

Resolution

①/1

a)

$$\left. \begin{aligned} dV/dT &= 5.88 \mu V/^{\circ}C \\ \text{resolution} &: \Delta T = \frac{\Delta V}{dV/dT} \\ \Delta V &= \frac{5V}{2^{12}-1} = 1.22 \text{ mV} \end{aligned} \right\} \Delta T = 208^{\circ}C$$

b)

$$\begin{aligned} 0^{\circ} &\rightarrow T_{\text{dif}} = 0^{\circ}C - 20^{\circ}C = -20^{\circ}C \\ &\rightarrow V = -20^{\circ}C \times 5.88 \mu V/^{\circ}C = -117.6 \mu V \\ 40^{\circ} &\rightarrow T_{\text{dif}} = 40^{\circ}C - 20^{\circ}C = +20^{\circ}C \\ &\rightarrow V = +117.6 \mu V \end{aligned}$$

$$+117.6 \mu V \longrightarrow +5$$

$$-117.6 \mu V \longrightarrow 0$$

$$A = \frac{5V}{2 \times 117.6 \mu V} = 21259 \times$$

offset 117.6 μV

$$\rightarrow \text{resolution : final : } \Delta T = \frac{40^{\circ}C}{2^{12}-1} = 9.8 \cdot 10^{-3}^{\circ}C$$

(obviously 21259 times better)