Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–IV (NEW) EXAMINATION – WINTER 2020

Subject Code:2141002 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**.

			MARKS
Q.1	**(a)**	Enlist the ideal characteristics of OPAMP.	**3**
	(b)	List the parameter those affecting to the transistor at high frequencies.	**4**
	(c)	Draw the hybrid π model for CE configuration and explain it.	**7**
Q.2	**(a)**	How op-amp is used as a summing amplifier?	**3**
	(b)	What is oscillator? What are the necessary conditions for the oscillations?	**4**
	(c)	Derive the expression for the frequency for the RC phase shift oscillator using transistor.	**7**
Q.3	**(a)**	List the merits & Demerits of negative feedback.	**3**
	(b)	Define the following parameters of Op-Amp: (i) Slew rate (ii) CMRR (iii) Input offset voltage (iv) PSRR	**4**
	(c)	Derive the A_{vf}, R_{if}, & R_{of} for Voltage Amplifier.	**7**
Q.4	**(a)**	Draw the block diagram of OPAMP.	**3**
	(b)	Draw the Block diagram of various Feedback topologies and explain the significance of each topology.	**4**
	(c)	For the voltage amplifier A_V = 140, f_L=200 Hz, f_H = 200 KHz, R_i = 2KΩ, R_o = 4.7KΩ. When negative feedback is employed in it with β = 0.4, determine the A_{vf}, R_{if}, R_{of}, F_{LH}, F_{HF}.	**7**
Q.5	**(a)**	What is precision rectifier?	**3**
	(b)	Explain the working of a Schmitt trigger using Op-amp.	**4**
	(c)	Explain the ideal integrator. What are the problems associated with this configuration? How it can overcome?	**7**
Q.6	**(a)**	Explain operation of PLL with basic blocks.	**3**
	(b)	Explain instrumentation amplifier.	**4**
	(c)	Explain with the circuit diagram and waveforms, the monostable multivibrator using 555 timer.	**7**

Q.7	**(a)**	Classify filter on the basis their frequency response.	**3**
	(b)	What is the difference between active and passive filters?	**4**
	(c)	Show how Bi-quad circuit can be used as a universal filter?	**7**
Q.8	**(a)**	Discuss magnitude and frequency scaling in filter design.	**3**
	(b)	What do you mean by Voltage regulator? List different types of voltage regulators.	**4**
	(c)	Design and explain the 2^{nd} order low pass Butterworth filter. Derive the equation of gain for the same.	**7**

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