B. Tech I Year (R07) Supplementary Examinations, December 2012
BASIC ELECTRONIC DEVICES AND CIRCUITS
(Electrical and Electronics Engineering)

Time: 3 hours   Max. Marks: 80

Answer any FIVE questions
All questions carry equal marks
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1   (a)   Draw the schematic diagram of a CRT and explain about the various sections and the materials used.
    (b)   Two parallel plates of a capacitor are separated by 4 cms. An electron is at rest initially at the bottom plate. Voltage is applied between the plates, which increases linearly from 0 V to 8 V in 0.1 m.sec. If the top plate is +ve, determine:
             (i) The speed of electron in 40 nsec
             (ii) The distance traversed by the electron in 40 nsec

2   (a)   Explain diode current equation.
    (b)   Explain transition capacitance and diffusion capacitances.
    (c)   For PN diode, the reverse saturation current at a bias of 20 V is 20 nA. It is 5 A at 75 volts. Calculate DC resistances at these points.

3   (a)   Draw the block diagram of a regulated power supply and explain its operation.
    (b)   Explain about different types of filter circuits and compare them in terms of ripple factors.

4   (a)   Draw input and output characteristics of CB configuration. Explain early effect or base width modulation in CB configuration.
    (b)   Compare MOSFET with JFET.

5   (a)   If the various parameters of a CE amplifier which uses the self bias method are $V_{cc} = 12\,V, R_1 = 10k\Omega, R_2 = 5k\Omega, R_c = 1k\Omega, R_e = 2k\Omega$ and $\beta = 100$, find:
             (i) The coordinates of the operating point, and
             (ii) The stability factor, assuming the transistor to be of silicon.
    (b)   Explain about compensation methods.

6   (a)   Discuss in detail how the current gain; input impedance, voltage gain and output impedance of a transistor amplifier can be obtained using h-parameters.
    (b)   List out the advantages of h-parameters.

7   (a)   Draw the circuit diagram of current series feedback amplifier and derive expressions for voltage gain and feedback factor.
    (b)   A voltage series negative feedback amplifier has a voltage gain without feedback of A = 500, input resistance $R_i = 3\,K$, output resistance $R_0 = 20\,K$ and feedback ratio $\beta = 0.01$. Calculate the voltage gain, input resistance and output resistance of the amplifier with feedback.

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.

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