Reg. No.

B. E / B. TECH. DEGREE EXAMINATIONS, MAY 2023

Fourth Semester

EE18404 – ANALOG ELECTRONICS

(Electrical and Electronics Engineering)

(Regulation 2018 /Regulation2018A)

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

CO1 Comprehend IC fabrication techniques of electron devices.Ω
CO2 Understand the basic concept of operational amplifier and its basic applications.
CO3 Analyze the use of Op Amp in various analog circuit applications.
CO4 Comprehend operation and applications of 555 timer and 565 PLLICs.
CO 5 Analyze the operation of IC based regulators and instrumentation amplifier.

PART- A(10x2=20Marks)

(Answer all Questions)

		CO	RBT LEVEL
1.	Mention the metal used for metallization in IC fabrication and its advantages.	1	1
2.	Draw and explain any two structures by which a transistor can be utilized as a monolithic diode.	1	2
3.	Explain briefly the open loop operation of an operational amplifier.	2	2
4.	What is the voltage at points A and B for the circuit shown in fig. below, if V_1 = 5V and V_2 = 5.2V	2	3

5.	Explain how an inverting comparator can be utilized as a zero detector.	3	2
6.	Draw the input and output waveforms of a sample and hold circuit for a sinusoidal input.	3	2
7.	In a monostable multivibrator using timer, R = 100KΩ and time delay T = 100ms. Calculate the value of C.	4	2
8.	Briefly explain about a frequency multiplier using PLL.	4	2
9.	Draw the circuit diagram of a dual supply – fixed voltage regulator using the ICs 7805 and 7905.	5	2
10.	List four applications of AD623 Instrumentation Amplifier.	5	2

PART- B (5x 14=70Marks)

			Marks	CO	RBT LEVEL
11. (a)		Discuss in detail about the various processes in IC fabrication with respect to a typical circuit	(14)	1	3
		(OR)			
(b)	(i)	Discuss about the monolithic IC fabrication for: NPN Transistor and	(07)	1	3
	(ii)	PNP Transistor	(07)	1	3
12. (a)	(i)	Obtain the high frequency model of an operational amplifier and explain magnitude and phase characteristics.	(08)	2	4
	(ii)	What is slew rate? Analyze the effect of slew rate for a voltage follower with a sine wave input.	(06)	2	4
		(OR)			
(b)	(i)	Describe the circuit configuration of an inverting amplifier using operational amplifier and derive the equation for closed loop gain.	(06)	2	4
	(ii)	Discuss the operations that can be implemented using the basic circuit of inverting amplifier.	(08)	2	4
13. (a)	(i)	Explain with circuit diagram, the operation of a phase shift oscillator. What is the need for phase shift when op-amp is used as the basic amplifier?	(08)	3	3
	(ii)	Design a phase shift oscillator to oscillate at 100 Hz.	(06)	3	3
		(OR)			
(b)	(i)	Discuss the method of successive approximation for the operation of an 8 bit analog to digital converter with relevant figures. Determine the conversion time, if the input clock is 5 MHz.	(08)	3	4
	(ii)	Draw the circuit of a 3 bit weighted resistor digital to analog converter and analyze the output.	(06)	3	4
14. (a)		Connect the NE555 timer for the operation as an astable multivibrator and discuss the functioning with waveforms.	(14)	4	3

(OR)

(b) (i) Describe the operation of Voltage Controlled Oscillator (VCO) – IC 566 that is utilized in PLL, and obtain the equation for output frequency.   (07)   4   3

(ii) Calculate the output frequency f_0, lock range $\triangle f_L$ and capture range $\triangle f_C$ of a 565 PLL if R_T= 10K, C_T = 0.01μF and C = 10μF   (07)   4   3

15. (a) (i) Discuss the operation of a low voltage regulator using 723 IC.   (08)   5   3

(ii) Explain how current boosting is done in a 723 IC regulator.   (06)   5   3

(OR)

(b) (i) Calculate the values of R1 and R2 for a high voltage, 723 IC regulator to get an output of 28 V.   (08)   5   3

(ii) Describe the symbol, pin diagram and block schematic of LM380 power amplifier and discuss the connections for any two applications.   (06)   5   3

PART- C (1x 10=10Marks)

(Q.No.16 is compulsory)

	Marks	CO	RBT LEVEL

16. Evaluate the performance of   (10)   2   5

     (i) an op-amp differentiator for a sine wave of 1V peak at 100 Hz, C_1 = 0.1μF and

     (ii) an op-amp integrator for a square wave of 1 V peak at 5 KHz, R_1 = 10K and C_f = 10 nF

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