**DEPARTMENT OF ELECTRICAL & ELECTRONIC ENGINEERING**
**BANGLADESH UNIVERSITY OF ENGINEERING & TECHNOLOGY**
**COURSE NO.: EEE 208**
**EXPT. NO. 02**

**Name of the Experiment:** Study of BJT Biasing Circuits

**Objective**

To establish the proper operating point and to study the stability of the operating point with respect to changing β in different biasing circuits



**Equipments**

| | |
|---|---|
| n-p-n transistor (C828,BC108) | one piece each |
| 500k potentiometer | one piece |
| resistors | 470Ω 560Ω 10KΩ |
| DC micrometer | 0-100μA |
| multimeter | one unit |
| Trainer board | one unit |

**Circuit Diagrams**

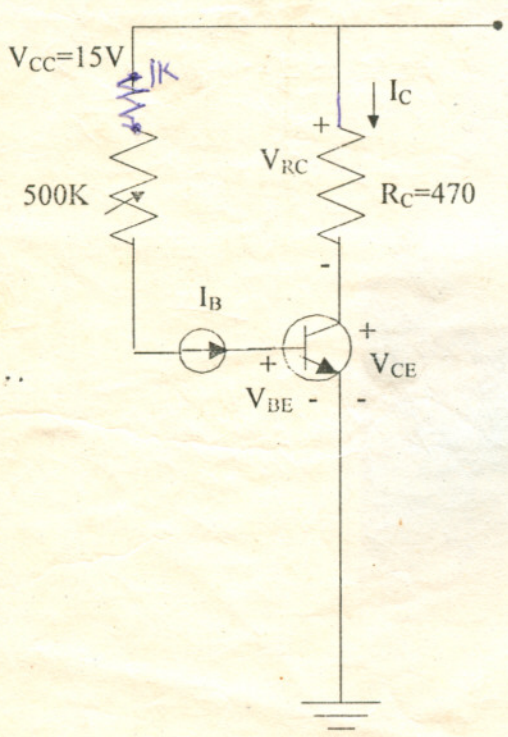



Fig. 1(a)

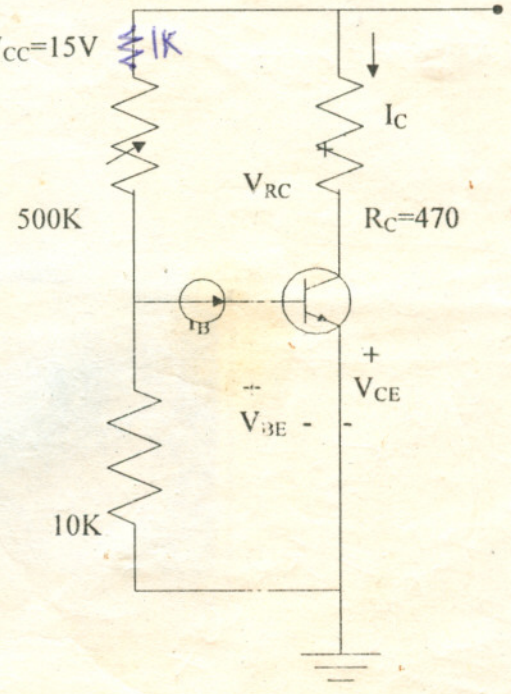



Fig. 1(b)

**Fixed bias circuits**

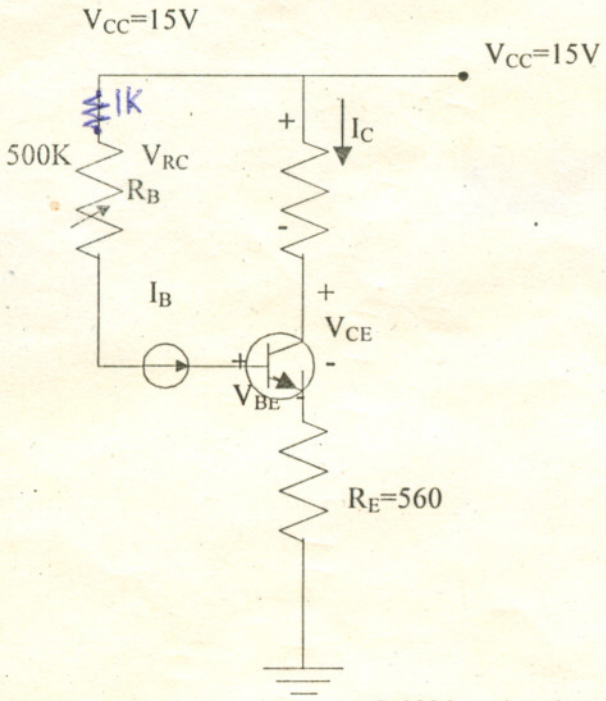



Fig. 2(a)

