

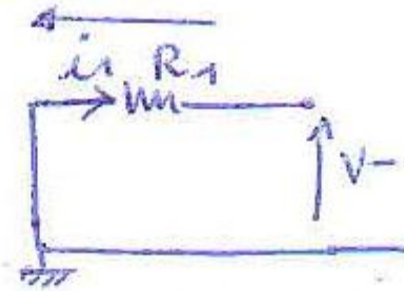
Solution: capteur d'éclairement

1- a/ on a $i_1 = i_2$ car $i^- = 0$

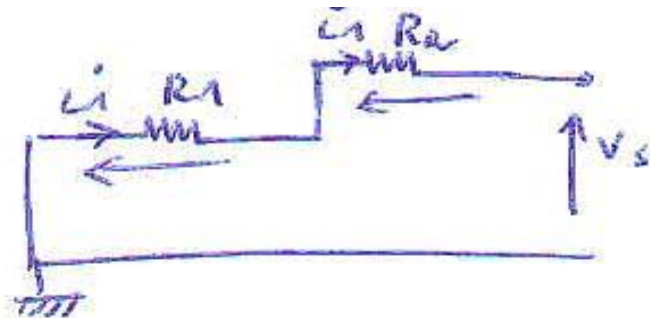
b/ on a $v_e = v_f = v^-$

et $v^- + R_1 i_1 = 0$

$$\Rightarrow v_e = -R_1 i_1$$



c/



$$v_s + R_2 i_1 + R_1 i_1 = 0 \Rightarrow v_s = -(R_1 + R_2) i_1$$

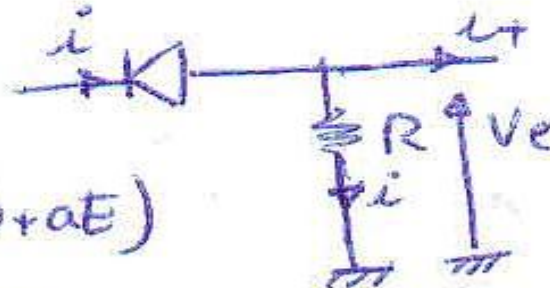
$$d/ T = \frac{v_s}{v_e} = \frac{R_1 + R_2}{R_1} = 1 + \frac{R_2}{R_1}$$

$$e/ T = 50 \Rightarrow \frac{R_2}{R_1} = 49$$

2/ a/ $v_e = R i$

$$= R(I_0 + \alpha E)$$

$$b/ v_s = T \cdot v_e = RT(I_0 + \alpha E)$$



$$c/ v_s = RT I_0 + RT \alpha E$$

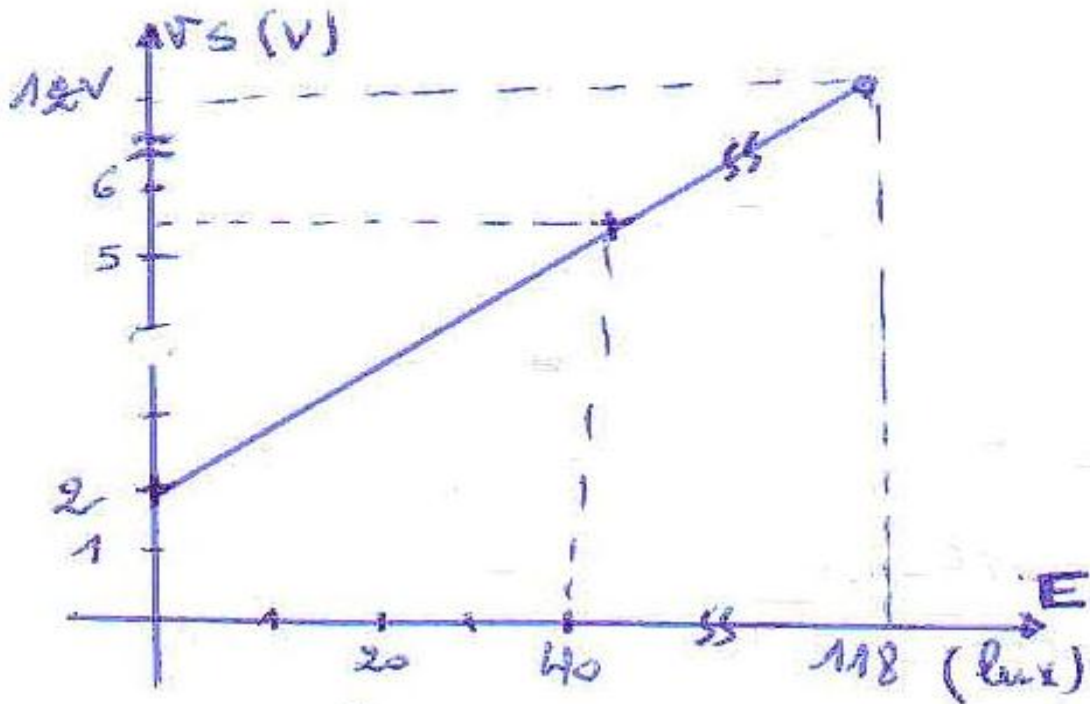
$$= V_{s0} + K E$$

$$V_{s0} = RT I_0 = 10 \cdot 10^3 \cdot 50 \cdot 4 \cdot 10^{-6} = 2V$$

$$K = RT \alpha = 10 \cdot 10^3 \cdot 50 \cdot 0,17 \cdot 10^{-6}$$

$$= 85 \text{ mV/lux}$$

d/



$$E = 0 \text{ lux} \Rightarrow V_S = V_{S0} = 2V$$

$$E = 40 \text{ lux} \Rightarrow V_S = 2 + 40 \cdot 85 \cdot 10^{-3} = 5,4V$$

$$E = 118 \text{ lux} \Rightarrow V_S = 2 + 85 \cdot 10^{-3} \cdot 118 \approx 12V$$

e/ on trouve $E \approx 70,6 \text{ lux}$