17445

11819

3 Hours / 100 Marks Seat No. | | | | | | | | |

Instructions – (1) All Questions are *Compulsory.*

(2) Answer each next main Question on a new page.

(3) Illustrate your answers with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

(6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. a) **Attempt any SIX of the following:** **12**

(i) Define –

(1) CMRR

(2) Input offset voltage

(ii) Draw circuit diagram of basic integrator using op-amp.

(iii) State the need of signal conditioning.

(iv) List any four specification of IC LM324.

(v) Draw voltage to current converter with floating load.

(vi) Define –

(1) Q factor of filter

(2) Roll of rate

(vii) Draw circuit diagram of narrow band pass filter using op-amp.

(viii) Draw pin diagram of IC555.

Marks

b) **Attempt any TWO of the following:** **8**

(i) Draw block diagram of op-amp. Describe the function of input stage and level shifting stage.

(ii) Compare ideal and practical op-amp values w.r.t.

(1) SVRR

(2) Input offset voltage

(3) Input offset current

(4) Slew rate

(iii) Draw dual input unbalanced output differential amplifier. State use of this stage.

2. Attempt any FOUR of the following: **16**

a) Derive the equation of virtual ground concept in op-amp.

b) Derive closed loop Inverting amplifier using op-amp and derive expression for its gain.

c) Design a circuit that convert square wave to triangular wave. Draw input - output waveforms.

d) For unity gain amplifier if V_{in} = +5V. What will be the output voltage? Draw the circuit diagram of unity gain amplifier.

e) Draw basic differentiator. Derive the expression for relation between its input and output.

f) Why offset nulling is required? Explain with circuit diagram.

3. Attempt any FOUR of the following: **16**

a) State the need of peak to peak detector and draw its circuit diagram.

b) Draw and explain circuit diagram of antilog amplifier.

c) Draw and explain V to I converter with grounded load.

d) Draw circuit diagram and input-output waveforms of inverting ZCD and non-inverting ZCD (Zero Crossing Detector)

e) List any four advantages and four applications of instrumentation amplifier.

f) Draw and explain sample and hold circuit using op-amp.

Marks

4. Attempt any FOUR of the following: **16**

a) Give classification of filters on the basis of –

(i) Components used

(ii) Frequency range

(iii) Frequency response

(iv) Nature of passband and stopband

b) Design second order low pass filter to get pass band gain two and cut off frequency 1 KHz.

c) Draw the circuit of wide band pass filter. Draw its frequency response characteristics.

d) Draw notch filter. Explain with characteristics.

e) Draw first order high pass filter and explain with characteristics.

f) Explain why active filter is better than passive filter.

5. Attempt any FOUR of the following: **16**

a) Draw and describe the operation of water level controller using IC555.

b) Draw the block diagram of IC555. State the function of both internal transistors in IC555.

c) Describe with the help of block diagram, the operation of FM demodulator using PLL.

d) Draw P.L.L. transfer curve. Explain –

(i) Capture range

(ii) Lock range

e) Explain how monostable multivibrator can be used as frequency divider.

f) Draw and describe the operation of touch plate switch using IC555.

Marks

6. Attempt any FOUR of the following: **16**

a) Explain the working of IC555 as schmitt trigger. Draw circuit diagram and output waveforms.

b) Draw and describe operation of Bistable multivibrator using op-amp.

c) Design and draw op-amp based wien bridge oscillator for frequency 1 KHz.

d) Explain principle of oscillator with block diagram.

e) Give advantages and disadvantages of wien bridge oscillator.

f) Draw the circuit diagram of phase shift oscillator using IC-741. State any two applications of it.
