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Experiments of analog electronics laboratory

Lab(7)

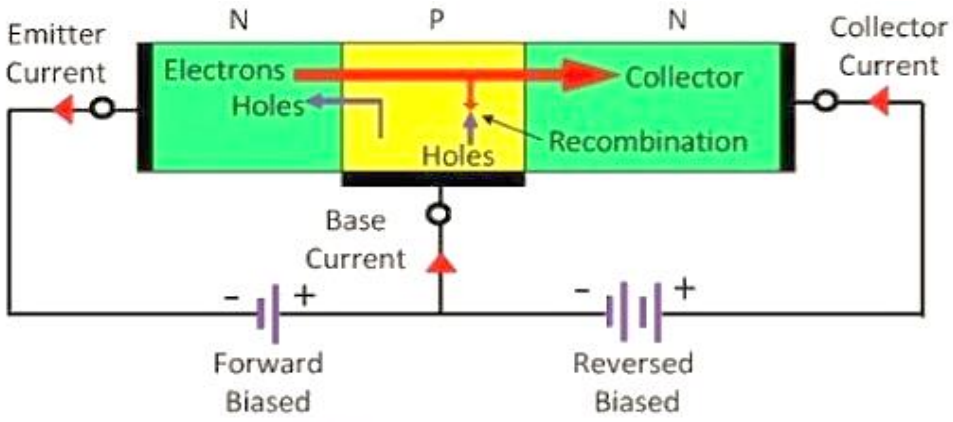
Transfer characteristics of a transistor

1. Aim of the experiment :

Measuring the collector current I_C as a function of base current I_B keeping the collector-emitter voltage V_{CE} constant.

2. Theory:

The silicon is used for making the transistor because of its high voltage rating, greater current, and less temperature sensitivity. The emitter-base section kept in forward bias constitutes the base current that flows through the base region. The magnitude of the base current is very small. The base current causes the electrons to move into the collector region or create a hole in the base region.



Working of Transistor

The base of the transistor is very thin and lightly doped because of which it has less number of electrons as compared to the emitter. The few electrons of the emitter are combined with the hole of the base region and the remaining electrons are moved towards the collector region and constitute the collector current. Thus we can say that the large collector current is obtained by varying the base region.

Transistor Operating Conditions:

When the emitter junction is in forward bias and the collector junction is in reverse bias, then it is said to be in the active region. The transistor has two junctions which can be biased in different ways.

3. Equipment and Components:

a. Transistor BD 130

b. potentiometer 200Ω

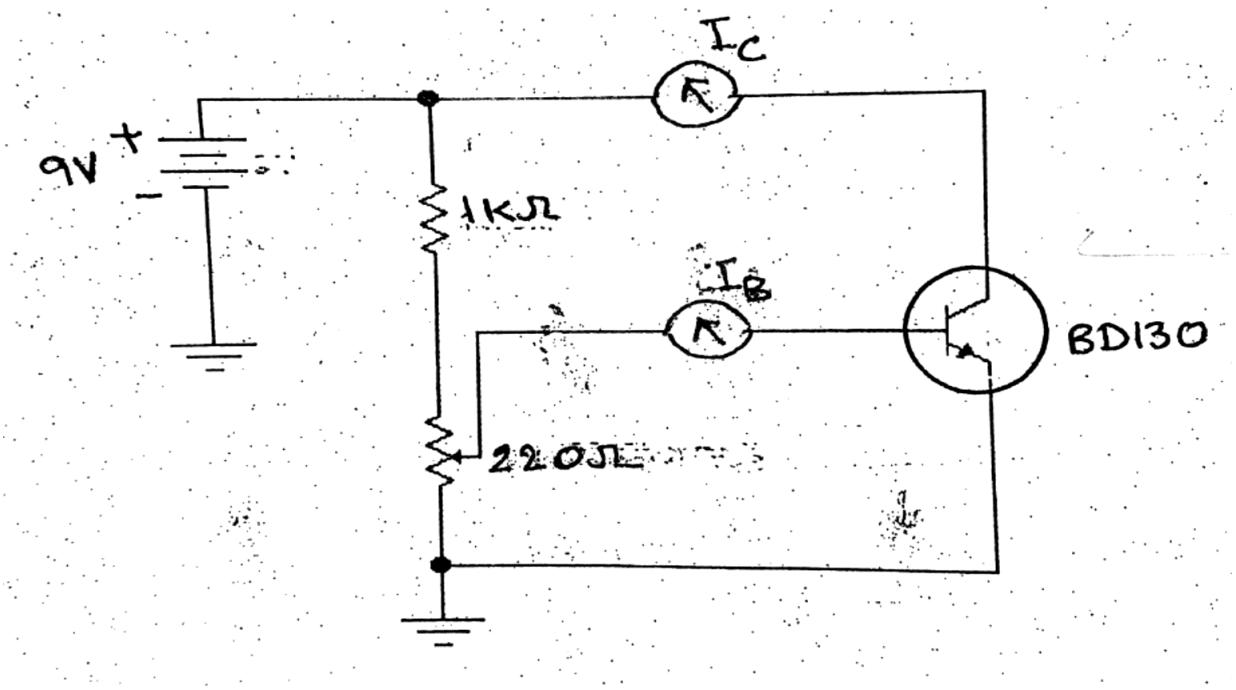
c. resistor 1 KΩ

d. oscilloscope

e. D.C power supply unite

4. practical part:

a. Assemble the circuit as follow:



b. Adjust the voltage V_{CE} to 9 Volt.

c. measure the collector current I_C as a function base current I_B keeping the collector-emitter voltage V_{CE} constant. I_B is varied with the potentiometer

Tabulate the results:

I_B/mA	0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8	2.0	2.2	2.4
I_C/mA												

d. Draw the relationship between I_C vs I_B. and find the slope = gain of transistor $ß_{CD}$.