

Question 1

(A) $1 \text{ ML} = 1000000 \text{ L}$
 $? = 52.1 \times 10^{-6} \text{ L}$

$$\frac{52.1 \times 10^{-6}}{1000000} \times 1 = 52.1 \times 10^{-12} \text{ L} = 52.10 \text{ pL}$$

(B) 87.2 mi/s^2

$$1 \text{ hr} = 3600 \text{ s}$$

$$1 \text{ hr}^2 = 12960000 \text{ s}^2 \Rightarrow 1 \text{ s}^2 = \frac{1}{12960000} \text{ hr}^2$$

$$87.2 \text{ mile} = 140.3348 \text{ km}$$

$$\text{Therefore } 87.2 \text{ mi/s}^2 = 140.3348 \times \frac{1}{12960000} = 1.8187 \text{ km/hr}^2$$

$$= 1.82 \text{ km/hr}^2$$

(C) $443.5 \text{ K to } ^\circ\text{F}$

$$443.5 \text{ K in degrees} = 443.5 - 273.15 = 170.35^\circ\text{C} = 170.4^\circ\text{C}$$

$$\text{in Fahrenheit} = \frac{9}{5}^\circ\text{C} + 32$$

$$^\circ\text{F} = \frac{9}{5} + 170.35 + 32 = 338.63 = 339^\circ\text{F}$$

2. a) volume = $(0.6212 \times 1000) \text{ cm}^3 = 621.2 \text{ cm}^3$

$$\rho = 10.49 \text{ g/cm}^3$$

$$\text{mass} = \rho \times \text{volume} = 10.49 \times 621.2 = 6515 \text{ g}$$

$$\text{Crown Worth} = \text{mass} \times \text{price per mass}$$

$$= 6515 \text{ g} \times \frac{720.11}{1000} = \$4691$$

3. a) Mass number = $(73 + 108) = \text{protons} + \text{neutrons} = 181$

Element with atomic no. 73 is Tantalum, Ta

$$\text{Nuclear symbol} = {}^{181}_{73}\text{Ta}$$

b) $n=3, l=2, m_l=-1, m_s=+\frac{1}{2}$

yes because l takes values from 0 to $n-1$ therefore l is valid

m_l takes values from $-l$ to l , m_l being -1 is acceptable.

m_s can take values of either $+\frac{1}{2}$ or $-\frac{1}{2}$

4. $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2 4p^6 4d^1 (4f^1)$

a) No

b) This is not correct. The correct one should be

$$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6 6s^1$$

d) Yes, the outermost energy level had one electron and the rest were paired up just as in the correct configuration only that the number of electrons was less