

Prelab – Experiment 8 Transistor Characteristics

Read the Experiment 8 instructions thoroughly and then answer the following questions:

1 Question 1

Using a BJT, V_{CE} is kept constant at 8 V while setting the base current first to $I_B = 8.00 \pm 0.01 \mu\text{A}$ and then to $I_B = 10.00 \pm 0.01 \mu\text{A}$. For these two cases, other values measured are $I_E = 1.6 \pm 0.1 \text{ mA}$ and $I_E = 2.0 \pm 0.1 \text{ mA}$, and $V_{BE} = 600.0 \pm 0.1 \text{ mV}$ and $V_{BE} = 607.0 \pm 0.1 \text{ mV}$.

What are the values and uncertainties for the

- (a) current gain, β (aka h_{fe}) _____ \pm _____
- (b) input impedance, h_{ie} _____ \pm _____
- (c) emitter resistance, r_E _____ \pm _____

Include units in your answers.

2 Question 2

For an N-channel JFET:

- (a) V_{GS} is held constant at -1.0 V . Other measurements are $I_D = 4.0 \text{ mA}$ at $V_{DS} = 5.0 \text{ V}$ and $I_D = 4.1 \text{ mA}$ at $V_{DS} = 10.0 \text{ V}$. What is the value of the drain resistance, r_{os} .
- (b) V_{DS} is held constant at 10 V while V_{GS} is changed from -1.1 V to -1.0 V . The measured value of I_D increases from 3.1 mA to 4.1 mA . What is the transconductance, g_{fs} ?