

N.B.:

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Draw diagrams wherever necessary.
- 3) Assume suitable data if **NECESSARY**.

- Q.1** a) What are characteristics of Ideal Op-Amp and Practical Op-Amp? (06)
b) What are different IC packages. Draw appropriate diagrams. (04)

OR

- a) Op-Amp 741C is used as inverting amplifier with gain of 75. The Voltage gain Vs. Frequency curve of IC 741C is flat upto 20KHz. What maximum peak to peak signal can be applied without distorting output. Draw diagram and appropriate input-output waveforms. (06)
b) Define : i) output voltage swing ii) Power Supply Rejection Ratio (04)

- Q.2** a) Peaking amplifier has following values: (06)
 $R_1 = 1K\Omega$, $L = 100\mu H$ with 3Ω internal resistance, $C = 0.01\mu F$, $R_f = 6.8 K\Omega$ and $R_L = 10K\Omega$.

Determine : i) peak frequency f_p ii) Gain at f_p iii) Bandwidth of amplifier

- b) How Op-Amp is used as voltage follower circuit. (04)

OR

- a) What are disadvantages of ideal integrator and differentiator? How to overcome these disadvantages? (06)
b) In Integrator circuit, input sine wave of peak to peak amplitude of 5V at 1KHz. Draw output voltage waveform if $R_1 C_f = 0.1$ mS and $R_f = 10 R_1$. Assume voltage across C_f is initially zero. (04)

- Q.3** a) Derive the equation for output voltage of antilog amplifier. Draw appropriate Diagram and waveforms. (06)

- b) For the basic comparator, $V_{in} = 2 V_{PP}$ sine wave at 1KHz, $R = 100 \Omega$, Supply voltage = ± 15 V. Draw the output waveform for $V_{ref} = 500$ mV and -0.1 V (04)

OR

- a) Design a Schmitt Trigger for UTP= 0.5 V and LTP= -0.5 V. Derive necessary equation. (06)
b) What are different temperature compensation techniques for Op-Amp? Why and Where they are used? (04)

- Q.4** a) Design 400Hz active Notch Filter (06)

- b) What is all Pass Filter? What are applications of All pass Filter. (04)

OR

- a) Design a narrow band pass filter for $f_c = 2KHz$, $Q = 20$ and $A_F = 10$ (06)
b) Draw and explain Triangular wave generator with waveforms. (04)

- Q.5** a) What are basic building blocks of PLL? (06)

- b) In Monostable Multivibrator , $R_A = 10 K\Omega$, output pulse width $t_p = 10$ mS. Determine value of C (04)

OR

- a) For PLL + V = 10 V and -V = -10 V , $R_1 = 12K\Omega$, $C_1 = 0.01\mu F$, $C_2 = 10\mu F$. Determine: i) free running frequency ii) Lock range iii) capture range (06)
b) Draw diagram and waveforms for use of IC 555 as Astable Multivibrator. (04)

- Q.6** a) How current to voltage converter is formed? Draw diagram and derive respective equation. (06)

- b) Draw A to D converter using counter Ramp technique. (04)

OR

- a) How D to A converter is formed using R-2R ladder technique. (06)
b) What is V to I converter. How it works? (04)