

LINEAR IC APPLICATIONS

(Electronics and Communication Engineering)

Time: 3 hours

Max. Marks: 70

PART – A

(Compulsory Question)

- 1 Answer the following: (10 X 02 = 20 Marks)
- Define differential amplifier.
 - Draw the op-amp equivalent circuit.
 - Write the properties of ideal op-amp.
 - What is the compensating network?
 - Draw the op-amp integrator circuit.
 - Write about the first order and second order filter.
 - How the name implies 555 timers.
 - Write the applications of PLL.
 - Write the disadvantage of weighted resistor DAC.
 - List out the ADC techniques.

PART – B

(Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

- 2 (a) List and compare the different configurations of differential amplifier.
 (b) What is level translator? Explain the necessity of level translator stage in cascading differential amplifiers.

OR

- 3 (a) Explain the term slew rate and write the importance in op-amp circuits.
 (b) For the given dual-input, balanced-output differential amplifier $R_C = 2.2 \text{ k}\Omega$, $R_E = 4.7 \text{ k}\Omega$, $R_{in1} = R_{in2} = 50 \text{ }\Omega$, $V_{CC} = +10 \text{ V}$, $V_{EE} = -10 \text{ V}$, $\beta_{DC} = \beta_{AC} = 100$ and $V_{BE} = 0.71 \text{ V}$, determine I_{CQ} , V_{CEQ} , r_e , voltage gain, input and output resistances.

UNIT – II

- 4 (a) Compare voltage series and voltage shunt feedback circuits.
 (b) Derive the expression for closed-loop gain.

OR

- 5 (a) Write the difference between compensating and uncompensating networks.
 (b) The op-amp non-inverting amplifier has the following parameters $R_1 = 1 \text{ k}\Omega$, $R_f = 10 \text{ k}\Omega$, $A = 2,00,000$, $R_i = 2 \text{ M}\Omega$, $R_o = 75 \text{ }\Omega$, supply voltages $V_{CC} = +15 \text{ V}$, $V_{EE} = -15 \text{ V}$. Determine A_f , R_{if} & R_{of} .

UNIT – III

- 6 (a) Derive the expression for 3 input summing amplifier with circuit diagram.
 (b) What is the need of Current to Voltage Converter?

OR

- 7 (a) The op-amp non-inverting summing circuit has the following parameters $V_{CC} = +15 \text{ V}$, $V_{EE} = -15 \text{ V}$, $R = R_1 = 1 \text{ k}\Omega$, $R_f = 2 \text{ k}\Omega$, $V_1 = +2 \text{ V}$, $V_2 = -3 \text{ V}$, $V_3 = +4 \text{ V}$. Determine the output voltage V_o .
 (b) Write the design steps of the second order low pass filter and draw its circuit.

UNIT – IV

- 8 Draw and explain the operation of Wein bridge oscillator and write its frequency expression

OR

- 9 (a) How to design the function generator
 (b) The monostable circuit used as divide by 2 network. The input frequency of trigger signal is 2 kHz, if $C = 0.01 \mu\text{F}$, calculate the value of R_A .

UNIT – V

- 10 Draw and explain the successive approximation ADC.

OR

- 11 Draw and explain in detail about R-2R DAC.
