Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– III (NEW) EXAMINATION – SUMMER 2015

Subject Code: 2130902 **Date:29/05/2015**

Subject Name: Analog Electronics

Time: 02.30pm-05.00pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Parameters of 741 IC are:** A (open loop gain) = 2×10^5, Ri = 2 MΩ, Ro = 75Ω, $F_0 \cong 5H_Z$, Supply voltages = ± 15 V, output voltage swing = ± 13 V.

Q.1	**(a)**	Determine h-parameter for two port networks. Also draw the hybrid model for CE, CB and CC Configuration.	**07**
	(b)	Define Following electrical parameters: input offset voltage, input resistance, CMRR, SVRR, Large signal voltage gain, Output voltage swing, and slew rate.	**07**
Q.2	**(a)**	Draw two op-amp based differential amplifier and derive expressions for its gain, input and output resistances, and bandwidth.	**07**
	(b)	The 741C op-amp having the following parameters is connected as a non-inverting amplifier with $R_1 = 1k\Omega$ and $R_F = 10k\Omega$ compute the values of $A_F, R_{iF}, R_{oF}, f_F, and\ V_{ooT}$.	**07**
		OR	
	(b)	Derive the expression for the closed loop gain, input resistance and output resistance of voltage series feedback amplifier.	**07**
Q.3	**(a)**	What is an instrumentation amplifier? Explain with the help of neat diagram the operation of an instrumentation amplifier employing the three basic op-amps and with provision for variation in the voltage gain.	**07**
	(b)	Describe the working of an integrator circuit with relevant diagrams.	**07**
		OR	
Q.3	**(a)**	Explain voltage to current converter with grounded load.	**07**
	(b)	Draw the circuit op-amp as differentiator and explain with necessary waveforms.	**07**
Q.4	**(a)**	Draw and explain the use of op-amp as a zero crossing detector.	**07**
	(b)	Explain with circuit diagram the operation of a VCO.	**07**
		OR	
Q.4	**(a)**	Explain the working of a summing and averaging amplifier when connected in inverting mode.	**07**
	(b)	Sketch the diagram of 555 timers as an astable multivibrator having 50% duty cycle. Explain its working and derive equation for frequency of output waveform.	**07**
Q.5	**(a)**	Explain with the help of circuit diagram, the operation of first order Butterworth low-pass filter.	**07**
	(b)	Explain op-amp as a comparator.	**07**
		OR	
Q.5	**(a)**	What is PLL? Discuss different applications of PLL in detail.	**07**
	(b)	Draw and explain basic block schematic of 78×× series three terminal voltage regulator ICs.	**07**

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