**Self bias circuits**

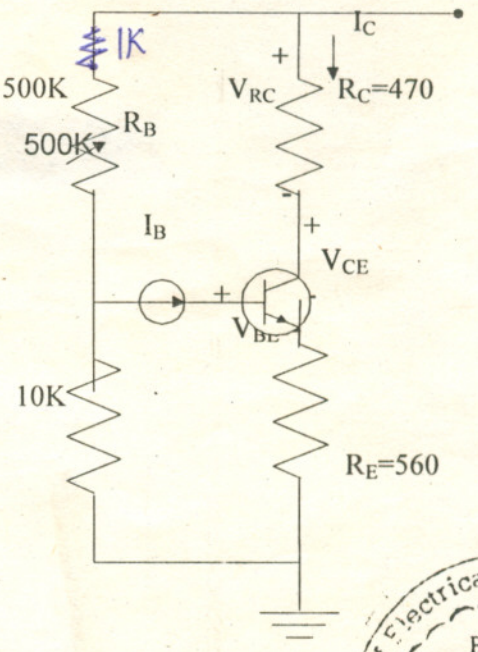
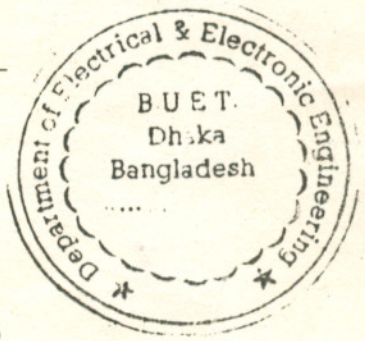



Fig. 2(b)




**Prelab Work**

Student must perform the following calculations before coming to the lab

1. For the circuit shown in Fig. 1(a) and 2(a), find expressions for $I_{CQ}$ and $V_{CQ}$.

**Procedures**

1. Measure the value of $R_c$ with multimeter and record.
2. Construct the fixed bias circuit with C828 transistors as shown in Fig. 1(a). Adjust 500K potentiometer until $V_{CE}$ is approximately equal to $V_{CC}/2$. Measure $V_{CE}$, $V_{BE}$, $V_{RC}$ and $I_B$. $I_C$ can be calculated from $V_{RC}$ and $R_C$.
3. Replace C828 by C829 keeping $V_{CC}$ and 500K potentiometer fixed at values set in step1. Measure $V_{CE}$ $V_{BE}$ $V_{RC}$ and $I_B$.
4. Construct the fixed bias circuit with C828 transistors as shown in Fig. 1(b). Repeat step 2 and 3.
5. Construct the self bias circuit with C828 transistors as shown in Fig. 2(a). Repeat step 2 and 3.
6. Construct the self bias circuit with C828 transistors as shown in Fig. 2(b). Repeat step 2 and 3.

**Reports**

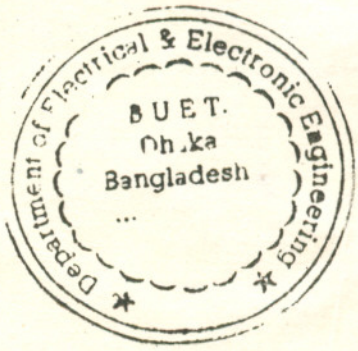
1. Compare the circuits of Fig. 1(a) and 1(b) with respect to stability against variation in $\beta$ and justify your answer.

2. Compare the circuits of Fig. 2(a) and 2(b) with respect to stability against variation in $\beta$ and justify your answer.

3. Compare the stability of fixed bias circuits with that of self bias circuits.

4. Discuss the stability of fixed bias and self bias circuits against variation in temperature.

5. Determine $\beta$ from the measured values of currents. Using this value for $\beta$ and measured value of PB, calculate $V_{CEQ}$ and $I_{CQ}$ for prelab expressions. Compare had calculated values with experimental ones.




**Updated by: Yeasir Arafat on 6th February, 2006**