GUJARAT TECHNOLOGICAL UNIVERSITY
BE- SEMESTER–III EXAMINATION – WINTER 2025

Subject Code:3130907 **Date:15-12-2025**

Subject Name: Analog & Digital Electronics

Time:10:30 AM TO 01:00 PM **Total Marks:70**

Instructions:
1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

			Marks
Q.1	**(a)**	Draw symbol of OP-AMP and equivalent circuit of OP-AMP.	**03**
	(b)	Explain Non-inverting Amplifier and Inverting Amplifier with waveform.	**04**
	(c)	Draw block diagram of OP-AMP. Explain each block in detail.	**07**
Q.2	**(a)**	List out and discuss all the ideal characteristics of an OP-AMP.	**03**
	(b)	Define following terms: 1.Input Offset voltage 2.Input offset current 3.Input bias current 4. CMRR	**04**
	(c)	Derive an expression for the output of a Inverting Summing amplifier with three input and Average amplifier.	**07**

OR

	(c)	Explain Half Adder circuit .Explain Full adder circuit with the help of two Half adder.	**07**
Q.3	**(a)**	Explain Square wave generator circuit using OP-AMP	**03**
	(b)	Draw and explain peak detector circuit using OP-AMP. Write applications of Peak detector.	**04**
	(c)	Minimize following Boolean function using K-map $F(A,B,C,D) = \Sigma m (1,3,7,11,15) + \Sigma d (0,2,5)$	**07**

OR

Q.3	**(a)**	Draw voltage follower circuit. Prove that voltage follower has unity gain.	**03**
	(b)	Discuss Wein bridge oscillators with circuit diagram.	**04**
	(c)	Explain circuit of OP-AMP as an integrator and draw output wave form.	**07**
Q.4	**(a)**	In response to a square wave input, the output of an OP-AMP changed from -3 V TO +3 V over a time period of 0.25 microsecond. Determine the slew rate of the OP-AMP.	**03**
	(b)	Simplify and prove that Boolean function $F=(A+\bar{B}+AB)(A+\bar{B})(\bar{A}B)=0$	**04**
	(c)	Minimize the following expression using K-map and realize using the logic gates. $F(a, b, c, d) = \Sigma m (1,2,9,10,11,14,15)$	**07**

OR

Q.4	**(a)**	What is Flip Flop? Draw Basic Block Diagram of SR Flip Flop and Explain Working of SR Flip Flop with Truth Table.	**03**
	(b)	Draw a 4-bit asynchronous up counter, explain its working with truth table.	**04**
	(c)	Explain the working of R-2R Ladder D/A converter.	**07**

Q.5	(a)	Design half subtractor logic circuit.	03
	(b)	Explain working of sample and hold circuit using op-amp. Write application of it.	04
	(c)	Draw diagram of serial in parallel out operation of shift register and explain its working with truth table.	07

OR

Q.5	(a)	Draw block diagram of 3 to 8 Decoder with truth table.	03
	(b)	Explain Master-Slave J-K flip-flop configuration.	04
	(c)	Draw a 3-bit up/down ripple counter, explain its working with truth table.	07

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