Reg. No.															

B.Tech. DEGREE EXAMINATION, NOVEMBER 2023

Fourth Semester

18EIC206J – ANALOG INTEGRATED CIRCUITS

(For the candidates admitted from the academic year 2020-2021 to 2021-2022)

Note:

(i) **Part - A** should be answered in OMR sheet within first 40 minutes and OMR sheet should be handed over to hall invigilator at the end of 40th minute.

(ii) **Part - B & Part - C** should be answered in answer booklet.

Time: 3 hours | Max. Marks: 100

PART – A (20 × 1 = 20 Marks)

Answer **ALL** Questions

	Marks	BL	CO	PO
1. The identifying initial used by texas instruments in op-amp IC is (A) μA (B) LM (C) MC (D) SN	1	1	1	1
2. The maximum input offset voltage of op-amp 741C is (A) 2 mV (B) 4 mV (C) 6 mV (D) 8 mV	1	1	1	1
3. The purpose of level shifter in op-amp internal circuit is to _____ (A) Adjust DC voltage (B) Increase input impedance (C) Provide high gain (D) Decrease output impedance	1	1	1	1
4. The output voltage is equal to input voltage both in magnitude and phase, the circuit is called as _____ (A) Scale changer (B) Adder (C) Voltage follower (D) Subtractor	1	1	1	1
5. Identify the commercially available monolithic instrumentation amplifier by analog devices (A) LM36310 (B) AD521 (C) IAA101 (D) INA121	1	1	2	1
6. The band elimination filter is also called as _____ (A) Band rejection filter (B) All pass filter (C) Band pass filter (D) Sallen key filter	1	1	2	1
7. The lower and higher cut-off frequency of a band pass filter is 3.2 KHz and 10 KHz calculate bandwidth (A) 3.2 KHz (B) 6.8 KHz (C) 10 KHz (D) 13.2 KHz	1	2	2	1
8. An electrical filter is _____ (A) Phase selective circuit (B) Frequency selective circuit (C) Amplitude selective circuit (D) Magnitude selective circuits	1	1	2	1

9. In PLL, the capture range is always _____the lock range. 1 1 3 1
   (A) Less than (B) Greater than
   (C) Equal to (D) More than

10. Select the application of timer in monostable mode 1 1 3 1
   (A) Missing pulse detector (B) FSK generator
   (C) Pulse position modulator (D) Schmitt trigger

11. The 555 timer can work with supply voltage in the range of 1 1 3 1
   (A) 5V to 22V (B) 5V to 18V
   (C) 5V to 25V (D) 5V to 10V

12. The astable multivibrator has 1 1 3 1
   (A) Two stable state (B) Two quasi stable state
   (C) One stable state (D) One stable and one unstable state

13. The resolution of an ADC is the value of 1 1 4 1
   (A) MSB (B) LSB
   (C) $\pm\left[\frac{1}{2}\right]MSB$ (D) $\pm\left[\frac{1}{2}\right]LSB$

14. Calculate the LSB value of an 8-bit DAC for 0 to 10V range 1 1 4 1
   (A) 23 mV (B) 39 mV
   (C) 27 mV (D) 34 mV

15. The successive approximation type ADC completes n-bit conversion in just _____clock period. 1 1 4 1
   (A) $2^n - 1$ (B) $2^n + 1$
   (C) 1 (D) N

16. A digital voltmeter uses _____type of ADC. 1 1 4 1
   (A) Dual slope (B) Flash
   (C) Counter (D) Tracking

17. 78XX are _____terminal _____fixed voltage regulators. 1 1 5 1
   (A) Three, negative (B) Three, positive
   (C) Four, negative (D) Four, positive

18. Select the output voltage range of LM723 1 1 5 1
   (A) 3 to 38V (B) 2 to 37V
   (C) 9.5 to 40V (D) 7.5 to 41.5V

19. Calculate the output voltage of boost converter if the supply voltage is 156V and duty cycle value is 4. 1 2 5 1
   (A) 260V (B) 264V
   (C) 261V (D) 268V

20. The _____regulator can give adjustable output voltage. 1 1 5 1
   (A) 7805 (B) 7905
   (C) 723 (D) 380

PART – B (5 × 4 = 20 Marks)

Answer **ANY FIVE** Questions

		Marks	BL	CO	PO
21.	Show the circuit of differential pair with large input differential signal.	4	1	1	1
22.	List any four ideal characteristics of op-amp.	4	1	1	1
23.	Show the circuit that gives cosine wave as output for an input sine wave.	4	2	2	1
24.	Discuss about the regenerative comparator circuit.	4	2	2	1
25.	Define Barkhausen criterion with a block diagram.	4	1	3	1
26.	List the advantages and disadvantages of flash type A/D converter.	4	1	4	1
27.	Name the categories of voltage regulation and explain.	4	1	5	1

PART – C (5 × 12 = 60 Marks)

Answer **ALL** Questions

		Marks	BL	CO	PO
28. a.i.	Design an adder circuit using an op-amp to get the output expression as $V_0 = -(0.1V_1 + 2V_2 + 10V_3)$ where V_1, V_2 and V_3 are inputs.	8	3	1	2
ii.	Associate the nodal equation of a non-inverting summing amplifier and give the expression for output voltage.	4	2	1	1
	(OR)				
b.	Develop the output voltage for four input voltages for an adder subtractor circuit with all necessary circuit diagrams.	12	1	1	1
29. a.	Analyze the transfer characteristics of regenerative comparator and discuss its working.	12	2	2	1
	(OR)				
b.	Calculate the total time period, frequency of oscillation and explain the working of astable multivibrator using op-amp.	12	4	2	2
30. a.	Outline the functional diagram of 555 timer as Schmitt trigger.	12	3	3	1
	(OR)				
b.	Discuss about the functional diagram of 555 timer in astable mode and derive the expression of frequency and duty cycle of output waveform.	12	3	3	1
31. a.	Modify the circuit diagram of R-2R ladder type DAC that corresponds to the binary word 100 and find the output voltage.	12	2	4	1
	(OR)				
b.	Illustrate and explain the working of successive approximation type ADC.	12	3	4	1
32. a.	Analyze how 723 general purpose voltage regulator acts as a low voltage regulator.	12	3	5	2
	(OR)				
b.	Outline the four parts of series op-amp regulated power supply.	12	3	5	1

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