

B.Tech I Year(R05) Supplementary Examinations, May/June 2010**ELECTRONIC DEVICES AND CIRCUITS**

(Common to Electrical & Electronic Engineering, Electronics & Communication Engineering, Computer Science & Engineering, Electronics & Instrumentation Engineering, Bio-Medical Engineering, Information Technology, Electronics & Control Engineering, Computer Science & Systems Engineering and Electronics & Computer Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Give the block diagram of CRO and explain about each block in detail?
(b) In a electrostatic deflecting CRT the length of the deflection plats is 2cm, and spacing between deflecting is 0.5cm, The distance from the cenlve of the deflecting plate to the screen is 20cm, the deflecting voltage is 25V Find the deflecting sensitivity, the angle of diction and velocity of the beam. Assume final anode potential is 1000V [8+8]
2. (a) Explain the formulation of junction in a pn-junction diode with neat diagrams.
(b) A specimen of silicon has square cross section of 2×2 mm and length of 2cm. The current in due to electrons with mobility $1300 \text{ cm}^2/\text{V-S}$. A d.c voltage of 1v in impressed across the bar gives 8mA current. Calculate:
i. concentration of free electrons
ii. drift velocity [8+8]
3. (a) Explain why a bridge rectifier is preferred over a centre-tap rectifier. [4]
(b) Explain the necessity of a bleeder resistor. [4]
(c) A diode has an internal resistance of 20Ω and 1000Ω load from a 110V rms source of supply. Calculate
i. the efficiency of rectification
ii. the percentage regulation from no load to full load. [8]
4. (a) With neat diagram explain the various current components in an pnp transistor. [8]
(b) Explain the input and output characteristics of a transistor in CB configuration. [8]
5. (a) Draw a BJT fixed bias circuit and derive the expression for the stability factor 'S'. [3+5]
(b) An NPN transistor with $\beta = 50$ is used in a common emitter circuit with $V_{CC} = 10\text{V}$, $R_C = 2\text{k}$. The bias is obtained by connecting a 100K resistance from collector to base. Assume $V_{BE} = 0.7\text{V}$. Find
i. the quiescent point and
ii. the stability factor, S. [4+4]
6. (a) What is Hall effect? Derive an expression for Hall coefficient? [8]
(b) Calculate the conductivity of copper having density 8.9 gm/cm^3 and mobility $34.8 \text{ cm}^2/\text{v-sec}$. Atomic weight of copper is 63.57 while it has 1 valance electron per atom. Assume the value of $M = 1.66 \times 10^{-27} \text{ kg}$. [8]
7. (a) What do you understand by feedback in amplifiers? Explain the terms feedback factor and open loop gain. [4+2+2]
(b) Calculate the gain, input impedance, output impedance of voltage series feedback amplifier having $A = 300$, $R_i = 1.5\text{K}$, $R_O = 50\text{K}$ and $\beta = 1/12$. [8]
8. (a) Draw the circuit diagram of a RC phases shift oscillator using BJT. Derive the expression for frequency of oscillators.
(b) Classify different type of oscillators based on frequency range.
(c) Why RC oscillators are not suitable for high frequency applications. [8+4+4]
