

Please read all the questions VERY carefully before answering. On scantron start from the same bubble number as the question number for your multiple choice question. Write neatly. If I cannot read your answer, you will not receive any point. Use the attached periodic table and constant chart. No outside paper is allowed. Total points = $38 + (24 \times 3) = 110$

SHORT ANSWER. In all calculations, write the set up equation first, then put the raw data with units. Then do your calculations. Points will be deducted if your answer is not clearly written.

- 1) Show calculations with units and sig. fig. to convert 16.32 gallon (gal) into milliliter (mL) (given 1 gal = 3.785 L and 1 L = 1000 mL). (6 pts.)

1) $6.177 \times 10^4 \text{ mL}$

$$16.32 \text{ gal} \frac{3.785 \text{ L}}{1 \text{ gal}} \frac{1000 \text{ mL}}{1 \text{ L}} = 61,771.2 \text{ mL}$$

- 2) Calculate (with units and sig. fig.) how many m^2 are in 2659 cm^2 (given $1 \text{ m} = 100 \text{ cm}$)? (6 pts.)

2) 0.2659 m^2

$$2659 \text{ cm}^2 \left(\frac{1 \text{ m}}{100 \text{ cm}} \right)^2 = 0.2659 \text{ m}^2$$

- 3) Calculate the volume of 12.8 g of a liquid that has a density of 0.789 g/mL. with correct numbers of significant figures (6 pts.)

3) 16.2 mL

$$d = \frac{m}{V}$$

$$V = \frac{m}{d}$$

$$\frac{12.8 \text{ g}}{0.789 \text{ g/mL}} = 16.223$$

$$V = \frac{12.8}{0.789} = 16.223$$

- 4) With a dosage requirement of 40.0 $\mu\text{g}/\text{kg}$ of body weight, show your calculation of how many milligrams of the medicine needs to be administered to a 80.0 lb patient? (Given 1 kg = 2.205 lb; 1 mg = 1000 μg) (6 pts.)

$$\frac{40.0 \mu\text{g}}{\text{kg}} \cdot \frac{1 \text{mg}}{1000 \mu\text{g}} = \frac{0.0400 \text{mg}}{\text{kg}} \cdot \frac{1 \text{kg}}{2.205 \text{lb}} = 0.0181 \text{mg/lb}$$

x 80 lb
= 1.4512

4) 1.45 mg

- 5) Suppose it took 108 joules of energy to raise a bar of gold from 25.0°C to 29.7°C. Given that the specific heat capacity of gold is 0.128 J/g·°C, what is the mass (in grams) of the bar of gold? Show all your calculations with set up equation and units and sig. fig.. Given $q = m \cdot C \cdot \Delta T$. (8 pts.)

$$108 \text{ J} = m (0.128) (4.7^\circ\text{C})$$

$$108 \text{ J} = m (0.6016)$$

2 sig figs

$$m = 179.521 \text{ g}$$

$$m = 180 \text{ g}$$

5) $1.8 \times 10^2 \text{ g}$

- 6) Density of a metal A is 1.7 g/cc and that of metal B is 7.9 g/cc. If a ball made from metal B has a mass of 409.5 grams, then what would be the mass of a ball, made from metal A. The balls have the same volume. (6 pts.)

A

$$d = \frac{m}{V} = \frac{1.7 \text{ g}}{\text{cm}^3}$$

B

$$d = \frac{m}{V} = \frac{7.9 \text{ g}}{\text{cm}^3} = \frac{(409.5)}{V}$$

$$\frac{m}{1.7 \text{ g/cm}^3} = V = \frac{409.5}{7.9 \text{ g/cm}^3}$$

$$\frac{m}{1.7} = 51.835$$

m = 88

6) 88g

$$d = \frac{m}{V}$$

$$V = \frac{m}{d}$$

