Q6 Jan 2004

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(a) $\quad$ density $= \dfrac{\text{mass}}{\text{volume}}$ ✓

(b)(i) $\quad$ volume of copper $= \dfrac{70}{100} \times 0.8 \times 10^{-3}$ ✓ $\quad (= 0.56 \times 10^{-3}\,\text{m}^3)$

$$\text{(volume of zinc} = 0.24 \times 10^{-3}\,\text{m}^3)$$

$$m_c \ (= \rho_c V_c) = 8.9 \times 10^3 \times 0.56 \times 10^{-3} = 5.0\,\text{kg} \ \checkmark \quad (4.98\,\text{kg})$$

$$m_z = \dfrac{30}{100} \times 0.8 \times 10^{-3} \times 7.1 \times 10^3 = 1.7\,(\text{kg}) \ \checkmark$$

$$\text{(allow C.E. for incorrect volumes)}$$

(ii) $\quad m_b \ (= 5.0 + 1.7) = 6.7\,(\text{kg})$ ✓

$\qquad$ (allow C.E. for values of m_c and m_z)

$$\rho_b = \dfrac{6.7}{0.8 \times 10^{-3}} = 8.4 \times 10^3 \,\text{kg m}^{-3} \ \checkmark$$

$\qquad$ (allow C.E. for value of m_b)

$[$or $\rho_b = (0.7 \times 8900) + (0.3 \times 7100)$ ✓ $= 8.4 \times 10^3 \,\text{kg m}^{-3}$ ✓$]$ $\qquad$ max(4)

(5)