Ch1 #1

Q.1 $500\ ft^2/gal$

$1\ ft = 30.48\ cm = 0.3048\ m \Rightarrow \boxed{1\ ft^2 = 0.093\ m^2}$

$\Rightarrow \boxed{1\ gal = 3.78\ \ell}$

$$\Rightarrow 500\ \frac{ft^2}{gal} = 500\ \frac{ft^2}{gal} \times 1 \times 1$$

$$= 500\ \frac{ft^2}{gal} \times \frac{0.093\ m^2}{ft^2} \times \frac{gal}{3.78\ \ell}$$

$$500\ ft^2/gal. = 12.3\ \frac{m^2}{liter}$$

Q.2 330 m/s :

1 mile = 1609 m

1 hour = 3600 s

$$330\ \frac{m}{s} = 330 \times 1 \times 1$$

$$= 330\ \frac{m}{s} \times \frac{1\ mile}{1609\ m} \times \frac{3600\ s}{1\ hr}$$

$$330\ m/s = 738\ \frac{mile}{hr}$$

Q.3 $R = 10\ fm = 10 \times 10^{-15}\ m$

$$Volume = \frac{4}{3}\pi R^3 = \frac{4}{3} \times 3.14 \times (10 \times 10^{-15})^3 = 4.2 \times 10^{-42}\ m^3$$

$$mass = 15u = 15 \times 1.66 \times 10^{-27}\ kg = 2.5 \times 10^{-26}\ kg$$

$$Density = \frac{m}{V} = \frac{2.5 \times 10^{-26}\ kg}{4.2 \times 10^{-42}\ m^3} = 5.9 \times 10^{15}\ \frac{kg}{m^3}$$

Cont → Ch1

Cont CH#1

Q.4 $340 \frac{m}{s}$:

$1\ ns = 10^{-9}\ s$, $1\ mm = 10^{-3}\ m$

$\Rightarrow 340 \frac{m}{s} \times 1 \times 1 = 340 \frac{m}{s} \times \frac{mm}{10^{-3} m} \times \frac{10^{-9} s}{ns}$

$340\ m/s = 3.4 \times 10^{-4}\ mm/ns$

Q.5 Volume $= (\pi r^2)(h)$

$h = 39\ mm = 39\ mm \times \frac{cm}{10\ mm} = 3.9\ cm$

$r = 19.5\ mm = 19.5\ mm \times \frac{cm}{10\ mm} = 1.95\ cm$

$V = (3.14)(1.95)^2(3.9) = 46.5\ cm^3$

$m = 1\ kg = 10^3\ g$

$\therefore$ Density $= \frac{m}{V} = \frac{10^3\ g}{46.5\ cm^3} = 21.5\ g/cm^3$

Q.6 $V = at^2 + bt^3$

$\frac{m}{s} = a(s^2) + b(s^3)$

$\Rightarrow \frac{m}{s} = as^2$ and $\frac{m}{s} = b(s^3)$

$\Rightarrow a = m/s^3$ $\Rightarrow b = m/s^4$

Cont ch1 →

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Q.7 $A = BC$

$$\frac{L}{M} = B\frac{L}{T}$$

$$\Rightarrow B = \frac{T}{M}$$

Q.8 $A = B^n C^m$

$$\therefore LT = \left(\frac{L^2}{T}\right)^n (LT^2)^m$$

$$L^1 T^1 = L^{2n} T^{-n} L^m T^{2m} = L^{2n+m} T^{2m-n}$$

$\Rightarrow$ ~~E~~ Power $1 = 2n + m$ ①

$1 = 2m - n$ ②

from ① $m = 1 - 2n$ sub into ②

$1 = 2(1-2n) - n \Rightarrow 1 = 2 - 4n - n$

$1 - 2 = -5n \Rightarrow \left(n = \frac{1}{5}\right)$ sub ①

$$1 = 2\left(\frac{1}{5}\right) + m \Rightarrow 1 - \frac{2}{5} = m$$

$$\left(m = \frac{3}{5}\right)$$