

Code.No: R07A1EC06

R07

SET-1

I B.TECH – EXAMINATIONS, DECEMBER - 2010
ELECTRONIC DEVICES AND CIRCUITS
(COMMON TO ECE, CSE, EIE, BME, IT, E.CON.E, CSS, ETM, ECC & ICE)
Time: 3hours **Max.Marks:80**

Answer any FIVE questions
All questions carry equal marks

- - -

1. Compare the motion and trajectories of electron when placed:
 - i) Only in electric field
 - ii) Only in Magnetic field
 - iii) Combined electric and magnetic fields. [16]

- 2.a) Compare the characteristics of a p-n Junction diode, zener diode and tunnel diode.
 b) What is Fermi-level? Prove that the Fermi level in an 'n'-type material is much closed to conduction band. [8+8]

- 3.a) Derive the expression for ripple factor, regulation and rectification efficiency of a half wave rectifier.
 b) Compare Full wave and Bridge rectifiers from the view point of ripple factor, regulation, rectification efficiency and PIV ratings of diodes. [8+8]

- 4.a) Explain how transistor acts as an amplifier.
 b) What is pinch-off voltage? Sketch the region in a bar of FET channel and explain.
 From the transfer characteristic relation using $g_m = \frac{\partial i_D}{\partial V_{GS}} / V_{DS}$, show that

$$g_m = g_{mo} \left[1 - \frac{V_{GS}}{V_p} \right] \text{ Where } g_{mo} = \frac{-2I_{DSS}}{V_p}. \quad [8+8]$$

- 5.a) Draw the circuit diagram of a fixed bias and self bias circuits and derive the expressions for the stability factors.
 b) Explain the term "Thermal Runaway". [8+8]

6. With the help of approximate hybrid model. Derive the expressions for current gain, input impedance, output impedance and voltage gain of a CC amplifier. [16]

- 7.a) Draw the block diagram of a feed back amplifier and derive the closed loop transfer function.
 b) Derive the expressions for A_v , Z_i , Z_o and A_i of a voltage shunt feedback amplifier. [8+8]

- 8.a) Give the circuit diagram of a colpitts oscillator and explain its working.
 b) What is the importance of crystal oscillator? Give the equivalent circuit of a quartz crystal. [8+8]

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