Total number of printed pages: **2**

D/4th/DECE404

2024

SUBJECT NAME: Linear integrated circuit

Full Marks : 100

Time : Three hours

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

*Answer **any five** questions*

Q.1	a)		Fill in the blanks	11
		i)	Input impedance of ideal Op-amp is …….	
		ii)	CMRR stands for …….	
		iii)	CMRR of ideal Op-amp is ……..	
		iv)	Frequency of DC signal is ……..	
		v)	Function generator generates……..signal.	
		vi)	Comparator is a ……loop application of Op-amp.	
		vii)	Output impedance of ideal Op-amp is ……	
		viii)	Voltage gain of ideal Op-amp is …….	
		ix)	Oscillator is a ……..feedback application of Op-amp.	
		x)	High pass filter rejects frequencies lower than …….frequency.	
		xi)	Inverting amplifier is a ……..feedback application.	
	b)	i)	Define oscillator.	2
		ii)	Write down conditions to start oscillation.	3
	c)	i)	Draw frequency response of low pass filter.	2
		ii)	Draw a passive low pass filter.	2
Q.2	a)		Write down whether the following statements are true or false	5
		i)	Reactance of capacitance has direct proportionality with frequency.	
		ii)	Infinite impedance can be replaced by short circuit.	
		iii)	Zero impedance can be replaced by open circuit.	
		iv)	Reactance of capacitance for dc signal is infinite.	
		v)	Resistance has no dependency of frequency.	
	b)	i)	Draw the circuit diagram of a active low pass filter.	4
		ii)	Explain the filtering action of above.	3
	c)	i)	Draw the circuit diagram of wein bridge oscillator.	4
		ii)	Explain it's function	4

Q.3	a)		Write down whether the following statements are true or false	5
		i)	Close loop gain for oscillation is unity.	
		ii)	Close loop Phase shift for oscillation should be effectively zero.	
		iii)	Ideal offset voltage of Op-amp should be 0V.	
		iv)	Common mode noise is cancelled out at differential output node of Diff–amp.	
		v)	Dc input response of a integrator is zero.	
	b)	i)	What is amplification?	1
		ii)	Draw a sinusoidal signal and it's amplified signal.	2
		iii)	Draw output characteristics of a transistor and mark the region where amplification is possible.	2
		iv)	Why dc biasing is required for a transistor for amplification?	2
		v)	What is operating point of a transistor.	1
		vi)	What is the main advantage of Differential amplifier over single stage amplifier.	2
	c)		Fill in the blanks	5
		i)	For a inverting amplifier rf=1kΩ ri=100Ω voltage gain =……	
		ii)	For a non inverting amplifier rf=10MΩ ri=1KΩ voltage gain= ……	
		iii)	For a summing amplifier if vin1=sinwt vin2=4sinwt vout =……	
		iv)	Ramp response to a differentiator is ……	
		v)	Op-amp is being build by using many ……..amplifier	
Q.4	a)	i)	Derive the output voltage equation of a inverting amplifier.	6
		ii)	Derive the output voltage equation of a integrator.	7
	b)	i)	Define offset voltage of a Op-amp.	2
		ii)	What do you mean by virtual ground of a Op-amp.	2
	c)		Draw the block diagram of a multiplier.	3
Q.5	a)		Draw the circuit diagram of the following	3X3=9
		i)	Log amplifier using diode.	
		ii)	Active Low pass filter.	
		iii)	Zero voltage detector	
	b)		Write short notes on	
		i)	Frequency response of filters	4
		ii)	Data sheet parameters of Op-amp	7
Q.6	a)			
		i)	Draw the cuicuit diagram of a 5 volt detector.	2
		ii)	Explain the detection functionality with help of drawing vin vout	6
	b)		Write down few practical characteristics of a Op-amp.	5
	c)		Derive the output voltage equation of a active op-amp differentiator.	7