

Code No.: 30412/40412

MR13/MR14

MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)

(Affiliated to JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD)
Gundlapochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad

III B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, NOVEMBER-2019

Subject: LINEAR AND DIGITAL IC APPLICATION

Branch: **EEE & ECE**

Time: **3 hours**

Max. Marks: **75**

PART – A

I. Answer ALL questions of the following

5x1M=5 M

1. Define an operational amplifier.
2. What are the limitations of the basic differentiator circuit?
3. What is the basic principle of PLL?
4. Define line regulation.
5. What is the name of IC 74154?

II. Answer ALL questions of the following

10x2M=20 M

1. Define input offset current. State the reasons for the offset currents at the input of the op-amp.
2. How the input offset voltage compensated for?
3. What is the need for an instrumentation amplifier?
4. List the features of instrumentation amplifier.
5. Design a second order low pass filter.
6. Define Notch filter and how do we get notch filter from a band pass filter.
7. Explain the internal structure of voltage regulator IC 723.
8. What are the advantages of switching regulators?
9. Draw the Symbol, circuit structure and truth table of a CMOS inverter.
10. Write any two applications of IC 7447.

PART-B

Answer ALL questions of the following

5x10 M= 50M

1. Draw the circuit of a symmetrical emitter coupled differential amplifier and derive CMRR.

OR

2. Explain how the following op-amp parameters are measured.

(i) Open loop voltage gain. (ii) Input bias current. (iii) Input offset current. (iv) Input offset voltage.

3. Draw and explain the operation of a I to V converter. If 741IC is used, what is the lowest value of current that may be measured?

OR

4. a) Sketch and explain the circuit operation of log amplifiers. Calculate output voltages for a given input and show how temperature dependence is minimized.

b) With the help of a neat circuit diagram, explain the operation of a three op-amp instrumentation amplifier and obtain the expression for its output voltage.

5. Draw the circuit of a 1st order Butterworth low pass filter and derive its transfer function.

OR

6. a) Design a mono-stable multivibrator using 555 timer to produce of 0.5msec. Derive necessary equations. Sketch the input and output waveforms.

b) Explain tracking range and capture range and calculate each range for a given PLL system.

7. a) Explain the operation of a multiplying DAC and mention its applications.

b) A 12-bit D to A converter has a full-scale range of 15 volts, its maximum differential linearity error is $\pm 1/2$ LSB. Determine the percentage resolution, and the minimum and maximum possible values of the increment in its output voltage.

OR

8. Explain the working of a weighted resistor D/A converter.

9. (a) Design a conversion circuit to convert a T flip-flop to D flip-flop.

(b) Explain the operation of parallel-in-parallel-out shift register.

OR

10. Explain the working of Multiplexer using IC 74151.