

Reg. No. :

**Question Paper Code : 20472**

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2022.

Fourth Semester

Electronics and Communication Engineering

EC 8453 — LINEAR INTEGRATED CIRCUITS

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

(Regulations 2017)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List the ideal Characteristics of Op amp.
2. Define slew rate.
3. Compare precision rectifier with the conventional rectifier.
4. Why the output of comparator circuit is always  $\pm V_{sat}$ ?
5. Give the applications of PLL.
6. What is the function of frequency synthesizer?
7. What are the disadvantages of weighted resistor type DAC?
8. For n bit ADC, how many clock cycle is required for its conversion when flash type and successive approximation ADC is used?
9. What is the need of an voltage regulator?
10. Write the Barkhausen criterion for oscillation.

PART B — (5 × 13 = 65 marks)

11. (a) Explain the internal operation of an op amp using a block diagram.

Or

- (b) Elucidate the operation current mirror when used as a bias and as an active load.

12. (a) Draw the circuit diagram of Instrumentation of instrumentation amplifier and explain its operation. Also list out its application.

Or

- (b) (i) Design a differential amplifier to implement  $V_o = \frac{3}{4}(V_2 - V_1)$ . (8)

- (ii) Design a positive clamper circuit using an op amp. (5)

13. (a) Explain the operation of PLL using a block diagram along with its operating ranges.

Or

- (b) Draw the circuit diagram of a gilbert multiplier cell and derive its differential output current.

14. (a) Design a flash type analog to digital converter with 4 bit as output and encode the 4bit into 2bit using priority encoder.

Or

- (b) Explain the working of a 3 bit non inverting R-2R ladder types DAC.

15. (a) Explain how 555 timer IC can be used as an astable multivibrator with a neat circuit diagram.

Or

- (b) Design a voltage regulator to regulate 10V at the output using 1C723.

PART C — (1 × 15 = 15 marks)

16. (a) Design an analog computer to solve a second order differential equation given as  $\frac{d^2y}{dt^2} + 5.4\frac{dy}{dt} + 0.58y = u(t)$ .

Where y is the output u(t) is the unit step input.

Or

(b) (i)

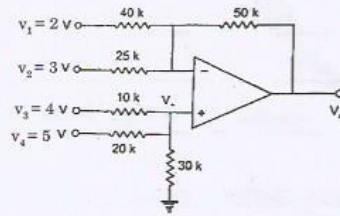


Fig. Q.16(b)(i)

Determine the output voltage  $V_o$ .

(8)

(ii)

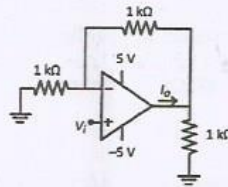


Fig. Q.16(b)(ii)

If the input voltage  $V_1$  is 2V, determine the current  $I_0$ .

(7)