B.Tech-3rd(EEE)

Analog Electronic Circuit

Full Marks : 50

Time : $2\frac{1}{2}$ hours

Answer **all** questions

The figures in the right-hand margin indicate marks

Symbols carry usual meaning

Any supplementary materials to be provided

1. Answer *all* questions : 2×5

(a) What is operating point of an amplifier ? Write its significance.

(b) What is stability factor ?

(c) What is pinch of voltage ?

(d) Draw the Darlington circuit.

(e) State and explain Barkhausen's criteria.

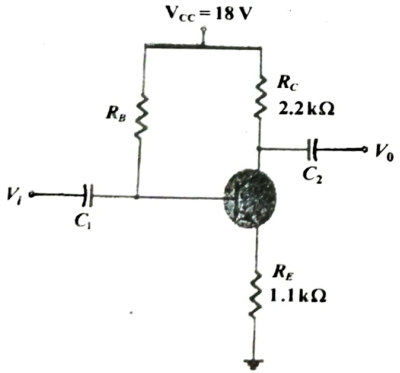
2. (*a*) What is biasing ? Explain Emitter biasing with neat sketch. 4

(*b*) Explain the output characteristic of CE transistor. Draw its load line. 4

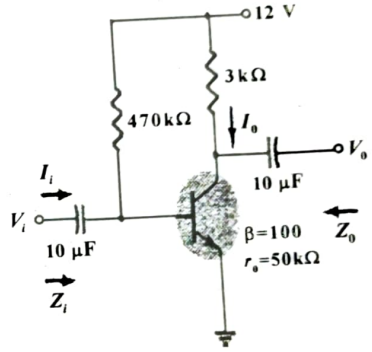
Or

(*a*) Discuss voltage divider bias configuration of BJT amplifier using exact method and approximate method with suitable circuit diagram. 4

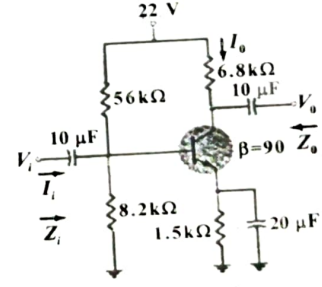
(*b*) Determine I_C V_{CE} and suitable I_{CQ} and V_{CEQ}. Given R_B - 430 kΩ. 4



3. (*a*) Determine the following for the above circuit. Given $r_o = \infty$ 4
(*i*) r_e, (*ii*) A_v, (iii) Z_0, (iv) Z_i

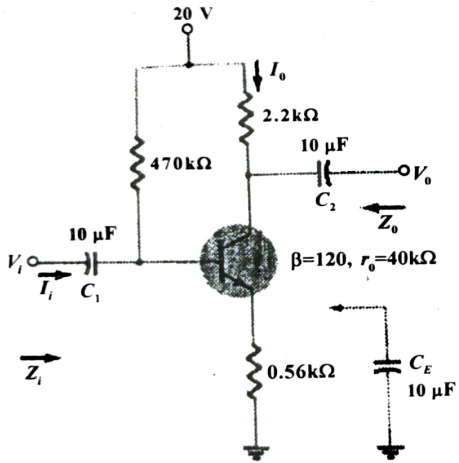


(*b*) Determine the following for the above circuit. Given $r_o = \infty$ 4
(*i*) r_e, (*ii*) A_v, (iii) Z_0, (iv) Z_i

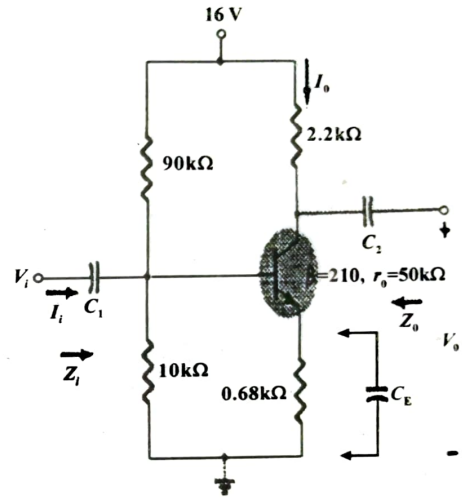


Or

(*a*) Determine the following for the above circuit. Given $r_o = \infty$ 4
(*i*) r_e, (*ii*) A_v, (iii) Z_0, (iv) Z_i



(*b*) Determine the following for the above circuit. Given $r_o = \infty$ 4
(*i*) r_e, (*ii*) A_v, (iii) Z_0, (iv) Z_i



4. (*a*) How FET differs from BJT ? Explain Self Bias circuit for Depletion type MOSFET. 5

(*b*) Sketch the transfer characteristics for an p-channel depletion type MOSFET with I_{DSS} = 10mA and V_p = -4V. 3

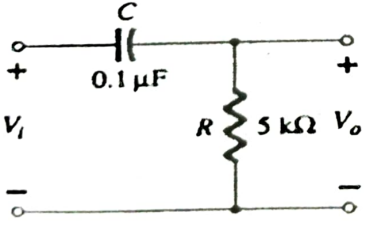
Or

(*a*) Discuss hybrid-π common emitter transistor model. 4

(*b*) Discuss a.c. analysis of JFET amplifier fixed bias configuration. 4

5. (*a*) Explain the frequency response of RC coupled amplifier. Compare it with that of transformer coupled and direct -coupled amplifiers. 4

(*b*) Determine the break frequency and gain at $A_{v(dB)} = -6dB$. Sketch the frequency response curve showing asymptotes and -3dB point. 4



(*Continued*)

Or

Demonstrate Miller effect capacitance for an inverting amplifier. 8

6. Explain the concept of positive feedback. With a neat diagram discuss various oscillator circuits. 8

Or

How do you differentiate between voltage amplifier and power amplifier ? Compare class A and Class B amplifiers. 8