

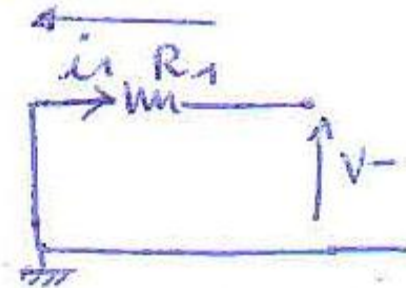
**Solution: capteur d'éclairement**

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

b/ on a  $v_e = v_+ = v_-$

et  $v_- + R_1 i_1 = 0$

$\Rightarrow v_e = -R_1 i_1$



c/



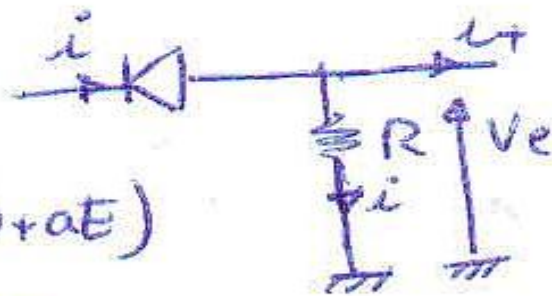
$v_s + R_2 i_2 + R_1 i_1 = 0 \Rightarrow v_s = -(R_1 + R_2) i_1$

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/  $v_e = R i$

$= R(I_0 + \alpha E)$



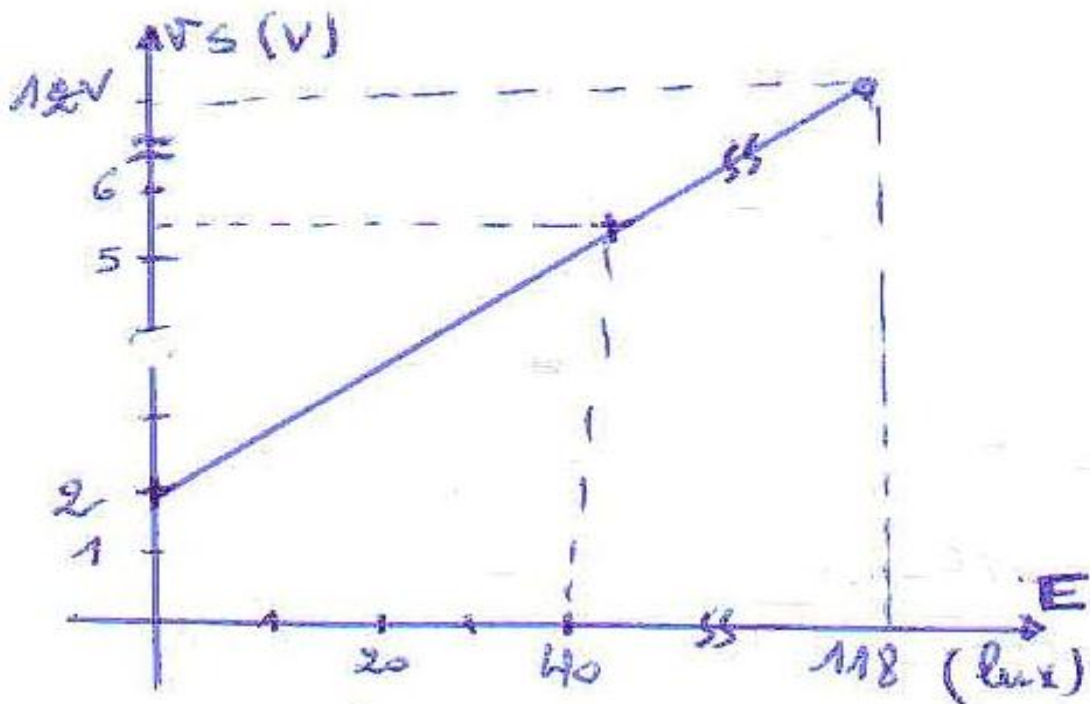
b/  $v_s = T \cdot v_e = RT(I_0 + \alpha E)$

c/  $v_s = RT I_0 + RT \alpha E$   
 $= V_{s0} + KE$

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

$K = RT \alpha = 10 \cdot 10^3 \cdot 50 \cdot 0,17 \cdot 10^{-6}$   
 $= \underline{85 \text{ mV/lux}}$

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  $E \approx 70,6 \text{ lux}$