Q. Code:553325

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

B.E / B.TECH. DEGREE EXAMINATIONS, MAY 2024

Fourth Semester

EC18403 – ANALOG INTEGRATED CIRCUITS AND ITS APPLICATIONS

(Electronics & Communication Engineering)

(Regulation 2018A)

TIME: 3 HOURS **MAX. MARKS: 100**

COURSE OUTCOMES	STATEMENT	RBT LEVEL
CO 1	Infer the DC and AC characteristics of operational amplifiers and its effect on output and their compensation techniques.	**3**
CO 2	Elucidate and design the linear and non-linear applications of an opamp and special application Ics.	**5**
CO 3	Classify and comprehend the working principle of data converters.	**3**
CO 4	Illustrate the function of application specific ICs such as Analog multiplier,PLL and its application in communication.	**3**
CO 5	Explain the working of multivibrators using IC 555,the special function ICs such as Voltage regulators,	**3**

PART- A(10x2=20Marks)

(Answer all Questions)

		CO	RBT LEVEL
1.	What is Virtual ground in op-amp?	**1**	**2**
2.	Enumerate the ideal characteristics of op-amp	**1**	**1**
3.	Compare precision rectifier with conventional rectifier	**2**	**3**
4.	Design a differentiator to differentiate an input signal that varies in frequency from 125 Hz to about 1 kHz. Assume the capacitance value of 1μF.	**2**	**2**
5.	Define resolution of data converters.	**3**	**2**
6.	What is the largest value of output voltage from an 8 bit DAC that produces 1V for a digital input of 00110110 ?	**3**	**3**
7.	List few applications of analog multiplier IC.	**4**	**1**
8.	How is frequency stability obtained in a PLL by use of VCO?	**4**	**3**

9.	In the monostable multivibrator circuit using 555 timer IC, C =0.1 μF and R_A = 15kΩ connected between pins 4 and 7. Calculate the duration of the output pulse width tp.	**5**		**3**
10.	State the functions of Optocoupler.	**5**		**1**

PART- B (5x 14=70Marks)

			Marks	CO	RBT LEVEL
11. (a)	Draw and analyze the Wilson current source circuit. Justify that it can provide very high output resistance.		**(14)**	**1**	**3**
	(OR)				
(b)	Examine the following Non-Ideal DC characteristics of op-amp in detail and also explain the ways to compensate the same. i) Input bias current ii) Input offset voltage		**(14)**	**1**	**3**
12. (a)	Draw the circuit of ideal integrator using Op-amp and derive the expression for the output voltage V0. Suggest a suitable practical integrator circuit and plot its frequency response.		**(14)**	**2**	**3**
	(OR)				
(b)	**(i)**	Draw the circuit of instrumentation Amplifier using Operational Amplifier and justify that it is ideal choice for high precision signal acquisition.	**(06)**	**2**	**3**
	(ii)	What is the need for Log amplifier? and Construct a temperature compensated Log amplifier and derive its output voltage.	**(08)**		
13. (a)	Classify the types of ADC. Justify that successive approximation type ADC is perfect choice for monolithic IC fabrication.		**(14)**	**3**	**3**
	(OR)				
(b)	(i) Explain the working of R-2R ladder DAC with circuit schematic.		**(07)**	**3**	**3**
	(ii) A 4 bit R-2R ladder type DAC having resistors 10K and 20K uses V_R of 10V. Find its a) Resolution b) I_0 for a digital input of 1101.		**(07)**		
14. (a)	Elaborate on the building blocks of Voltage controlled oscillator and show that the output frequency is directly proportional to the applied control voltage.		**(14)**	**4**	**3**
	(OR)				
(b)	Explain the working principle of four quadrant variable form of transconductance Analog multiplier.		**(14)**	**4**	**3**
15. (a)	With neat sketches of circuit diagram and waveforms, explain the operation of 555 timer based Monostable multivibrator. Derive an expression for T_{ON} and T_{OFF}.		**(14)**	**5**	**3**

(OR)

		Marks	CO	RBT LEVEL
(b)	With suitable functional diagram, explain the function of low voltage regulator using IC723 and discuss its current foldback techniques.	**(14)**	**5**	**3**

PART- C (1x 10=10Marks)

(Q.No.16 is compulsory)

		Marks	CO	RBT LEVEL
16.	Design, derive the frequency of oscillation and explain the operation of Hartley oscillator using operational amplifier for a frequency of 50KHZ. Assume C=0.01μF.	**(10)**	**2**	**5**

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