

B. ETCE 3RD YEAR 1ST SEMESTER SUPPLEMENTARY EXAMINATION 2017**ANALOG CIRCUITS – II (OLD)****Time: Three Hours****Full Marks: 100**

Answer any *Five* questions
All questions carry equal marks

1. a) Explain the working principle of a shunt regulator and hence justify the term 'shunt'. 7 + 3
 - b) Determine the range of values of Input Voltage in a shunt regulator having source and load resistances of 0.22 k Ω and 1.2 k Ω respectively. The regulating element exhibits a maximum current of 60 mA at 20V. 10
 2. a) Differentiate between comparison element and control element in a series voltage regulator. 6
 - b) Discuss about the significance of β -multiplier in the regulator of Part 'a'. 8
 - c) Explain how a constant output voltage is maintained against a variation of input voltage in the regulator of Part 'a'. 6
 3. a) Explain the output voltage waveforms of a high-pass RC circuit with very low and very high time constants. How a pulse could be converted into spikes? 4 + 4 + 4
 - b) Show that in a low-pass RC circuit, the rise time $t_r = 2.2RC$. 8
 4. a) Draw the circuit diagram of RC coupled amplifier and explain the functionalities of all the components. Justify the term 'RC Coupled'. 2 + 6 + 4
 - b) Discuss about the nature of the frequency response characteristics of RC coupled amplifier. 8
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5. a) In the high-frequency domain, a transistor is accounted by the presence of a capacitance. What is the name of this capacitance? What is the reason behind the existence of such capacitance? 2 + 8
- b) Draw the hybrid-pi model of a transistor and justify the presence of all the components in this model. 2 + 8
6. a) Starting from the general form of oscillator circuit derive the expression for the loop gain and hence comment on the types of reactive elements. 6 + 4
- b) Differentiate between Hartley and Colpitts oscillator circuits in terms of principles of operations. 10
7. a) Discuss about the salient features of different classes of Power Amplifiers. 8
- b) What do you mean by crossover distortion? How could such distortion be overcome? 4 + 2
- c) Explain the working principle of Class B Push Pull Power Amplifier. 6
8. a) Explain the working principle of Tuned Amplifier with capacitor-coupled load. 10
- b) Determine the resonant frequency, voltage gain and the bandwidth of the amplifier in Part 'a' with $h_{ie} = 1 \text{ k}\Omega$, $h_{fe} = 50$, $h_{oe} = 10^{-5} \text{ moh}$, $C_c = 5 \text{ pF}$, $C_p = 330 \text{ pF}$, $L_p = 75 \text{ }\mu\text{H}$, $R_w = 1\Omega$ and $R_L = 5 \text{ k}\Omega$. 2 + 4 + 4
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