substance or a mixture. If it is a pure substance, classify it as an element or a compound. If it is a mixture, classify it as homogenous or heterogeneous. Justify your choices.
	1. Ranch Dressing

Heterogeneous mixture – if you look at ranch dressing you can see bits of spices mixed in with the liquid portion. Each spoonful of dressing will have different amounts of spice.

Homogeneous mixture – If you take one spoonful of dressing out of the bottle, it will look just like any other spoonful of dressing. They all have the same composition and if you taste many different spoonfuls, they will all taste the same.

* 1. Sucrose (Table Sugar)

Pure substance - compound

1. (5 points) The Toyota Prius, a hybrid electric vehicle has an EPA gas mileage rating of 52 mi/gal in the city. How many kilometer can the Prius travel on 47.0 L of gasoline?

$$?km=47.0 L×\frac{1.06 qt}{1 L}×\frac{1 gal}{4 qt}×\frac{52 mi}{1 gal}×\frac{5280 ft}{1 mi}×\frac{12 in}{1 ft}×\frac{2.54 cm}{1 in}×\frac{1 m}{100 cm}×\frac{1 km}{1000 m}=1000 km$$

1. (5 points) The density of mercury is 13.6 g/mL. If a fish tank with a volume 3.00 ft3 were filled with mercury, calculate the mass (in lb) of mercury in the fish tank. (Would you be able to lift the tank?)

$$?lb=3.00 ft^{3}×\left(\frac{12 in}{1 ft}\right)^{3}×\left(\frac{2.54 cm}{1 in}\right)^{3}×\frac{1 mL}{1 cm^{3}}×\frac{13.6 g}{1 mL}×\frac{1 lb}{454 g}=2540 lb Hg $$