Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐☐☐

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 Trasnsfer 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.

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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 $f_{max} = 100 Hz$.   (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 $V_0 = (I / RC) \int V_1 \, dt$.   (7)

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