

## Quiz 1.2 – Measurements and Numbers

Name: Key

## Question 1

Give the total number of significant figures and the position of the least significant digit in each quantity

$1.250\text{ g}$	$6.022 \times 10^{23}$	$0.00215\text{ L}$	$3500\text{ km}$	$2.590 \times 10^{-7}\text{ m}$
4, $10^{-3}$	4, $10^{-3}$ ( $10^{20}$ )	3, $10^{-5}$	2, $10^2$ ( $10^5$ )	4, $10^{-3}$ ( $10^{-10}$ )

## Question 2

Give the solution to each expression with the proper number of significant figures

$x = 23.14\text{ cm} + 4.105\text{ cm}$

$27.25\text{ cm}$

$x = \frac{0.12\text{ mol}}{1.53\text{ L}}$

$0.078 \frac{\text{mol}}{\text{L}}$

$x = 94\text{ }\mu\text{s} - 8.7 \times 10^{-5}\text{ s}$

$7 \cdot 10^{-6}\text{ s}$

$x = \frac{12.4\text{ g} + 1.94\text{ g}}{20.4\text{ cm}^3 - 3.47\text{ cm}^3}$

$\frac{14.34\text{ g}}{16.93\text{ cm}^3}$

$0.847 \frac{\text{g}}{\text{cm}^3}$

## Question 3

Later in this course we will use the following equation:  $v_{rms} = \sqrt{\frac{3RT}{M}}$ Find the units of  $v_{rms}$  if  $R$  has units  $\frac{\text{J}}{\text{mol K}}$ ,  $T$  has units  $\text{K}$ ,  $M$  has units  $\frac{\text{kg}}{\text{mol}}$ , and  $J \equiv \frac{\text{kg m}^2}{\text{s}^2}$ 

$$\sqrt{\frac{\frac{\text{kg m}^2}{\text{s}^2 \cdot \text{mol} \cdot \text{K}} \cdot \text{K}}{\frac{\text{kg}}{\text{mol}}}} = \sqrt{\frac{\text{m}^2}{\text{s}^2}} = \frac{\text{m}}{\text{s}}$$

## Question 4

Convert the  $80.0 \frac{\text{miles}}{\text{h}}$  to units of  $\text{m/s}$ 

$$\frac{80\text{ miles}}{\text{h}} \cdot \frac{1\text{ h}}{60\text{ min}} \cdot \frac{1\text{ min}}{60\text{ s}} \cdot \frac{1.609\text{ km}}{1\text{ mile}} \cdot \frac{1000\text{ m}}{1\text{ km}} = 35.8 \frac{\text{m}}{\text{s}}$$

## Question 5

Light travels at a speed of  $2.998 \times 10^8\text{ m/s}$ 

- How many  $\text{s}$  does it take for light to travel from the surface of the earth to the moon and back (478,000 miles)?

$$\frac{478,000\text{ miles}}{1\text{ mile}} \cdot \frac{1.609\text{ km}}{1\text{ km}} \cdot \frac{1000\text{ m}}{1\text{ km}} \cdot \frac{1\text{ s}}{2.998 \cdot 10^8\text{ m}} = 2.57\text{ s}$$

- How far does light travel in one minute?

$$\frac{1\text{ min}}{1\text{ min}} \cdot \frac{60\text{ s}}{1\text{ s}} \cdot 2.998 \cdot 10^8\text{ m} = 1.799 \cdot 10^{10}\text{ m}$$