



ELEKTRONIKA ANALOG

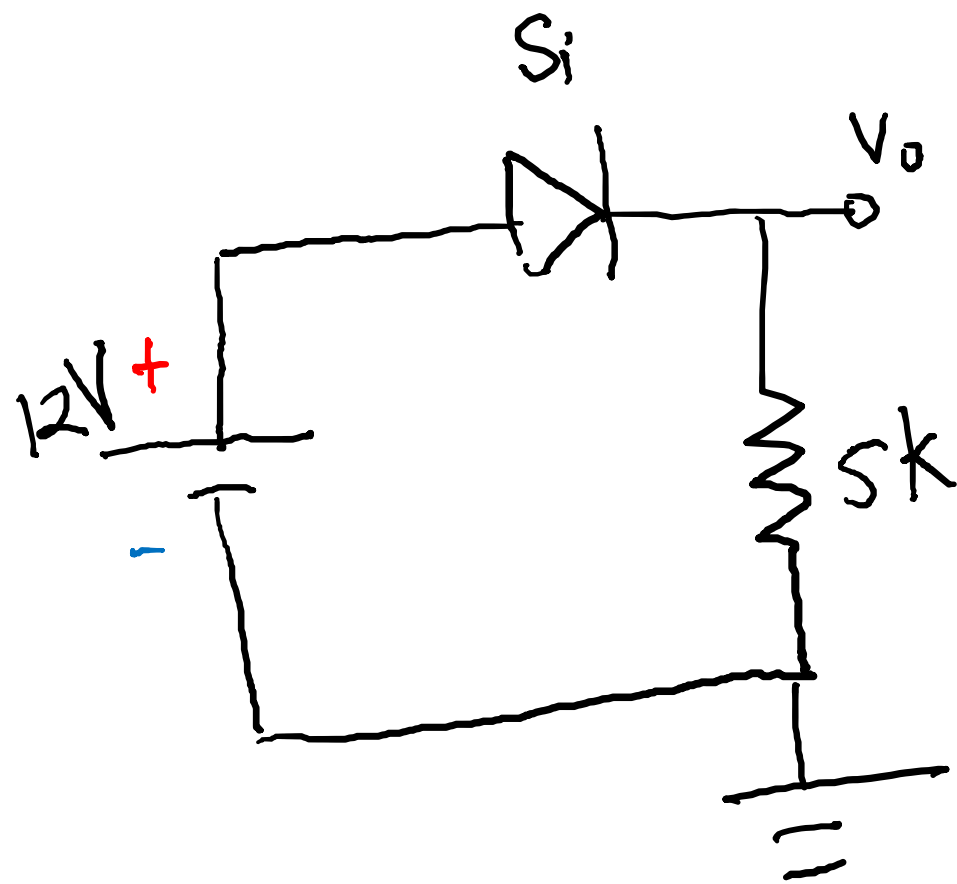
Pertemuan 7 – Review



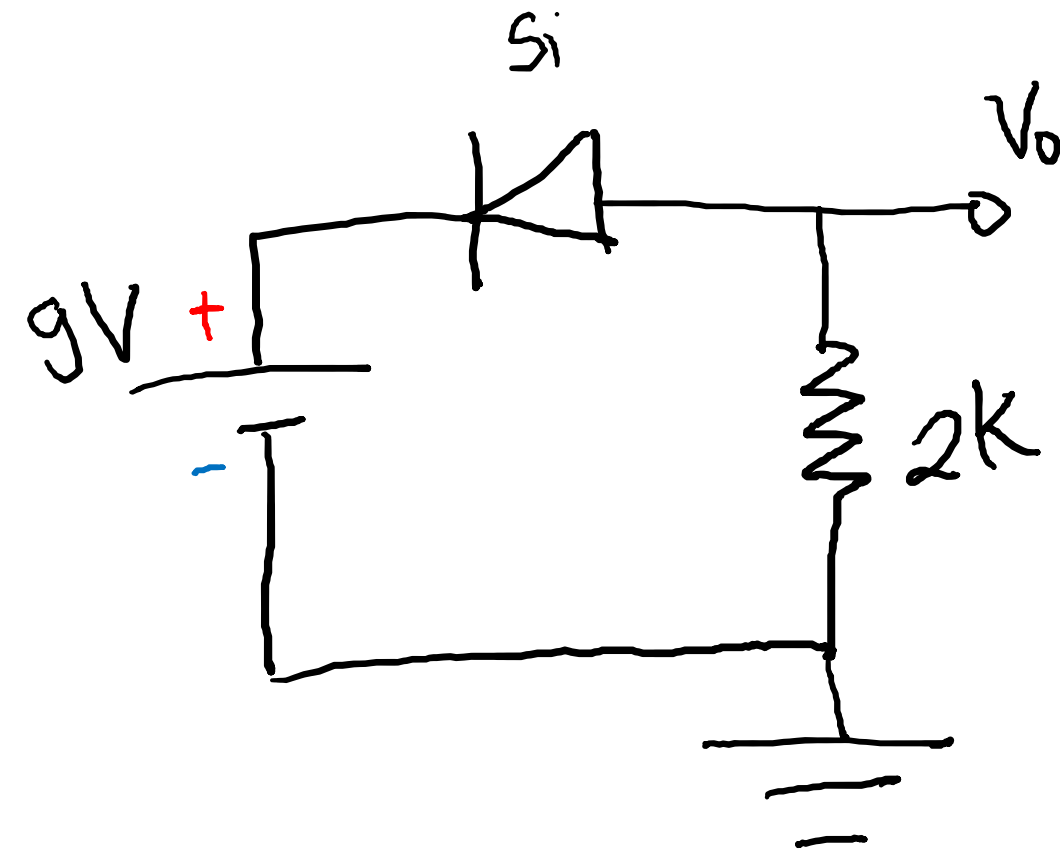
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TUGAS DIODA

