

# Examination of Bipolar transistor

## Tasks:

### **I. Practical measurements:**

#### **Common Emitter:**

1. Measure the output characteristic of bipolar transistor  $I_C=f(U_{CE})$  for  $I_B=\text{const.}$
2. Measure the input characteristic of bipolar transistor  $U_{BE}=f(I_B)$  for  $U_{CE}=\text{const.}$
3. Measure the transfer characteristic of bipolar transistor  $I_C=f(I_B)$  for  $U_{CE}=\text{const.}$

### **II. Graphics:**

1. In different coordinate systems draw all three characteristics of bipolar transistor connected in scheme common emitter.

### **III. Calculations:**

#### **Common Emitter:**

From the measured characteristic calculate the output resistance  $R_{out}$ , input resistance  $R_{in}$  and  $\beta$ .

From output characteristic

$$R_{out} = \frac{U_{CE2} - U_{CE1}}{I_{C2} - I_{C1}} \text{ for } I_B = \text{const}$$

From input characteristics

$$R_{in} = \frac{U_{BE2} - U_{BE1}}{I_{B2} - I_{B1}} \text{ for } U_{CE} = \text{const}$$

From transfer characteristic

$$\beta = \frac{I_{C2} - I_{C1}}{I_{B2} - I_{B1}} \text{ for } U_{CE} = \text{const}$$

### **Answer the questions**

1. What is the approximately value of output resistance?
2. What is the approximately value of input resistance?
3. What is the value of current gain coefficient for Common Emitter connection of bipolar transistor?

