Total number of printed pages:

ted pages: Programme (UG)/5th /UECE 515C 2024 Linear Integrated Circuits and Systems

Full Marks : 100

Time : 3 hours

The figures in the margin indicate full marks for the questions.

Answer any five questions.



		Q1 transistor, RL=1k Ω . Q1has $V_{BE} = 0.7V$ and high value of β .	
	c)	Determine the output waveform from a true integrator for the input waveform as shown, which is governed by the equation: $Vout(t) = \int_0^t Vin(t) + Vout(0)$. Assume capacitor is initially relaxed. 6V Vin(t) t $1ms 3ms$ $-6V$	[10]
3	a)	Find differential voltage gain of circuit as shown in Figure, if parameters of transistors are as; n-p-n transistors: Is=2fA, βF =200, VA=100V & p-n-p transistors: Is=1fA, βF =50, VA=80 V.	[8]
	b)	Draw the circuit diagrams for two different Voltage bias generators; derive the expression for the output voltage.	[2+2]
	c)	$\mathbf{v}_{in} \underset{\mathbf{R}_{1}}{\mathbf{R}_{1}} \underbrace{\mathbf{D}_{2}}_{\mathbf{V}_{0A}} \underbrace{\mathbf{D}_{1}}_{\mathbf{V}_{out}} \underbrace{\mathbf{D}_{1}}_{$	[4+2+2]
4	a)	Describe the operation of inverting Schmidtt trigger circuit, and draw the VTC.	[6+2]
	b)	Draw the simplified schematics of the output stage of uA 741 op-amp and explain the concept of short circuit protection.	[4+2]
	c)	A differentiator circuit has a output expression of $V_{out}(t) = -\frac{dV_{in}(t)}{dt}$ and sketch the output waveform for the input shown.	[6]
5	a)	Describe the operation of a saturating half wave rectifier with input, output waveforms and draw the corresponding VTC.	[4+6]
	b)	Find the values of the output voltage, Io, IL, Rin, Rout for the circuit shown	[10]

		here. $1 \vee \overset{1 \times \Omega}{=} \overset{10 \times \Omega}{=} \overset{10 \times \Omega}{} 10$	
6.	a)	Draw the time domain waveforms: $v_n(t)$, $v_p(t)$, $v_{out}(t)$, of the circuit diagram shown below Fig. (a) and plot the voltage transfer characteristics, when it is driven by an input: $Vin(t) = 4V \cos 2000\pi t$.	[8]
	b)	Draw the circuit diagram of a VCVS with infinite input impedance. Find the expression for the output of circuit, if the input analog signal is $Vin(t) = 3\cos 50\pi t + 1.5\sin 300\pi t - 3.5\cos 100\pi t$ and $R_f = 3k\Omega$, $R_1 = 1k\Omega$.	[2+6]
	c)	Draw the output of the circuit above Fig (b) and find the duty cycle of the	[4]
		output, while input is 5 Vpeak 1kHz sine wave.	
7	a)	(I) Draw the circuit diagram of the non- saturating half wave precision rectifier, for third quadrant operations. Explain it's operation, plot the VTC. (II) Explain the operation of circuit shown above and draw the VTC.	[1+5+2]
	b)	Write short note on the Slew rate of Op-amp.	[4]