

1-2

$$4.70 \frac{\text{slug}}{\text{ft}^3} \rightarrow \text{SI} = \frac{\text{kg}}{\text{m}^3}$$

$$4.70 \frac{\text{slug}}{\text{ft}^3} \times \frac{\text{ft}^3}{0.3048 \text{ m}^3} \times \frac{14.5938 \text{ kg}}{\text{slug}} = 225 \frac{\text{kg}}{\text{m}^3}$$

1-10

$$a) W = 10 \text{ kg} \left(9.81 \frac{\text{m}}{\text{s}^2} \right) = 98.1 \text{ N}$$

$$b) W = 0.5 \text{ g} \left(\frac{10^{-3} \text{ kg}}{\text{g}} \right) \left(9.81 \frac{\text{m}}{\text{s}^2} \right) = 4.905 \text{ N}$$

expressed to 3 sig figs: 4.91 mN

$$c) W = (4.5 \text{ Mg}) \left(\frac{10^3 \text{ kg}}{\text{Mg}} \right) \left(9.81 \frac{\text{m}}{\text{s}^2} \right) = 44145 \text{ N}$$

expressed to 3 sig figs = 44.1 kN

1-11

$$40 \text{ slug/s} \left(\frac{14.5938 \text{ kg}}{\text{slug}} \right) = 584 \text{ kg}$$

1-13

$$\text{find volume first: } \pi r^2 h = \pi \left(\frac{350 \text{ mm}}{2} \right)^2 (2 \text{ m})$$

$$\pi \left(\frac{0.35 \text{ m}}{2} \right)^2 (2 \text{ m}) = 0.192325 \text{ m}^3$$

$$\text{find mass } \Rightarrow m = \text{density (volume)} = \left(\frac{\text{mass}}{\text{volume}} \right) (\text{volume})$$

$$\text{mass} = \left(2.45 \frac{\text{Mg}}{\text{m}^3} \right) (0.192325 \text{ m}^3) \left(\frac{10^3 \text{ kg}}{\text{Mg}} \right) = 471.196 \text{ kg}$$

$$W = mg = 471.196 \text{ kg} \left(9.81 \frac{\text{m}}{\text{s}^2} \right) = 4622.435 \text{ N}$$

$$\text{change to pounds: } 4622.435 \text{ N} \left(\frac{\text{lb}}{4.4482 \text{ N}} \right) = 1039.17 \text{ lb}$$

$$\text{change to 3 sig figs } \boxed{1.04 \text{ kip}} \Rightarrow \text{kip} = 1,000 \text{ lb}$$