

2005  
9.9

Alloy	Iron	Al
$m = 0.441 \text{ kg}$	$S = 8$	$S = 2.7$
$V = 75 \text{ cm}^3$ $75 \times 10^{-6}$	$\rho = 8000$	$\rho = 2700$
$\rho = \frac{m}{V}$	$V = x$	$V = 75 - x$

$$= \frac{0.441}{75 \times 10^{-6}}$$
$$= 5880$$

$$\rho = \frac{m}{V} \quad m = \rho V$$

$$i) \rho_{\text{mixture}} = \frac{M_{\text{mix}}}{V_{\text{mix}}}$$

$$5880 = \frac{8000x + 2700(75 \times 10^{-6} - x)}{75 \times 10^{-6}}$$

$$0.441 = 8000x + 0.2025 - 2700x$$

$$0.2385 = 5300x$$

$$45 \times 10^{-6} = x$$

$$\boxed{V_{\text{iron}} = 45 \text{ cm}^3}$$

$$ii) m_{\text{Al}} = \rho V$$

$$= 2700 (75 \times 10^{-6} - 45 \times 10^{-6})$$

$$= 0.081 \text{ kg}$$

2006  
9.a.

Acid  
 $V = 16 \text{ cm}^3$   
 $S = 1.8$   
 $\rho = 1800$

H<sub>2</sub>O  
 $V = 7 \text{ cm}^3$   
 $\rho = 1000$

Alloy  
 $V = 22.35 \text{ cm}^3$   
 $S =$   
 $\rho =$

i)  $16 + 7 = 23 \text{ cm}^3$   
 $- 22.35 \text{ cm}^3$   

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 $0.65 \text{ cm}^3$  contraction

$$\rho = \frac{m}{V}$$

ii)  $\rho_{\text{mixture}} = \frac{m_{\text{acid}} + m_{\text{H}_2\text{O}}}{V_{\text{acid}} + V_{\text{H}_2\text{O}} + V_{\text{total}}}$  =  $\frac{(1800)(16 \times 10^{-6}) + (1000)(7 \times 10^{-6})}{22.35 \times 10^{-6}}$

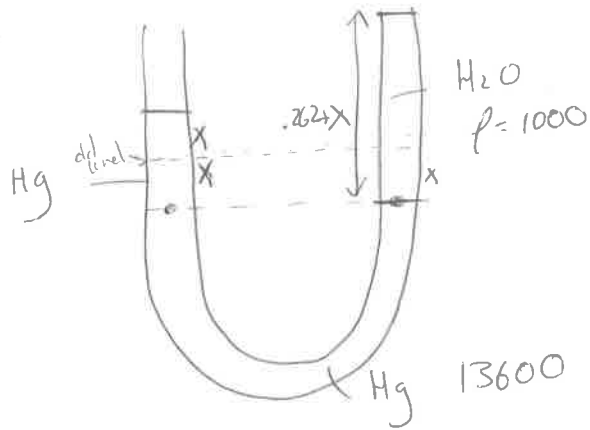
$$\rho = 1601.7897$$

$$S = 1.6$$

2007

A

U-tube



$$(13600)(g)(2x) = 1000(g)(.262 + x)$$

$$27200x = 262 + 1000x$$

$$26200x = 262$$

$$x = 0.01 \text{ m}$$

$$= 1 \text{ cm}$$

$$h_{\text{H}_2\text{O}} = 26.2 \text{ cm} + 1 \text{ cm} = 27.2 \text{ cm}$$