GUJARAT TECHNOLOGICAL UNIVERSITY
BE- SEMESTER–IV (NEW) EXAMINATION – WINTER 2020

Subject Code:3141002   **Date:09/02/2021**
Subject Name:Analog Circuit Design
Time:02:30 PM TO 04:30 PM   **Total Marks:56**
Instructions:
1. Attempt any FOUR questions out of EIGHT questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

Q.1	**(a)**	Explain Barkhausen criterion for oscillation.	**03**
	(b)	Explain internal block diagram of OP-AMP	**04**
	(c)	Explain the basic differentiator using an op-amp. What are the problems associated with this configuration? How they are overcome?	**07**
Q.2	**(a)**	Explain operation of PLL with basic blocks and mention any four applications of it in radio communication.	**03**
	(b)	Explain the working of a Square wave generator using op-amp	**04**
	(c)	Explain working of 555 timer based A-stable multivibrator.	**07**
Q.3	**(a)**	Explain the concept of V to I converter with floating load.	**03**
	(b)	Explain inverting and non inverting amplifier 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 absolute wave circuit.	**04**
	(c)	What is need of clipper circuit? Explain op-amp as a positive and negative clipper along with necessary waveforms.	**07**
Q.5	**(a)**	What is Voltage limiter circuit?	**03**
	(b)	Explain summing, scaling and averaging amplifier.	**04**
	(c)	Draw op-amp based wein bridge oscillator. Obtain frequency of oscillation and discuss amplitude stabilization for same.	**07**
Q.6	**(a)**	Explain peak detector circuit	**03**
	(b)	Explain differential amplifier using two op-amps	**04**
	(c)	Draw the hybrid Π common emitter transistor model. Also derive the expression for transistor trans-conductance.	**07**
Q.7	**(a)**	Discuss fixed and adjustable voltage regulator with necessary circuit diagrams.	**03**
	(b)	Explain the magnitude and phase response of low pass function of biquad circuit.	**04**
	(c)	Derive the high frequency trance conductance equation for g_m for CE amplifier.	**07**
Q.8	**(a)**	State the relation between hybrid-Π and h-parameters.	**03**
	(b)	Design RC phase oscillator for the frequency of 2 KHz.	**04**
	(c)	Derive high frequency current gain for CE amplifier with R_S.	**07**

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