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B. Tech. Degree III Semester Examination November 2014

CS/EB/EE 1306 ELECTRONIC DEVICES AND CIRCUITS (2012 Scheme)

Time: 3 Hours

Maximum Marks: 100

PART A (Answer *ALL* questions)

(8 x 5 = 40)

- I. (a) Write short notes on: (i) PIN diode (ii) UJT.
 (b) Draw the circuit and explain a full wave voltage doubler.
 (c) Draw the hybrid equivalent form of a transistor CE configuration. Determine the h-parameters.
 (d) Derive the expression for the voltage gain of a common source FET amplifier.
 (e) Discuss about class B power amplifier. What is its efficiency?
 (f) Explain 'thermal run away' in transistor. How can the heat generated in transistors be removed?
 (g) What are the characteristics of ideal rectangular pulses?
 (h) Draw and explain the circuit diagram of an RC differentiate.

PART B

(4 x 15 = 60)

- II. (a) Explain various types of filters used in rectifiers. (5)
 (b) Derive the expression for ripple factor in a full wave rectifier with capacitor filter. (10)

OR

- III. (a) What is the use of bleeder resistor? (5)
 (b) Design a zener diode shunt voltage regulator with (10)
 $V_o = 6V$ $I_c = 10mA$ $I_z = 10mA$ $V_m = 7-12V$.

- IV. (a) Draw the input and output characteristics of a CB transistor configuration and derive the relation between α and β . (10)
 (b) Compare the characteristics of transistor amplifier in the three possible configurations. (5)

OR

- V. (a) Draw the circuit diagram of a common emitter amplifier. Find out its voltage gain and input impedance. (8)
 (b) Explain the frequency response of an RC coupled CE amplifier with a neat figure. Why does the gain fall at low frequencies and at high frequencies? (7)

(P.T.O.)

VI. What is Barkhausen criterion? Explain, with circuit diagram, the working of RC phase-shift oscillator. Write the expression for frequency of oscillation and its demerits. (15)

OR

VII. (a) Explain the working of a crystal oscillator. (5)

(b) What are the merits and demerits of negative feedback? What are the four different types of negative feedbacks in amplifiers? (5)

(c) What is a tuned amplifier? Write the expression for its 'Quality factor'. (5)

VIII. (a) Explain the principle of operation of a positive peak clipper and a positive clamper circuit. (10)

(b) Draw the output wave form for an input square wave form under the conditions. (5)

(i) $RC \ll T$ (ii) $RC \gg T$

OR

IX. (a) In an astable multivibrator $RC_1 = RC_2 = 5k\Omega$ $R_1 = R_2 = 0.4K\Omega$ (7)

$C_1 = C_2 = 0.02\mu F$. Determine: (i) the frequency of oscillation

(ii) minimum value of transistor β .

(b) Explain the working of a monostable multivibrator with a neat diagram. Give its waveforms. What is the function of commutating capacitors? (8)
