Sem 5 - Biomed - Design & Analog Circuits

Con. 6134-10. **(REVISED COURSE)** **GT-6729**

(3 Hours) [**Total Marks : 100**

N.B. (1) Question No. **1** is **compulsory**. Answer any **five** questions.
(2) Assume **suitable** data if **required**.
(3) Draw neat **diagrams** and **waveforms**

1. (a) List various electrical parameters of OP-AMP supplied in data sheet **20**
(b) If GBP of OP-AMP is 2 MHz. What is its bandwidth when connected in voltage follower ?
(c) What is the difference between open loop and closed loop gain of OP-AMP ?
(d) Draw and explain circuit for missing pulse detector using timer 555.

2. (a) Draw circuit diagram for 3 OP-AMP Instrumentation amplifier. Explain how will you adjust gain by deriving an expression for output voltage. List all the features of Instrumentation amplifier. **10**
(b) Design Schmitt-Trigger circuit for : **10**
UPT = 4 V. LTP = 2 V. V_{sat} = 12 V using OP-AMP.

3. (a) Draw and explain circuit diagrams for following OP-AMP applications Draw necessary waveforms (Any **two**) :— **10**
(i) Sample and Hold circuits
(ii) Multiplier
(iii) Voltage Limiter (positive and negative).
(b) Draw circuit diagram for inverting and non-inverting comparator using OP-AMP. Draw necessary waveforms. **10**

4. Draw circuit diagram for KRC LPF and derive its Transfer function. Find the expression for cut off frequency using equal component design. specify elements for IInd order LPF with f_0 = 1 KHz and Q = 5. What is its d.c. gain ? **20**

5. (a) Draw and explain functional diagram for Astable Multivibrator using timer 555. **10**
(b) Draw circuit diagram for 1st order LPF using OP-AMP. Derive an expression for $\frac{V_o}{V_i}$. plot the frequency response for the same. **10**

6. (a) Draw and explain functional block diagram for IC 8038. Write an equation for frequency of oscillation. **10**
(b) Explain the difference between active and passive filter. **10**

7. Write short notes on any **four** of the following :— **20**
(a) PLL 4046
(b) V-F Converter
(c) OP-AMP noise
(d) Internal Frequency Compensation
(e) External Frequency Compensation
(f) Generalized Impedance Convertor.