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**

****