Reg. No. : | | | | | | | | | | | | |

Question Paper Code:U4B04

B.E./B.Tech. DEGREE EXAMINATION, NOV 2023

Fourth Semester

Biomedical Engineering

21UBM404 - Analog Integrated Circuits

(Regulations 2021)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1.	Mention the advantages of integrated circuits.	CO1-U
2.	Define slew rate. What are the causes for slew rate?	CO1-U
3.	Mention some of the linear applications of op-amps.	CO1-U
4.	List the limitations of an ideal integrator.	CO1-U
5.	Define accuracy of a converter.	CO1-U
6	An 8-bit DAC has on output voltage range of 0 - 2.55V. Calculate its resolution.	CO2-App
7	What are the merits of switching regulator?	CO1-U
8	Compare linear regulator with switching regulators.	CO1-U
9	State the need and advantages of Isolation Amplifiers.	CO1-U
10	What is an opto coupler? Mention its applications.	CO1-U

PART – B (5 x 16= 80 Marks)

11.	(a)	What are DC characteristics of IC741? Obtain the voltage and current relations for the various DC characteristics with necessary sketches.	CO1-U	(16)
		Or		
	(b)	Elaborate in detail the performance characteristics of an op-amp for AC input with its limitations. Analyze and suggest the compensation techniques.	CO1-U	(16)

12.	(a)	(i) Briefly explain the function of a Sample and Hold circuit using op-amp.	CO1 -U	(8)
		(ii) Design a practical Integrator circuit with a dc gain of 10 to integrate a square wave of 10 kHz.	CO2-App	(8)
		Or		
	(b)	(i) How to implement the instrumentation amplifier using three op-amps? Deduce the condition for ensuring high CMRR in the circuit?	CO1- U	(8)
		(ii) Design a Regenerative comparator using IC741, and find the comparator output for the given input signal, Vin=Vmsinωt.	CO2- App	(8)
13.	(a)	Design a 4 –bit binary weighted resistor DAC for the following specifications:Use LM741 op- amp, R = 10kΩ, Vref =2.5V and full scale output = 5V.	CO2-App	(16)
		Or		
	(b)	Design a 4 bit R-2R ladder DAC and compute the analog equivalent of the binary input1011.	CO2-App	(16)
14.	(a)	Describe the second order high pass filter with its frequency response and design the circuit with the cut-off frequency of 5 KHz.	CO1-U	(16)
		Or		
	(b)	(i) Discuss the functional block diagram of a 723 voltage regulator.	CO1-U	(8)
		(ii) State the limitations of linear voltage regulators. Draw the complete block diagram of switching regulator and explain its operation.	CO1- U	(8)
15.	(a)	Explain about different modes of operation of 555 timer.	CO1-U	(16)
		Or		
	(b)	(i) Explain the working of PLL.	CO1-U	(8)
		(ii) Briefly describe about video amplifier.	CO1- U	(8)