

Exp. No.:

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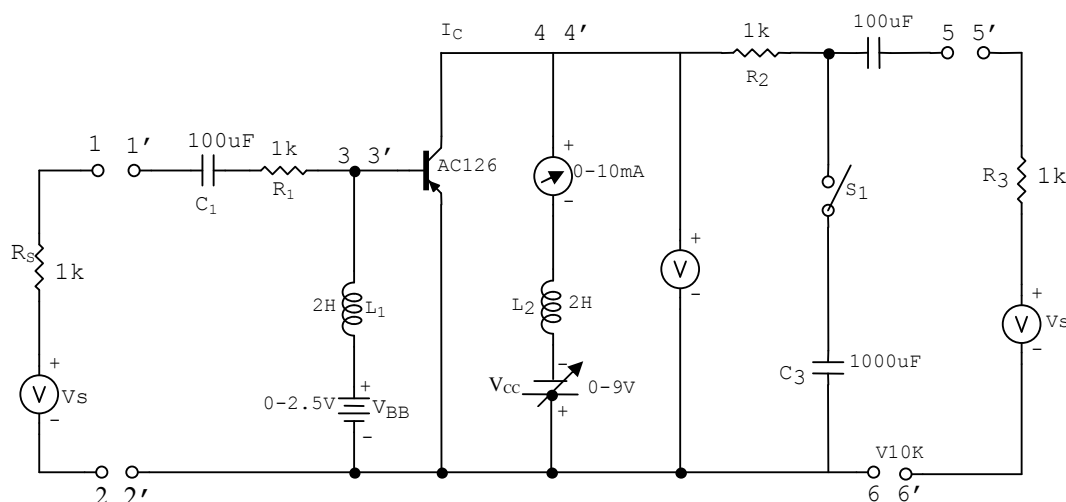
## MEASUREMENT OF $h$ - PARAMETERS OF TRANSISTOR IN CE CONFIGURATIONS

**AIM:** To measure the  $h$ -parameters of the transistor AC126 at 1 KHz.

### APPARATUS :

S.No.	Name of the Apparatus	Range	Quantity
1.	$h$ - parameters module	-	1No.
2.	AF Oscillator	0-30V	2No.
3.	Voltmeter	0-10V	2No.
4.	Ammeter	0-10mA	1No.

### CIRCUIT DIAGRAM:



### PROCEDURE:

1. Switch on the supply with the help of Main switch.
2. To set the desired biasing condition, first connect the ammeter as shown in fig and now with the help of  $P_1$  and  $P_2$  the desired biasing current and voltage can be adjusted say  $I_C = 2\text{mA}$  and  $V_{CE} = -5\text{V}$ .
3. Connect AF Oscillator between the terminals 1 and 2 and set the frequency at 1KHZ and voltage of about 10mV to 20mV.
4. Switch ON  $S_1$ .
5. Measure voltages  $V_{23}$ ,  $V_{31}$ ,  $V_{46}$  and  $V_{56}$ .

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6. Disconnect the AF Oscillator and now connect it across the terminals  $5^1$  and  $6^1$ . Set the frequency at 1 KHZ and voltage of about 250mV (200-300mV).
7. Switch OFF  $S_1$ .
8. Measure voltages  $V_{3^1 2^1}$ ,  $V_{4^1 6^1}$  and  $V_{5^1 6^1}$ .

**READINGS :****i.  $S_1$  is ON i.e.,  $V_C = 0$** 

$$V_{23} =$$

$$V_{31} =$$

$$V_{46} =$$

$$V_{56} =$$

**ii.  $S_1$  is OFF i.e.,  $I_b = 0$** 

$$V_{3'2'} =$$

$$V_{4'6'} =$$

$$V_{5'6'} =$$

**CALCULATIONS:**

$$h_{ie} = \frac{V_b}{I_b}, V_C = 0$$

$$h_{fe} = \frac{I_C}{I_b}, V_C = 0$$

$$h_{re} = \frac{V_b}{V_c}, I_b = 0$$

$$h_{oe} = \frac{I_c}{V_c}, I_b = 0$$

But  $V_b = V_{23} =$ 

$$I_b = \frac{V_{31}}{R_1} =$$

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$$I_c = \frac{V_{46} - V_{56}}{R_2} \text{ for } V_c = 0; =$$

$$V_b = V_{3'2'}, =$$

$$I_c = \frac{V_{5'6'} - V_{4'6'}}{R_2} =$$

$$\text{and } V_c = V_{4'6'} \text{ for } I_b = 0$$

$$\text{Therefore, } h_{ie} = \frac{R_1 V_{23}}{V_{31}} \text{ ohms} =$$

$$h_{fe} = \frac{(V_{46} - V_{56}) R_1}{R_2 V_{31}} = \frac{R_1}{R_2 V_{31}} (V_{46} - V_{56}) =$$

$$h_{re} = \frac{V_{3'2'}}{V_{4'6'}} =$$

$$h_{oe} = \frac{V_{5'6'} - V_{4'6'}}{R_2 V_{4'6'}} \text{ mhos} =$$

**RESULTS:**

The measured h-parameters for the given transistor AC 126 at 1 KHZ.

$$h_{ie} =$$

$$h_{re} =$$

$$h_{fe} =$$

$$h_{oe} =$$

**STANDARD VALUES:**

$$h_{ie} = 1.0 \text{ TO } 3.8 \text{ k}\Omega$$

$$h_{re} = 130 \text{ TO } 300$$

$$h_{fe} = (10 - 50) \times 10^{-4}$$

$$h_{oe} = < 170 \mu \text{ mhos}$$