

Question Paper Code : X10397

**B.E/B.Tech. DEGREE EXAMINATIONS NOV/DEC2020 & APRIL / MAY 2021**

**Fourth semester**

**Electrical and Electronics Engineering**

**EE8451-LINEAR INTEGRATED CIRCUITS AND APPLICATIONS**

**Common to: (Electronics and Instrumentation Engineering/Instrumentation and Control Engineering)**

**(Regulations 2017)**

Time: 3 Hours

Answer ALL Questions

Max. Marks 100

**PART- A (10 x 2 = 20 Marks)**

1. State the difference between Monolithic Integrated Circuits and Hybrid Integrated Circuits
2. Define the term "Sheet Resistance( $R_s$ )".
3. List down the characteristics of an Operational Amplifier in Ideal Working Condition.
4. Draw the differentiator circuit using an OP-AMP and write its output equation.
5. If the CMRR is  $10^5$  and Differential Gain ( $A_{DM}$ ) is  $10^5$ , Calculate the Common Mode Gain ( $A_{CM}$ ) of an OP-AMP.
6. Give the advantages of Integrating Type Analog- to – Digital Converters.
7. Mention the various applications of IC 555 Timer
8. Define the terms "Capture Range" and "Lock-in – Range" in the context of Phase Locked Loop(PLL).
9. Write down the features of ICL8038 Function Generator IC.
10. Is it true that switching regulators have better efficiency than series regulators? Justify your answer.

**PART- B (5 x 13 = 65 Marks)**

11. a) Elucidate the process of Oxidation and Photolithography in the IC Fabrication.  

**OR**

b) Explain the various isolation techniques used in Integrated Circuits.
12. a) Explain the operation of inverting and non-inverting configurations of Operational Amplifiers.  

**OR**

b) Discuss the various frequency compensation techniques for Operational Amplifiers.
13. a) Illustrate the working of R-2R Ladder Digital – to – Analog Converter (DAC) with neat diagrams.  

**OR**

b) Design and explain the operation of OP-AMP based RC based RC Phase Shift Oscillator with the output frequency of 1kHz.

14. a) With necessary diagrams, illustrate the operation of Voltage Controlled Oscillator (VCO).

**OR**

b) Explain any two applications of IC 555 Timer in Monostable Mode of Operation.

15. a) With a neat diagram, explain as to how an AD623 Instrumentation Amplifier used for Load Cell Weight measurement application.

**OR**

b) Illustrate the working principle of Switched Mode Power Supplies with necessary diagrams.

**PART- C (1 x 15 = 15 Marks)**

16. a) With a neat diagram, explain the operation of OP-AMP based Log Amplifier and derive the expression for output voltage. Also, discuss the method to compensate the saturation current and temperature effects in the same.

**OR**

b) Design an Astable Multivibrator using IC 555 Timer to produce a square wave of 1 kHz with 40% duty cycle. Explain.