

Name KEY Rec. Instr. _____

Two-Digit Section No. _____ Lab. Instr. _____

1. [6 points] Circle each of processes below where a chemical change occurs.

An egg being fried

Alcohol being distilled

Snow melting

A Tree burning

A battery discharging

A piece of iron rusting

2. [4 points] How many significant figures are there in the following numbers?

101.1010 g/cm³ 74.03 × 10⁻¹ meters 30.0100 × 10⁵ parsecs 3

400.0 ounces 4

3. [10 points] A brand of cigarettes contains 0.015 g of tar per cigarette. If a person smokes 20 cigarettes each day, how many milligrams of tar are inhaled in 30 days? Give answer with correct number of significant figures.

$$\frac{0.015 \text{ g tar}}{\text{cigarette}} \left| \frac{20 \text{ cigarettes}}{\text{day}} \right| \frac{30 \text{ days}}{1} = \boxed{9.0 \text{ g tar}}$$

4. [10 points] How many grams of platinum are there in a bar of platinum 20.0 cm by 10.0 cm by 10.0 cm? The density of platinum 21.4 g/cm
- ³
- . Give answer with correct number of significant figures.

$$\frac{21.4 \text{ g}}{\text{cm}^3} \left| \frac{(20.0 \text{ cm})(10.0 \text{ cm})(10.0 \text{ cm})}{1} \right| = \boxed{4.28 \times 10^4 \text{ g}}$$

Name KEY Rec. Instr. _____

Two-Digit Section No. _____ Lab. Instr. _____

1. [2 points] Is wood a pure substance?

No

2. [8 points] How many significant figures are there in the following numbers?

0.4532 g/cm³ 41.0745 × 10⁻¹ meters 51.7450 × 10⁵ parsecs 5

1.7000 ounces 5

3. [6 points] Calculate the following to the correct number of significant figures.

$$(0.847 - 0.840) \times (42.8 + 1.75) = (0.007) \times (44.55) = 0.311850$$

↓
0.3

4. [7 points] 1.00 cubic millimeter of oil spread out on water forms a film which covers an area of 1.00 m
- ²
- . What is the thickness of the oil film in Å units? (Recall 1 Å = 10
- ⁻¹⁰
- m.) Give answer with correct number of significant figures.

$$\text{Volume} = \text{Area} \times \text{Thickness}$$

$$\text{Thickness} = \frac{\text{Volume}}{\text{Area}} = \frac{1.00 \text{ mm}^3}{1.00 \text{ m}^2} \left| \frac{(1 \text{ m})^3}{(10^3 \text{ mm})^3} \right| \left| \frac{1 \text{ Å}}{10^{-10} \text{ m}} \right| = \boxed{10.0 \text{ Å}}$$

5. [7 points] From the beginning of time to 1970 the world production of gold, density 19.3 g/mL, has been estimated to be approximately two billion (2.0 × 10
- ⁹
-) ounces, (one ounce is 28.349523 g). Assuming that all this gold is packed together in a cube, what would be the approximate length of a side of the cube in meters. Give answer with correct number of significant figures.

$$\frac{2.0 \times 10^9 \text{ ounces}}{\text{mass}} \left| \frac{28.349523 \text{ g}}{\text{ounce}} \right| \left| \frac{1 \text{ cm}^3}{19.3 \text{ g}} \right| = 2.937774 \times 10^9 \text{ cm}^3$$

$$\text{Volume of cube} = (\text{length of side})^3$$

$$\text{So length of side} = (2.937774 \times 10^9 \text{ cm}^3)^{1/3} = \boxed{1.4 \times 10^3 \text{ cm}}$$