1. Hitung I_{R1} dan I_{R2} berikut! (Dioda Silikon = 0,7 V)

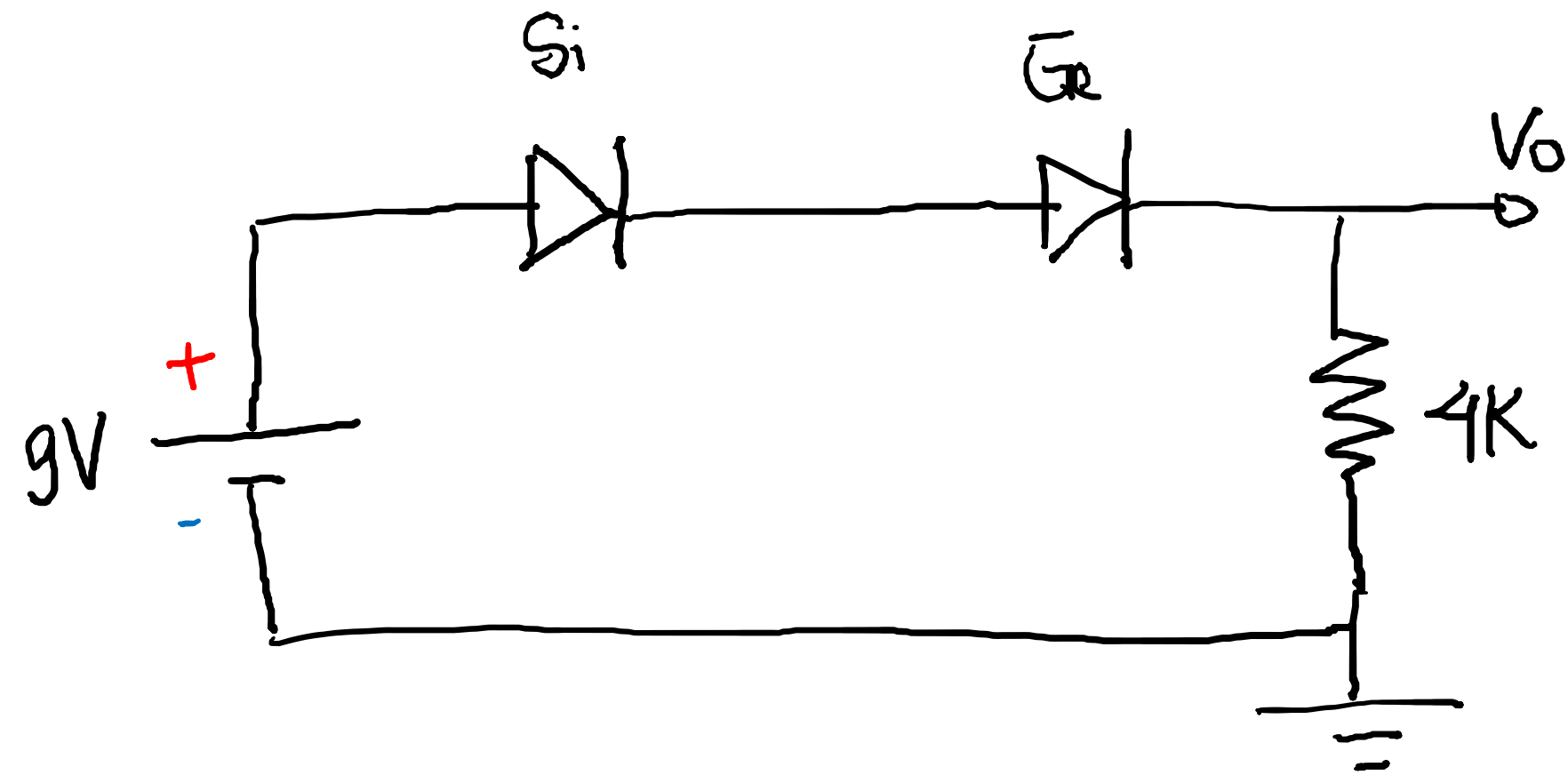


Rangkaian 1



Rangkaian 2

TUGAS DIODA

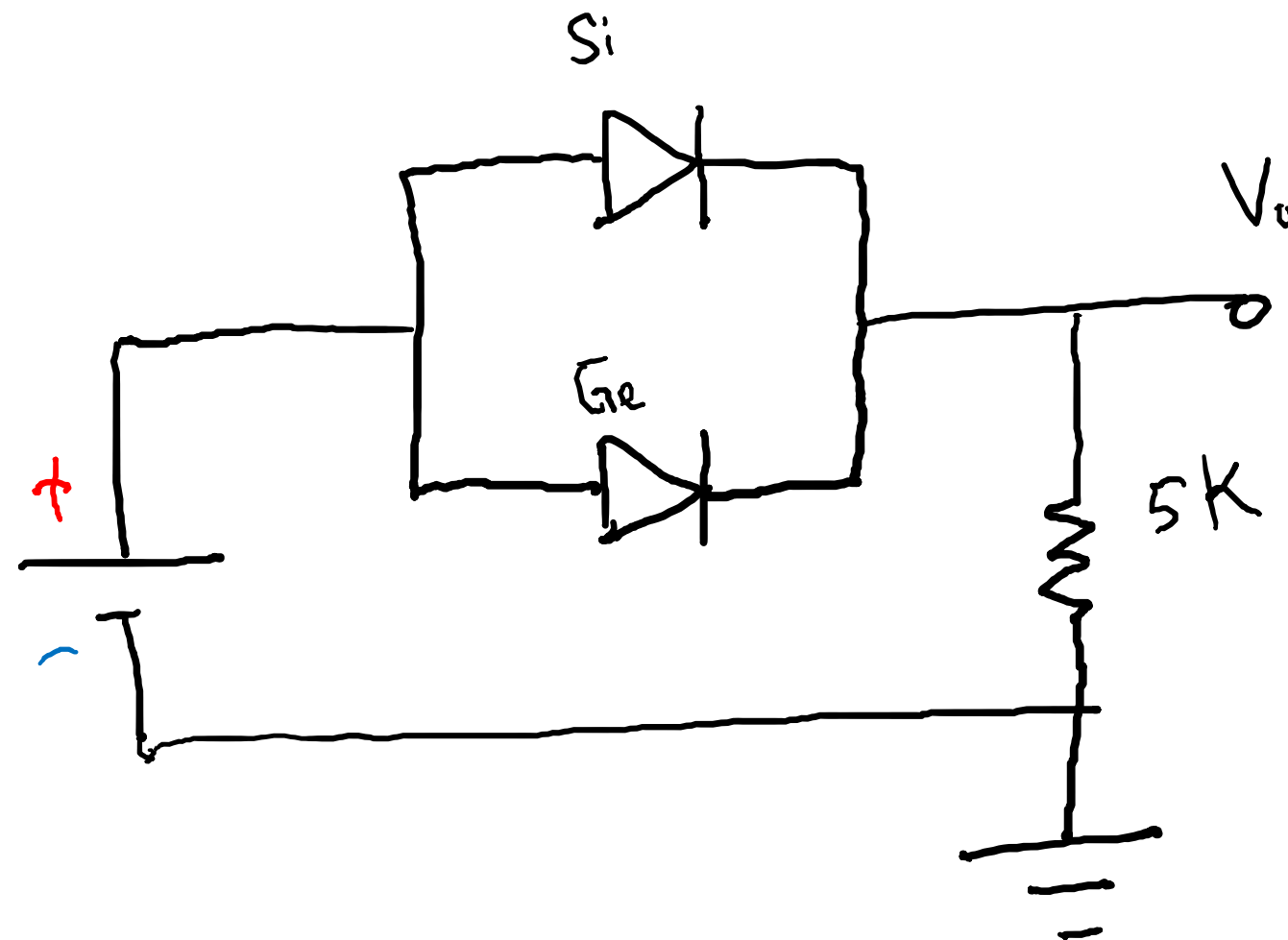


2. Apabila diketahui nilai tegangan dioda silikon adalah 