

(b) What is Bias Stabilization ? Determine the general stability factors for all the configurations.

9. (a) In a CE transistor amplifier when signal changes by 0.02 V, the base current changes by 10 μ A and collector current by 1 mA. If the collector resistance $R_C = 5 \text{ k}\Omega$ and $R_L = 10 \text{ k}\Omega$, find ;

- (i) Voltage gain
- (ii) Current gain
- (iii) Input impedance
- (iv) A.C. load resistance, and
- (v) Power gain.

(b) What is Ebers-Moll Model ? Explain in detail.

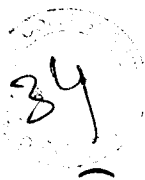
Total No. of Questions : 9]

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EC-201

ELECTRONIC DEVICES AND CIRCUITS (NEW)

(B.Tech., 3rd Semester, 2055)



Time : 3 Hours

Maximum Marks : 60

Note :- Section A is compulsory. Attempt any Four questions from Section B and any Two questions from Section C.

Section--A

Marks : 2 Each

1. (a) Compare the characteristics of silicon and a germanium diode and determine which you would prefer to use for most practical applications.
- (b) What will happen to output a.c. signal if the d.c. level is insufficient in an amplifier ? Sketch the effect on waveform.
- (c) What do you mean by Gain-Bandwidth product ?

- (d) Explain the concept of photoconductivity.
- (e) What is programmable UJT ?
- (f) What is thermal runaway ?
- (g) What do you mean by Rise Time, Fall Time and Propagation Delay ?
- (h) What is ripple factor ?
- (i) Which of three configurations of BJT has a low voltage gain and highest output resistance ? Why ?
- (j) What is Shockley equation ?

Section-B Marks : 5 Each

2. (a) Describe why I_C is effectively zero amperes for a JFET transistor.
- (b) Why is input impedance to a JFET so high ?
- (c) Why is terminology 'field effect' appropriate for this three-terminal device ?

3. Explain Bias Compensation Methods.

4. Given $I_E = 2.5 \text{ mA}$, $h_{fe} = 140$, $h_{oe} = 20 \mu\text{s}$ ($\mu\text{ mho}$) and $h_{ob} = 0.5 \mu\text{s}$. Determine :
 - (a) Common-emitter hybrid equivalent circuit
 - (b) Common-base remodel.

5. An emitter follower using $p-n-p$ transistor with $\beta_o = 150$ is biased at $I_C = 0.25 \text{ mA}$. The voltage signal source has $R_s = 3 \text{ k}\Omega$:
 - (a) In order to make overall $R_o = 110 \Omega$ determine R_E .
 - (b) For this value of R_E obtain A_v and input resistance.
6. Discuss the relative differences in mode of operation between LED and LCD display.
7. By drawing neat diagrams, explain the working of BJT and FET and state their relative merits.
8. (a) Potential divider biasing from $V_{CC} = 15 \text{ volts}$ is obtained for an $n-p-n$ transistor. Given $R_1 = 72 \text{ k}\Omega$, $R_2 = 18 \text{ k}\Omega$, $R_E = 1.4 \text{ k}\Omega$, $R_C = 4 \text{ k}\Omega$. Determine the operating point :
 - (i) When $\beta = 125$
 - (ii) When β is doubled.
 Use $V_{BE} = 0.7 \text{ V}$ and comment on stability of operating point with change in β .

Section-C Marks : 10 Each