U.S.N. | | | | | | | | | |

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

September / October 2023 Semester End Main Examinations
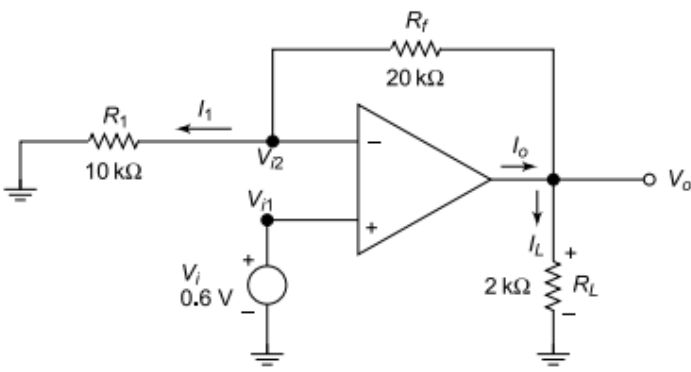
Programme: B.E. **Semester: IV**
Branch: EIE/MD **Duration: 3 hrs.**
Course Code: 22ES4PCLIC **Max Marks: 100**
Course: Linear Integrated Circuits

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

			MODULE - I	CO	PO	Marks
1	a)		Differentiate between the ideal and practical characteristics of an op amp.	CO1		**06**
	b)		Determine (a) A_v (b) V_o (c) I_L and (d) I_o. for the circuit shown in Fig.1(b) Fig.1(b)	CO3	PO2	**06**
	c)		Briefly describe the significance of Frequency Compensation in op amp and explain the method to provide frequency compensation.	CO2	PO1	**08**
			OR			
2	a)		Draw and explain the circuit of Instrumentation Amplifier and derive an expression for output voltage	CO2	PO1	**08**
	b)		Draw the circuit of a capacitor-coupled inverting amplifier and explain its operation.	CO2	PO1	**06**
	c)		Draw a fundamental Sample-and-Hold circuit. What factors contribute to the hold mode droop in this circuit?	CO2	PO1	**06**
			MODULE - II			
3	a)		Explain the non-inverting comparator, with neat output waveform.			**06**

		b)	Derive an equation for the amplitude and frequency of a Triangular waveform generator using op amp.	*CO2* PO1	**06**
		c)	Explain the operation of an RC phase-shift oscillator. Derive an expression for the frequency of oscillation.	*CO2* PO1	**08**
			MODULE - III		
4		a)	Enumerate the various errors in an ideal integrator circuit. How are these errors minimised?	*CO2* PO1	**08**
		b)	Explain how Notch filter is used for power line noise removal?	*CO1*	**06**
		c)	Design a fourth order low pass Butterworth filter having a cut off frequency of 2kHZ. Assume $\alpha_1 =0.765$, $\alpha_2 =1.848$ and C=0.1μF.	*CO4* PO3	**06**
			MODULE - IV		
5		a)	A system uses a 12-bit word to represent the input signal. If the maximum peak-to-peak voltage at the output is set to 4V, find the resolution of the system and the dynamic range.	*CO3* PO2	**05**
		b)	Explain the operation of Successive Approximation ADC with a suitable example,	*CO2* PO1	**08**
		c)	Discuss the applications of DACs and ADCs.	*CO2* PO1	**07**
			OR		
6		a)	Define the following i. Monotonicity ii. Resolution iii. Offset Voltage	*CO1*	**06**
		b)	Discuss the operation of a Dual slope A to D converter	*CO2* PO1	**08**
		c)	Consider the R – 2R 4 -bit converter and assume that feedback resistance R_f of the op-amp is variable, the resistance R = 10 kΩ and $V_R = 10V$. Determine the value of R_f that should be connected to achieve the following output conditions. (a) The value of 1 LSB at the output is 0.5 V. (b) An analog output of 6V for a binary input of 1000. (c) The full-scale output voltage of 12 V. (d) The actual maximum output voltage of 10 V.	*CO3* PO2	**06**
			MODULE - V		
7		a)	Discuss the block diagram of a PLL with a neat schematic diagram.	*CO2* PO1	**08**
		b)	Explain the Analog phase detector used in PLL	*CO2* PO1	**08**
		c)	Explain how PLL is used for frequency multiplication.	*CO2* PO1	**04**

******