0,7 v dan dioda germanium adalah 0,3 v. Tentukan:

- Kondisi dioda silikon? (ON/OFF)
- Kondisi dioda germanium? (ON/OFF)
- I_R

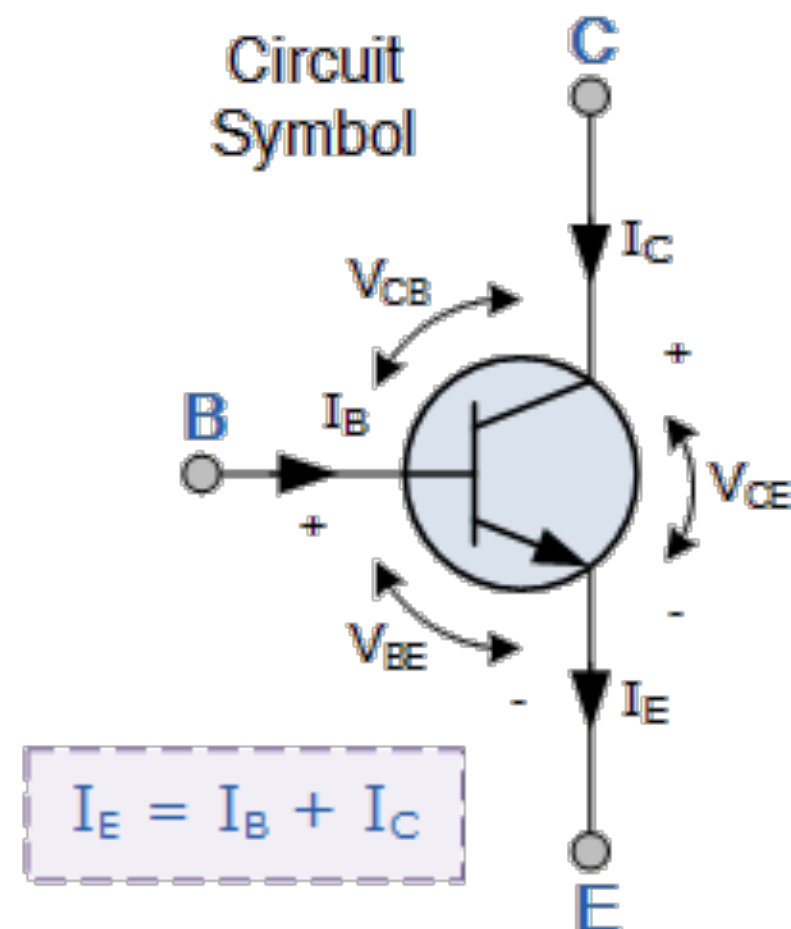
TUGAS DIODA

3. Apabila rangkaian di bawah dialiri sumber tegangan sebesar **digit terakhir NIM** kalian, maka hitung arus yang mengalir pada resistor tersebut!



Transistor: NPN

NPN



$$I_C = \beta \cdot I_B$$

$$\beta = h_{fe}$$

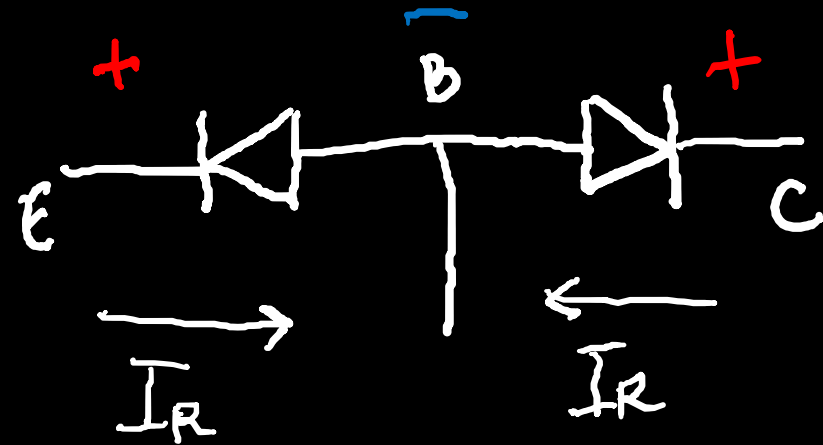
$$I_E = I_C + I_B$$

$$I_E = \beta \cdot I_B + I_B$$

