GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER–IV EXAMINATION – SUMMER 2025

Subject Code:3141002   **Date:08-05-2025**

Subject Name:Analog Circuit Design

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.**

Q.1	**(a)**	Explain internal block diagram of OP-AMP	**03**
	(b)	List ideal characteristics of OP-AMP.	**04**
	(c)	Define Slew rate, CMRR, SVRR, input offset voltage, input offset current, input bias current, offset adjustment range.	**07**
Q.2	**(a)**	What is Barkhusen's criteria for oscillation?	**03**
	(b)	What is PLL? Explain operation of PLL with basic blocks and mention any four applications of it in radio communication.	**04**
	(c)	Explain working of 555 timer based Monostabe multivibrator.	**07**
		OR	
	(c)	Explain working of 555 timer based A-stable multivibrator.	**07**
Q.3	**(a)**	Explain the concept of V to I converter with grounded load.	**03**
	(b)	Explain absolute wave circuit.	**04**
	(c)	Analyze second order butterworth high Pass filter. Draw its frequency response and state design procedure.	**07**
		OR	
Q.3	**(a)**	Explain the importance of All Pass filter.	**03**
	(b)	Explain the working of a Square wave generator using op-amp	**04**
	(c)	Analyze second order butterworth low Pass filter. Draw its frequency response and state design procedure	**07**
Q.4	**(a)**	Explain the concept of virtual ground in op-amp.	**03**
	(b)	Explain summing, scaling and averaging amplifier.	**04**
	(c)	What is need of clipper circuit? Explain op-amp as a positive and negative clipper along with necessary waveforms.	**07**
		OR	
Q.4	**(a)**	What is Voltage limiter circuit?	**03**
	(b)	Explain differential amplifier using two op-amps	**04**
	(c)	Explain how op-amp can be used to generate free running square wave with necessary circuit diagram and waveforms.	**07**
Q.5	**(a)**	Explain peak detector circuit.	**03**
	(b)	Derive relationship between hybrid π and h parameter	**04**
	(c)	Derive the high frequency trance conductance equation for g_m for CE amplifier.	**07**

OR

Q.5 **(a)** Explain gain bandwidth product. **03**

(b) Derive the expression for gain in inverting and non-inverting configuration of OP-AMP. **04**

(c) Derive high frequency current gain for CE amplifier with R_S. **07**

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