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Question Paper Code : 40446

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2021.

Fourth Semester

Biomedical Engineering

EC 8453 – LINEAR INTEGRATED CIRCUITS

(Common to Electronics and Communication Engineering/
Medical Electronics / Robotics and Automation)

(Regulations 2017)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is a Voltage Reference?
2. Why is the slew rate infinite in an ideal Opamp?
3. Draw the circuit of Opamp as a subtractor.
4. Draw the circuit of an Integrator.
5. List the applications of analog multipliers?
6. What is FSK modulation?
7. What output voltage would be produced by a D/A converter whose output range is 0 to 10V and whose input binary number is 10111100 (for a 8-bit DAC)?
8. Give the resolution of an 8-bit ADC of by input range?
9. Draw the functional diagram of 555 timer.
10. State the principle used in Voltage to Frequency conversion?

PART B — (5 × 13 = 65 marks)

11. (a) Draw and explain the block diagram of an Opamp. Discuss the functions of each stage in detail.

Or

- (b) Explain the AC characteristics of an Opamp.
12. (a) Describe the following applications of OPAMP:
- (i) Voltage to Current Converter
 - (ii) Current to Voltage Converter

Or

- (b) (i) Explain the circuit of a Non-inverting comparator.
(i) Describe the circuit and working of a Square-wave generator.
13. (a) Explain the circuit of an Operational Transconductance Amplifier and its Transfer characteristics.

Or

- (b) Elucidate Frequency Multiplication and Translation using PLL.
14. (a) Explain the following types of DACs:
- (i) Weighted resistor DAC
 - (ii) R-2R ladder

Or

- (b) Explain the following types of ADCs:
- (i) Flash ADC
 - (ii) Counter type ADC
15. (a) (i) Explain the circuit of a RC Phase Shift Oscillator.
(ii) Describe the performance parameters of IC regulators.

Or

- (b) (i) Explain Switched Capacitor Filters.
(ii) Give the classification of Power amplifiers and explain.

PART C — (1 × 15 = 15 marks)

16. (a) (i) Explain the circuit that performs the mathematical operation of differentiation. Draw its output waveform. (8)
- (ii) Design an opamp differentiator that will differentiate an input signal with $f_{max} = 100Hz$. (7)

Or

- (b) (i) Explain the circuit that provides an output voltage which is proportional to the time integral of the input. (8)
- (ii) Consider a non-inverting integrator circuit. Show that $V_0 = (1/RC) \int V_1 dt$. (7)

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