Code: R7100407

R7

B.Tech I Year (R07) Supplementary Examinations, June 2013

ELECTRONIC DEVICES AND CIRCUITS
(Common to ECE, CSE, EIE, IT, E.Con.E, ECC and CSS)

Time: 3 hours   Max Marks: 80

Answer any FIVE questions
All questions carry equal marks
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1 (a) An electron is moving perpendicular to magnetic field 'B'. Derive the expression for radius 'R' of the trajectory and period of rotation T.
   (b) Give the block diagram of CRO and explain about each block in detail.

2 (a) Draw the symbol and explain the V – I characteristics of the P-N junction diode.
   (b) Derive the expression for transition capacitance C_T of a diode.

3 (a) For a full wave rectifier with shunt capacitance filter derive expression for ripple factor using approximate analysis.
   (b) Draw the circuit diagram of a bridge rectifier circuit with π section followed by L- section filter and explain its operation.

4 (a) Explain the construction and working of n – channel JFET. Also give transfer characteristics for different V_{ds} values.
   (b) Derive the relation between $\propto, \beta$ and γ.

5 (a) What is the need for biasing a transistor? Explain the reasons for shift in the operating point of the transistor.
   (b) A transistor with $h_{fe} = 50$ is used in the voltage divider bias. $V_{cc} = 16\,V$, $R_C = 1.5\,k$, $V_{CE} = 8\,V$ And $I_C = 4\,mA$. if a stability factor of 12 is desired find R_1, $and\ R_2\ and\ R_e$.

6 (a) Draw the circuit diagram of small signal CE amplifier circuit and give its equivalent hybrid model. What is the role of C_C of C_e?
   (b) Compare common collector and common emitter configuration with regards to R_1, R_0, A_I, A_V.

7 (a) Show that for current series feedback amplifier input and output resistances are increased by a factor $(1 + A\beta)$ with feedback.
   (b) What are the advantages and disadvantages of negative feedback?

8 (a) What is the type of feedback incorporated in the Wien bridge oscillator circuit? Explain its working.
   (b) Derive an expression for frequency of oscillation of Hartley oscillator using BJT.

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