$$I_E = I_B (\beta + 1)$$

Transistor: Region

CUTOFF



$$\Rightarrow V_B < V_E ; V_B < 0,6V$$

Maka, berlaku reverse biased pada E-B junction

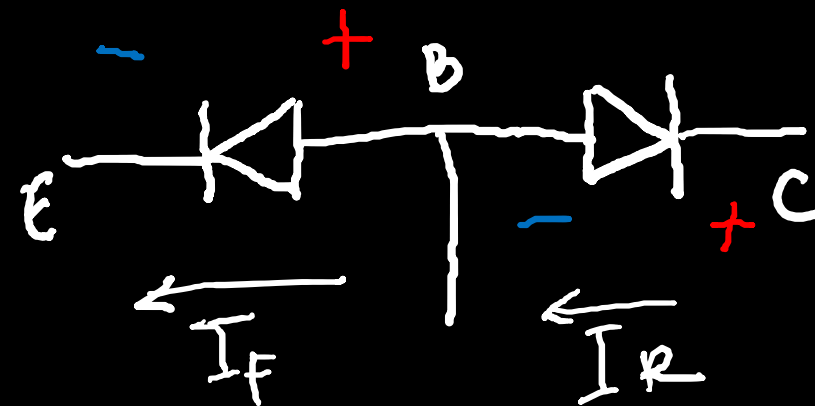
$$\Rightarrow V_B < V_C ; V_{CE} = V_{CC}$$

