

P. 182

1.

Factor	Name	Symbol
10	deca	da
10^{-15}	femto	f
10^{-3}	milli	m
10^9	giga	G
10^{-1}	deci	d

2.

Information	SI base unit
Unit based on a property of the cesium ^{133}Cs atom	s
Unit defined in relation a distance covered by light	m
Only unit defined in relation to a material standard	kg
Unit that has been modified four times since 1889	m
Most precisely known SI unit	s

3.

Force	Vector
Mass	Scalar
Velocity	Vector
Acceleration	Vector
Energy	Scalar

4.

$$p = mv$$

mass · velocity will have a magnitude and direction w/ units of $\text{kg} \cdot \text{m/s}$. So it is a vector

5. Unit of momentum $\text{kg} \cdot \text{m/s}$

6.

$$F = G \frac{m_1 m_2}{r^2}$$

$$\text{Force } F = \text{kg} \cdot \text{m/s}^2 \quad \frac{m_1 m_2}{r^2} = \frac{\text{kg}^2}{\text{m}^2}$$

$$G = \frac{F \cdot r^2}{m_1 \cdot m_2} = \frac{\text{kg} \cdot \text{m}}{\text{s}^2} \cdot \frac{\text{m}^2}{\text{kg}^2}$$

$$G : \frac{\text{m}^3}{\text{kg} \cdot \text{s}^2}$$

7. mass, $m = 1 \text{ kg}$ volume: $V = (\pi r^2) h$

$$d = h = 39 \times 10^{-3} \text{ m}$$

$$V = \pi \left(\frac{39 \times 10^{-3} \text{ m}}{2} \right)^2 (39 \times 10^{-3} \text{ m}) = 4.7 \times 10^{-5} \text{ m}^3$$

$$\text{density: } \rho = \frac{\text{kg}}{4.7 \times 10^{-5} \text{ m}^3} = 2.1 \times 10^4 \text{ kg/m}^3$$

$$\rho = 2.1 \times 10^4 \frac{\text{kg}}{\text{m}^3} \left(\frac{1 \text{ m}}{100 \text{ cm}} \right)^3 \left(\frac{1000 \text{ g}}{\text{kg}} \right)$$

$$\rho = 2.1 \times 10 \text{ g/cm}^3 = 21 \text{ g/cm}^3$$

8. $E = \text{kg} \cdot \text{m}^2/\text{s}^2$ $P = \text{kg} \cdot \text{m}^2/\text{s}^3$

$$E = \text{Power} \cdot \text{time} = P \cdot t \quad \left(\frac{\text{kg} \cdot \text{m}^2}{\text{s}^3} \right) (\text{s}) = \frac{\text{kg} \cdot \text{m}^2}{\text{s}^2}$$