22423

12425

03 Hours / 70 Marks Seat No. | | | | | | | | |

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

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

(3) Figures to the right indicate full marks.

(4) Assume suitable data, if necessary.

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

(6) Preferably, write answers in sequential order.

Marks

1. Attempt any FIVE of the following : **10**

a) Define parameters, Input bias current and Output voltage swing of Op-Amp.

b) Draw circuit diagram of unity gain amplifier using Op-Amp and write its output voltage equation.

c) Draw the circuit diagram of zero crossing detector using Op-Amp.

d) State the need of all-pass filter and write its two applications.

e) Draw diagram of analog divider.

f) Define Lock range and capture range of PLL.

g) Define roll-off rate. What is the roll-off rate of second order Low pass Butterworth filter ?

Marks

2. Attempt any THREE of the following : **12**

a) Draw the block diagram of Op-Amp and state the function of each block.

b) Draw circuit diagram of window detector using Op-Amp and explain its working with waveforms.

c) Draw circuit diagram of Monostable multivibrator using IC 555 and explain its working with waveforms.

d) Draw the circuit diagram of open loop inverting amplifier and find its output voltage, if input voltage applied is 20 mVdc. Assume 741C Op-Amp.

3. Attempt any THREE of the following : **12**

a) Explain virtual ground concept of an Op-Amp with diagram.

b) Draw circuit diagram of current to voltage converter using Op-Amp and derive its output voltage expression.

c) Draw circuit diagram and frequency response of narrow band reject filter and write its notch frequency equation.

d) Explain with diagram how PLL can be used as a FM demodulator ?

4. Attempt any THREE of the following : **12**

a) Identify and draw circuit diagram using Op-Amp to generate output voltage, $V_o = V_a - V_b$, where V_a and V_b are input voltages applied to Op-Amp.

b) Explain PLL as a FM demodulator with block diagram.

c) Compare active and passive filters. (Any 4 points)

d) Design a high pass Butterworth filter with centre frequency f_c = 1 KHz and passband gain of 2.

e) How IC 555 can be used as voltage controlled oscillator (VCO) ? Explain it with diagram and waveforms.

Marks

5. Attempt any TWO of the following : **12**

a) Draw circuit diagram of peak to peak detector using Op-Amp and explain its working with waveforms.

b) Draw circuit diagram of Hartley oscillator, explain its working and write its two applications.

c) Draw sample and hold circuit diagram using Op-Amp and explain its working with waveforms.

6. Attempt any TWO of the following : **12**

a) Draw circuit diagram and input-output waveforms of practical active differentiator circuit. Explain its working.

b) Draw pin diagram of IC LM324 and list its four specifications. State its two applications.

c) Draw the circuit diagram of second order Low pass filter using Op-Amp and explain its working with waveforms.