

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER– IV(NEW) EXAMINATION – SUMMER 2023****Subject Code:2141002****Date:07-07-2023****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) Define following terms: (i) CMRR (ii) Slew Rate (iii) Offset voltage	03
	(b) List advantages of Schmitt trigger over the conventional comparators.	04
	(c) Show how Biquad circuit can be used as a universal filter?	07
Q.2	(a) State the advantages and disadvantages of SMPS.	03
	(b) Define and explain the 'Lock range' and 'Capture range'.	04
	(c) Draw Hybrid - π equivalent circuit for CE transistor. Also derive the equation of transconductance g_m .	07
OR		
	(c) For the voltage amplifier $A_V = 140$, $f_L = 200$ Hz, $f_H = 200$ KHz, $R_i = 2K\Omega$, $R_o = 4.7K\Omega$. When negative feedback is employed in it with $\beta = 0.4$, determine the A_{vf} , R_{if} , R_{of} , F_{LH} , F_{HF} .	07
Q.3	(a) What is thermal drift? How does it affect the performance of an op-amp circuit?	03
	(b) Draw the block diagram of PLL and explain each block.	04
	(c) What is an oscillator? Explain the concept of oscillation with Barkhausen criteria.	07
OR		
Q.3	(a) Draw and explain block diagram of Op-amp.	03
	(b) How op-amp is used as a summing amplifier?	04
	(c) Draw Wien-bridge oscillator circuit and obtain its frequency of oscillation.	07
Q.4	(a) List the merits & Demerits of negative feedback.	03
	(b) What are the characteristics of an ideal 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
OR		
Q.4	(a) What are precision rectifiers? Explain the working of anyone of them.	03
	(b) Design Op-amp based RC phase oscillator for the frequency of 3 KHz.	04
	(c) Draw the Block diagram of various Feedback topologies and explain the significance of each topology.	07

- Q.5** (a) Explain zero crossing detector with circuit diagram and waveforms. **03**
(b) Explain instrumentation amplifier. **04**
(c) Explain the working of Monostable multivibrator using IC 555. **07**

OR

- Q.5** (a) What is the difference between active and passive filter. **03**
(b) Draw and explain peak detector. **04**
(c) Design and explain the 2nd order low pass Butterworth filter. Derive the equation of gain for the same. **07**