Maka, berlaku reverse biased pada C-B junction

$$\Rightarrow I_C \approx 0A$$

Transistor OFF -> OPEN SWITCH

ACTIVE



$$\Rightarrow V_{BE} \geq 0,6V$$

Maka, berlaku forward biased pada E-B junction

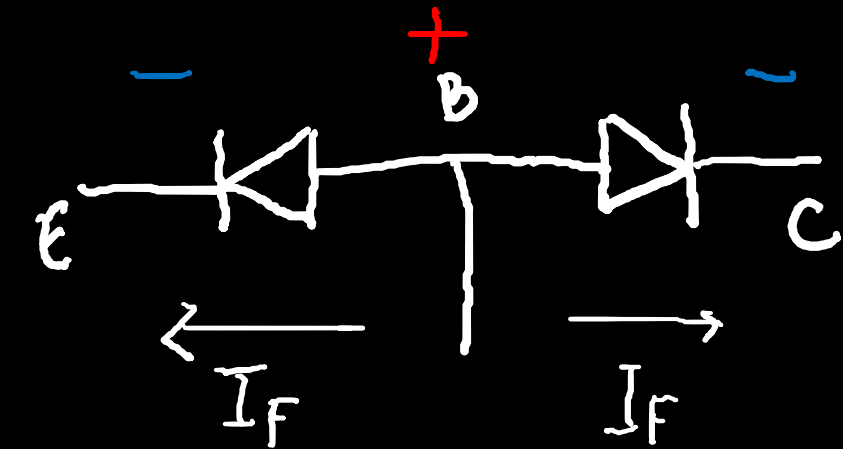
$$\Rightarrow V_B < V_C ; 0 < V_{CE} < V_{CC}$$

Maka, berlaku reverse biased pada C-B junction

$$\Rightarrow 0 < I_C < I_{sat} ; I_C = \beta \cdot I_B$$

Transistor = Amplifier

SATURATION



$$\Rightarrow V_{BE} \geq 0,6V$$

Maka, berlaku forward biased pada E-B junction

$$\Rightarrow V_{CE} \approx 0V$$

Maka, berlaku forward biased pada C-B junction

$$\Rightarrow I_C \approx I_{C(sat)}$$

$$\hookrightarrow I_{C(sat)} = \frac{\Delta V}{\Sigma R} = \frac{V_{CC} - V_D}{R_C}$$

