Code: R7100407

R07

B.Tech I Year (R07) Supplementary Examinations December/January 2015/2016

ELECTRONIC DEVICES & CIRCUITS
(Common to ECE, CSE, EIE, IT, E.Con.E, ECC, & CSS)
(For 2008 regular admitted batch only)

Time: 3 hours   Max. Marks: 80

Answer any FIVE questions
All questions carry equal marks

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1 (a) What are the main parts of the CRT? Describe in detail.
   (b) Analyze the motion of an electron under perpendicular electric and magnetic fields.

2 (a) A silicon diode is operated at a forward bias voltage of 0.5 V. Calculate the factor by which the current will be multiplied when the temperature is increased from 25 to 150℃.
   (b) Explain in detail PN junction energy band diagram.

3 (a) Compare half-wave, centre tapped full-wave and bridge rectifiers and explain full wave bridge rectifier operation with neat sketches.
   (b) A DC power supply circuit is to be designed for the given specifications: V_{dc} = 5 V, I_{dc} = 200 mA. Take Si diodes and centre tap transformer. Assume necessary data.

4 (a) What are the differences between Bipolar junction transistor and field effect transistor? Explain JFET operation with suitable diagrams.
   (b) Explain the construction and working principle of UJT.

5 (a) Explain various compensation techniques.
   (b) In a CE germanium transistor find operating point for the circuit of potential divider bias arrangement with $R_2 = R_C$ = 5 kΩ, R_E = 1 kΩ and R_1 = 40 kΩ.

6 (a) Using small signal model explain the operation of CE amplifier.
   (b) A common collector amplifier has a resistance of 220 kΩ is connected between base of the transistor and the supply voltage. Its emitter resistance is 3.3 kΩ. If h_{ie} = 1.275 kΩ and h_{fe} = 100 are given, find A_v, A_i, R_i and R_0 using hybrid parameter model.

7 (a) An amplifier has a mid-band gain of 125 and bandwidth of 250 kHz. Find the resulting bandwidth and gain if 4% of negative feedback is introduced. Give comments.
   (b) Analyze current shut feedback amplifiers with discrete components.

8 (a) Explain in detail about the Hartley oscillator and derive its frequency of oscillation.
   (b) A phase shift oscillator using BJT has R_L = 3.3 kΩ, R = 5.6 kΩ and c = 0.01 μF. Calculate frequency of oscillation and h_{fe} required for sustained oscillations.

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