Reg. No. : | E | N | G | G | T | R | E | E | . | C | O | M |

Question Paper Code : 40983

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2024.

Fourth Semester

Electronics and Communication Engineering

EC 3451 – LINEAR INTEGRATED CIRCUITS

(Common to : Electronics and Telecommunication Engineering)

(Regulations 2021)

Time : Three hours
Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. How does the change in supply voltage affect the operating point in the transistor?

2. How is the figure of merit of a differential amplifier calculated?

3. Suggest a circuit to generate triangular waveform from square waveform using OPAMP.

4. Name a comparator with positive feedback.

5. What is the function of voltage-controlled oscillator in PLL?

6. What is the function of a logarithmic multiplier?

7. An 8-bit D/A converter has an output voltage ranging from 0 to 2.55 V. Find the resolution of the system.

8. Suggest two methods to enhance the performance of an A/D converter.

9. How is current limit protection provided in a voltage regulator?

10. How is PLL used as a frequency translator?

PART B — (5 × 13 = 65 marks)

11. (a) Elaborate on a low value current source designed by using an emitter resistor in conjunction with a differential amplifier.

Or

(b) Discuss the impact of frequency response, gain, bandwidth, slew-rate and phase-shift on OPAMP performance in real-time.

12. (a) Analyze a voltage to current converter circuit with load floating and ground. How does this affect the current drawn from the source?

Or

(b) Design a multiple feedback narrow bandpass filter with $f_r = 1\,kHz$, $Q = 3$ and $A_f = 10$.

13. (a) Perform the dc analysis of the Gilbert cell and comment on the linearity of the output.

Or

(b) In a FSK based satellite communication system, how could the PLL design be configured to perform both FSK modulation and demodulations?

14. (a) Convert a 2-bit analog signal into a digital signal using a simultaneous fastest A/D converter.

Or

(b) Explain the principle of operation of a first order sigma-delta modulator.

15. (a) Draw and explain how an IC 723 voltage regulator could be modified to supply a voltage range from 2 V to 7 V.

Or

(b) Draw and explain the circuit diagram of IC 733 video amplifier along with its features.

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PART C — (1 × 15 = 15 marks)

16. (a) Design a square wave generator using 555 timer to generate a frequency of 150 Hz with 70% duty cycle. Assume C = 0.1 μF.

Or

(b) Design a continuously adjustable power supply for the range of 2 V to 5 V with a current limit of 1 A using IC LM 723.

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