Transistor ON -> CLOSED SWITCH

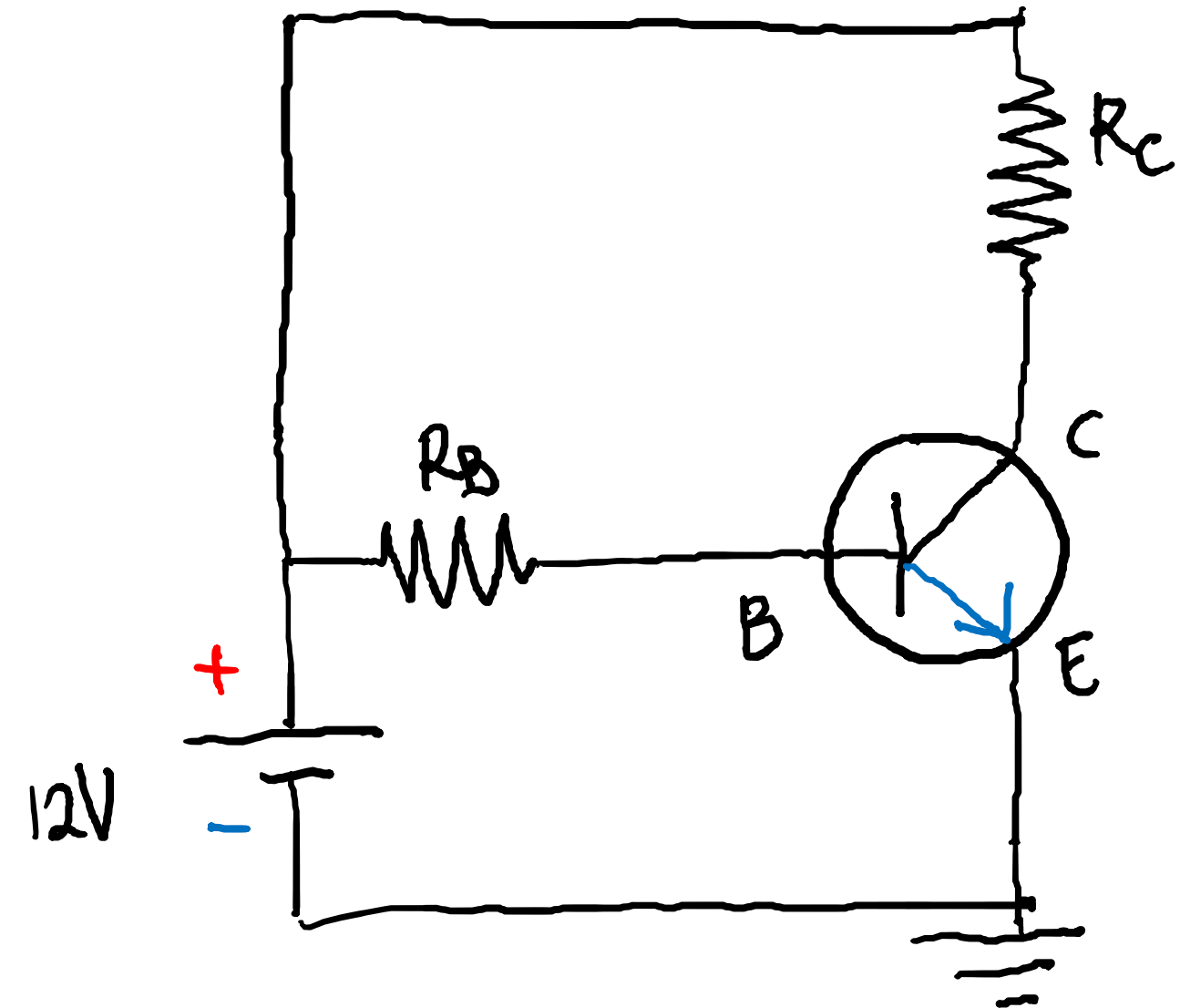
Transistor: Soal

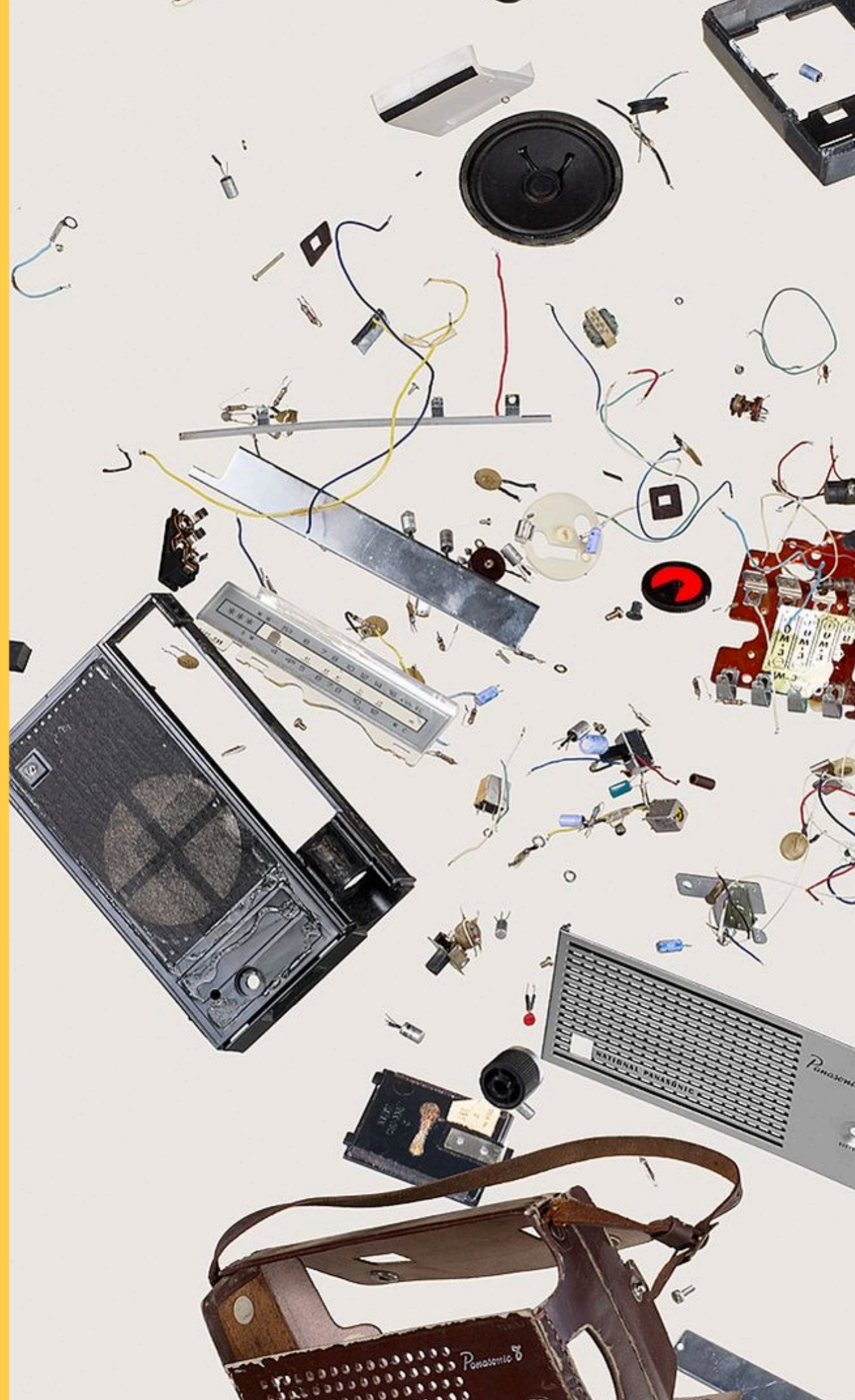
Berdasarkan rangkaian di samping, diketahui:

- Sumber $V_{CC}=12\text{ V}$
- Resistor kolektor $R_C=1,0\text{ k}\Omega$
- Resistor basis $R_B=100\text{ k}\Omega$ dihubungkan dari V_{CC} ke basis.
- Emitor langsung ke ground.
- Transistor memiliki $\beta=100$
- Gunakan $V_{BE}(\text{on})=0,7\text{ V}$ dan anggap $V_{CE}(\text{sat})=0,2\text{ V}$

Tentukan:

- Arus basis (I_B)
- Apabila diasumsikan transistor berada di active region, tentukan arus kolektor (I_C)
- Apabila diasumsikan transistor berada di saturation region, tentukan arus kolektor (I_C) dengan $V_{CE} = 0,2\text{ V}$
- Dengan Membandingkan jawaban pada (b) dan (c), tentukan region operasi transistor (cutoff / active / saturation).





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