B.E. / B.Tech. Electronics & Communication / Telecommunication Engineering
(Model Curriculum) Semester-IV
SE204 - Analog Circuits

P. Pages : 2

Time : Three Hours

23 24

Max. Marks : 80

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Notes : 1. All questions carry marks as indicated.
2. Assume suitable data wherever necessary.
3. Illustrate your answers wherever necessary with the help of neat sketches.

1. a) Analyze the following circuit shown in fig. Explain the operation of circuit with its input, output waveforms, if a triangular wave is applied at the input with a peak voltage of 10 volts. **8**
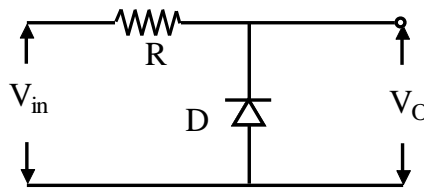
b) Draw hybrid equivalent circuit for common emitter transistor configuration and derive its h-parameters. **8**

OR

2. a) Draw and explain low frequency small signal hybrid π model of transistor. **8**

b) What is Cascode amplifier. Draw and explain the operation of Cascode amplifier. **8**

3. a) For a class 'B' amplifier using common emitter amplifier, the supply voltage is 25 V while the load resistance is 16Ω. If the input a.c. signal of 20V peak is supplied, determine the input power, output power and the efficiency. **8**

b) What do you understand by feedback in amplifier. Explain the block diagram of negative feed-back amplifier and obtain expression for its closed loop gain. **8**

OR

4. a) Derive the input and output impedance of transconductance feedback amplifier. **8**

b) Identity the following circuit diagram and explain what will be the effect on input, output impedance, gain of amplifier and harmonic distortion. **8**
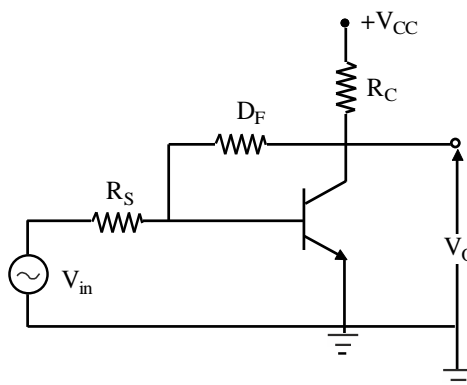
5.	a)	State the Barkhausen criteria for sustaining oscillator. Compare Hartley oscillator and Colpitts oscillator. State the function of tank circuit and RFC.	**8**
	b)	What is multivibrator. Draw and explain the operation of one shot multivibrator. Explain why it is called as one shot multivibrator.	**8**

OR

6.	a)	In Colpitts oscillator the value of the inductor and capacitors in the tank are L = 40mH, C_1 =100pF and C_2 = 500pF	**8**
		a) Find the frequency of oscillation.	
		b) If the input voltage is 10v, find the feedback voltage	
		c) Find the minimum gain if the frequency is changed by changing 'L' alone.	
		d) Find the value of C_1 for a gain of 10	
		e) Also find the new frequency of oscillation.	
	b)	Draw and explain the operation of UJT relaxation oscillator. List the factor affecting oscillator frequency.	**8**

7.	a)	What is differential amplifier. Explain DC analysis of Dual input balanced output differential amplifier.	**8**
	b)	What is output offset voltage prove that	**8**

$$V_{oos} = I_{ios} \ Rf + V_{ios} \left(1 + \frac{RF}{R_1}\right)$$

OR

8.	a)	Explain	**8**
		i) Input offset voltage	
		ii) Input bias current	
		iii) CMRR	
		iv) Slew Rate	
		v) PSRR	
		vi) Input offset current.	
	b)	Draw and explain constant current source method to improve CMRR.	**8**

9.	a)	What is an active integrator. With neat diagram and waveforms explain the working of an active integrator.	**8**
	b)	Design a scaling adder circuit using an op-amp, to give the output.	**8**

$$V_0 = -\left(3V_1 + 4V_2 + 5V_3\right)$$

OR

10.	a)	Show that the output of the subtractor is proportional to the difference between the two input voltages.	**8**
	b)	What is active filter. Explain the operation of second order low pass active filter with their frequency response.	**8**

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