



# PRESIDENCY UNIVERSITY

BENGALURU

Roll No.												
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## End - Term Examinations – MAY 2025

Date: 26-05-2025

Time: 01:00 pm – 04:00 pm

<b>School:</b> SOE	<b>Program:</b> B. Tech ECE	
<b>Course Code:</b> ECE3001	<b>Course Name:</b> Linear Integrated Circuit	
<b>Semester:</b> IV	<b>Max Marks:</b> 100	<b>Weightage:</b> 50%

CO - Levels	C01	C02	C03	C04	C05
Marks	10	31	55	3	1

### Instructions:

- (i) Read all questions carefully and answer accordingly.
- (ii) Do not write anything on the question paper other than roll number.

### Part A

Answer ALL the Questions. Each question carries 2marks.

10Q x 2M=20M

1.	What is slew rate? How is it Significant?	2 Marks	L1	C02
2.	Compare the open loop and closed loop operation of an operation amplifier.	2 Marks	L2	C01
3.	Draw the circuit diagram of opamp as integrator and differentiator.	2 Marks	L2	C02
4.	Which is the fastest ADC? Justify.	2 Marks	L1	C03
5.	Sketch the circuit of the square wave generator.	2 Marks	L2	C03 C04
6.	Draw the equivalent circuit of the practical OPAMP.	2 Marks	L1	C01
7.	Draw the circuit diagram of monostable multivibrator and also state the application of multivibrator.	2 Marks	L2	C03 C05
8.	Sketch the circuit diagram of current to voltage convertor using OP-AMP.	2 Marks	L2	C02 C04
9.	What is the advantage of the Schmitt trigger. Draw the input and output wave form of the same.	2 Marks	L2	C03 C04
10.	Derive the relation of gain for non-inverting OPAMP with neat circuit diagram.	2 Marks	L2	C02

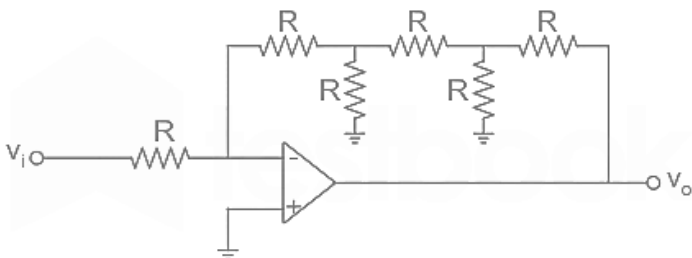
## Part B

**Answer the Questions.**

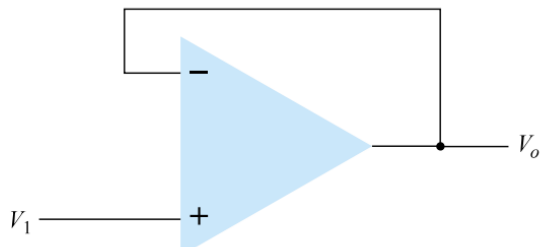
**Total Marks 80M**

11.	a.	Sketch the circuit diagram with frequency response and derive the expression for voltage gain for first order Butterworth low pass filter.	10 Marks	L3	CO3
	b.	Design the low pass filter with 1KHz cutoff frequency and with pass band gain of 5. Using the frequency Up techniques convert this LPF with cutoff frequency of 1.6KHz.	10 Marks	L3	CO3
<b>Or</b>					
12.	a.	Sketch the circuit diagram with frequency response and derive the expression for voltage gain for first order Butterworth High pass filter.	10 Marks	L3	CO3
	b.	Design the High pass filter with 1KHz cutoff frequency and with pass band gain of 5. Using the frequency Up techniques convert this HPF with cutoff frequency of 1.6KHz.	10 Marks	L3	CO3
13.	a.	Sketch the circuit diagram of the IC 555 Timer. With neat circuit diagram and waveform explain the working of IC 555 timer as Astable multivibrator. In 555 astable multivibrator, calculate the width of the positive pulse if $R_a=22k\Omega$ , $R_b=39k\Omega$ and $C=0.01\mu F$ .	12 Marks	L3	CO3
	b.	Sketch and explain the circuit diagram and wave form of sample and Hold circuit. What is the purpose of sample and hold circuit in ADC and DAC.	8 Marks	L3	CO3
<b>Or</b>					
14.	a.	Design a square wave generator using IC555 timer for a frequency of 120 Hz and 60% duty cycle. Assume $C=0.2\mu F$ .	10 Marks	L4	CO3
	b.	Sketch and explain the working of the 3-bit binary weighted Digital to analog convertor and derive the expression for the Output voltage.	10 Marks	L3	CO3
15.	a.	With the neat suitable diagram explain the operating principle of instrumentation amplifier and derive the gain.	10 Marks	L3	CO2
	b.	With block diagram explain the working of the successive approximation ADC.	10 Marks	L3	CO3
<b>Or</b>					
16.	a.	With block diagram explain the working of FLASH ADC.	8 Marks	L2	CO3
	b.	With the neat suitable diagram explain the operating principle of difference amplifier and derive the output voltage expression.	8 Marks	L3	CO2

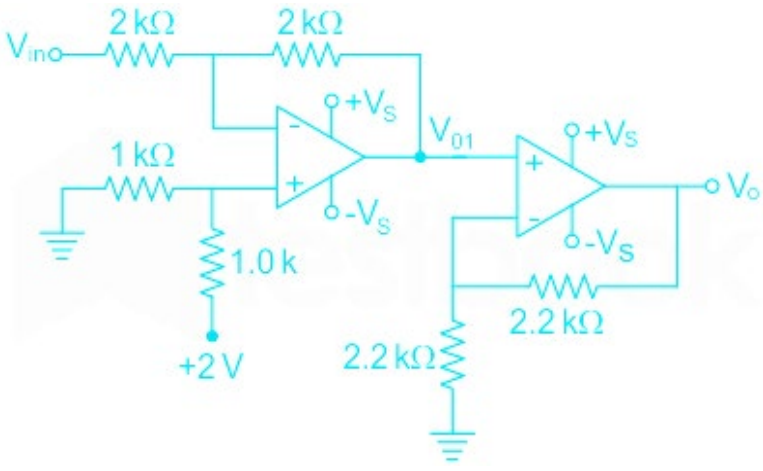
	c.	An amplifier has a current and voltage gain of 100 and 10 respectively. Find the voltage, current and power gain in dB.	4 Marks	L3	C02
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17.	a.	For the given opamp circuit given below, find the overall voltage gain $\frac{V_o}{V_i}$ ? 	8 Marks	L3	C02
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	b.	An amplifier using an op – amp with a slew rate of $1V/\mu s$ has a gain of 40 dB. If this amplifier is to faithfully amplify sinusoidal signals from dc to 20 kHz, without any slew rate induced distortion, what is the maximum input that can be applied?	6 Marks	L2	C01
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	c.	Sketch the output wave form for the circuit shown here, if the input is $V_1 = 5 \cos\left(6.28t + \frac{\pi}{6}\right)$ Volt. 	6 Marks	L4	C02
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Or

18.	a.	In the circuit shown the saturation voltage of the opamp is $\pm 15$ V and the input voltage is -3.5 V, then find the output voltage of the given circuit arrangement. 	8 Marks	L3	C02
	b.	`	6 Marks	L2	C01

c.

Calculate the output voltage for the circuit shown here when  $R_f = 68\text{ k}\Omega$ .

6 Marks

L3

C02

