

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 , $R_i = 2 \text{ M}\Omega$, $R_o = 75\Omega$, $F_o \cong 5H_z$, Supply voltages = $\pm 15 \text{ V}$, output voltage swing = $\pm 13 \text{ V}$.

- 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 78xx series three terminal voltage regulator ICs. **07**
