Code No: R21026 **R10** SET - 1

II B. Tech I Semester Supplementary Examinations, Dec - 2015
ELECTRONIC DEVICES AND CIRCUITS
(Com. to EEE, ECE, EIE, ECC, CSE, IT, BME)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
~~~~~~~~~~~~~~~~~~~~~~~~~

1. a) Derive an expression for magnetic deflection sensitivity of a C.R.O.
   b) In a CRT, the electrons emitted are accelerated by a potential of 500V. The length of the deflecting plates is l = 1.3cm. Distance between the deflecting plates is 0.5cm. The distance between the centre of the deflecting plates and the screen is 20cm. Determine the value of electrostatic deflection sensitivity.

2. a) Write the Fermi-Dirac distribution function and explain Fermi level.
   b) The intrinsic carrier density at room temperature in Ge is $2.38 \times 10^{19}/m^3$. If the electron and hole mobilities are 0.38 and 0.19 m^2/Vs respectively. Calculate the resistivity.

3. a) What is the operating principle of LED? Why are Si and Ge not used in LED?
   b) What is breakdown of a diode? What is the difference between avalanche breakdown and zener breakdown of a PN-junction diode?

4. a) Explain the principle of operation of FWR with capacitor filter and derive an expression for its ripple factor.
   b) Compare the performance measure of different filters.

5. a) At V_{CE} = 8.6 V, the change in collector current is 1.2mA for a change in base current of 20μA. Find β of the transistor.
   b) Draw and explain the V-I characteristics of phototransistor.

6. a) In an N-channel JFET, I_{DS} is 6 mA and V_P=-6V. Find the minimum value of V_{DS} for pinch-off operation. Determine the value of drain current at V_{GS} = -3V.
   b) Explain the construction and working of MOSFET with a neat diagram.

7. a) Draw the circuit diagram of a self bias circuit and derive expression for S. Why it is widely used?
   b) Discuss the phenomena of thermal runaway.

8. a) Draw the small signal hybrid model of CE amplifier and derive the expressions for its A_i, Av, R_i and R_o.
   b) For any amplifier prove that $Ri = \dfrac{hi}{1 - hrAv}$.
~~~~~~~~~~~~~~~~~~~~~~~~~