

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER-IV (NEW) EXAMINATION – SUMMER 2022

Subject Code:3141002

Date:23-06-2022

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.

		Marks
Q.1	(a) List out characteristics of ideal op-amp.	03
	(b) Define following terms. Slew Rate, CMRR, SVRR, I/P offset voltage.	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 window detector using OP-AMP.	03
	(b) Write a short-note on crystal oscillator.	04
	(c) Derive the expression for the CE short-circuit current gain A_i as a function of frequency.	07
OR		
Q.3	(c) Explain working of 555 timer based A-stable multivibrator.	07
	(a) Explain the concept of virtual ground in op-amp.	03
	(b) Explain summing, scaling and averaging amplifier.	04
	(c) Draw block diagram of Phase Locked Loop (PLL) and briefly explain its operation.	07
OR		
Q.3	(a) What are the advantages of the adjustable voltage regulators over the fixed voltage regulators?	03
	(b) What is Voltage limiter circuit?	04
	(c) Explain in detail Sallen-Key second-order low-pass filter.	07
Q.4	(a) Define following terms. Lock Range for PLL, Capture Range for PLL, Frequency Stability for Oscillators.	03
	(b) State the relation between hybrid-II and h-parameters	04
	(c) Draw the hybrid II common emitter transistor model. Also derive the expression for transistor trans-conductance.	07
OR		
Q.4	(a) Discuss the difference between active and passive filter.	03
	(b) Write a short-note on Advantages of negative feedback in amplifiers.	04
	(c) Draw op-amp based wein bridge oscillator. Obtain frequency of oscillation and discuss amplitude stabilization for same.	07
Q.5	(a) Explain differential amplifier using two op-amps	03
	(b) Explain class A power amplifier	04
	(c) Draw and explain square wave generator using OP-AMP.	07
OR		
Q.5	(a) Explain sample and hold circuit using OP-AMP.	03
	(b) Explain peak detector using OP-AMP.	04
	(c) Derive the high frequency trans conductance equation for g_m for CE amplifier.	07
