



GIET UNIVERSITY, GUNUPUR – 765022
 B. Tech (Third Semester Regular) Examinations, December – 2023
22BECPC23001 – Analog Electronic Circuits
 (ECE)

Time: 3 hrs

Maximum: 70 Marks

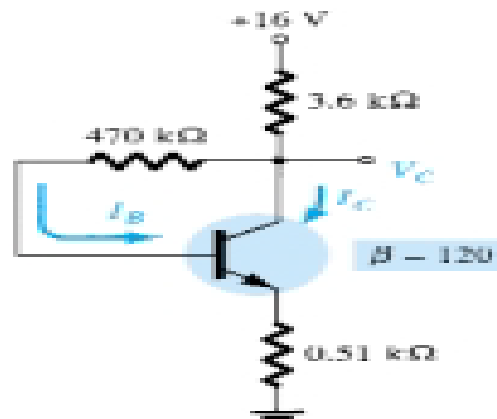
Answer all questions
 (The figures in the right hand margin indicate marks)

PART – A**(2 x 5 = 10 Marks)**Q.1. Answer *ALL* questions

- | | CO # | Blooms Level |
|---|------|--------------|
| a. Define how BJT is a current-controlled device whereas FET is a voltage-controlled device? | CO1 | K1 |
| b. In a fixed bias circuit with emitter stabilized resistor, $R_B = 560\text{ K}\Omega$, $R_C = 4.7\text{ K}\Omega$, $R_E = 1\text{ K}\Omega$, $V_{CC} = 10\text{ V}$, $\beta = 80$, coupling capacitors of $0.01\text{ }\mu\text{F}$ and $C_E = 0.047\text{ }\mu\text{F}$ are used. Find the value of $I_{C_{sat}}$. | CO1 | K2 |
| c. Define the Threshold voltage for a MOSFET. | CO2 | K1 |
| d. Draw the r_e equivalent circuit for emitter follower configuration of BJT and write the expression for voltage gain. | CO3 | K2 |
| e. Find the feedback connection type which is used in the of RC phase-shift oscillator. | CO4 | K1 |

PART – B**(15 x 4 = 60 Marks)**Answer *ALL* questions

2. a. For the collector feedback configuration, determine the dc operating point of the biasing circuit.

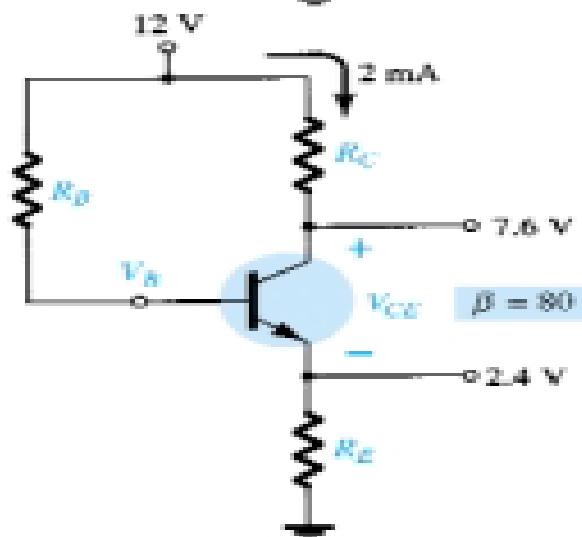


Marks 8

CO # CO1

Blooms Level K3

- b. In the circuit, determine: R_C , R_E , R_B , V_{CE} , V_B .



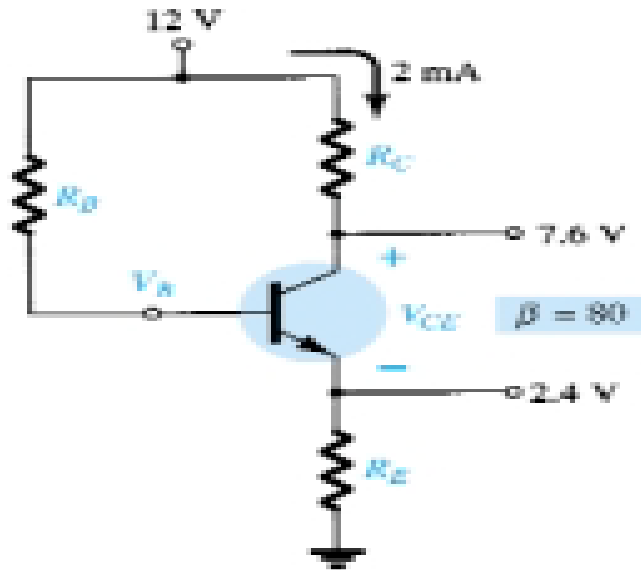
7

CO1

K3

(OR)

- c. Derive expressions for the stability factors of a Fixed bias CE amplifier. 8 CO1 K3
- d. In the circuit, determine: 7 CO1 K3
- $R_C, R_E, R_B, V_{CE}, V_B.$



- 3.a. Draw and analyse a DEMOSFET configuration. Why is it called so? 7 CO2 K1
- b. Briefly explain the principle and operation of n-channel DMOSFET with its transfer characteristics. 8 CO2 K1

(OR)

- c. Briefly explain the principle and operation of n-channel JFET with its transfer characteristics. 7 CO2 K1
- d. Explain the need of a CMOS circuit. Draw a basic CMOS circuit. 8 CO2 K1
- 4.a. For the Self bias circuit of BJT, draw the AC equivalent circuit and derive the expression for voltage gain, input impedance and output impedance. 8 CO3 K2
- b. Show that the trans-conductance g_m of a JFET is related to the drain current I_{DS} given by $g_m = \frac{2}{|V_P|} \sqrt{I_{DSS} I_{DS}}$ where the symbols have their usual meanings. 7 CO3 K2

(OR)

- c. Draw the equivalent model of a voltage-divider biased JFET circuit under small signal conditions and calculate A_{VNL}, Z_i and Z_o . 8 CO3 K2
- d. Derive the voltage gain for a Common Base configuration using its r_e equivalent circuit. 7 CO3 K2
- 5.a. Write various advantages of negative feedback. Draw the block diagrams of different topologies and write down its gain with feedback. 8 CO4 K2
- b. Draw the RC phase shift oscillator with Op-Amp and calculate the gain, A of the amplifier and the operating frequency of this RC phase-shift oscillator for $R = 3.3K\Omega, C = 0.1\mu F,$ and $R_1 = 33 K\Omega$ and $R_F = 1M\Omega$. 7 CO4 K3

(OR)

- c. Draw a push pull transformer-coupled class B power amplifier and explain its operation. 8 CO4 K2
- d. Calculate the output voltage, V_o , in the circuit given below: 8 CO4 K3

