

Question #10 (16)

at equilibrium temperature

$$\text{Heat Lost} = \text{Heat Gained}$$

$$\text{i.e. } Q_{\text{lost}} = Q_{\text{gained}}$$

$$Q = mc\Delta\theta, \text{ where } m \Rightarrow \text{mass}$$

$c \Rightarrow$ specific heat capacity

$\Delta\theta \Rightarrow$ Change in Temperature

$$C_{\text{water}} = 4200 \text{ J/kg/}^\circ\text{C}$$

$$C_{\text{copper}} = 385 \text{ J/kg/}^\circ\text{C}$$

Heat lost by ~~water~~ copper = Heat gained by water

$$Q = 200 \times 385 \times (100 - T_f) = 450 \times 4200 \times (T_f - 24)$$

$$= 7700000 - 77000T_f = 1890000T_f - 45360000$$

$$= 7700000 + 45360000 = (1890000 + 77000)T_f$$

$$\therefore T_f = \frac{50130000}{1967000}$$

$$T_f = 25.49^\circ\text{C}$$

$T_f \Rightarrow$ final temperature.