

Reg. No.

Question Paper Code

11661

B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV/DEC 2022

Fourth Semester

Electronics and Communication Engineering

20ECPW402 - LINEAR INTEGRATED CIRCUITS WITH LABORATORY

(Regulations 2020)

Duration: 3 Hours

Max. Marks: 100

**PART - A (10 × 2 = 20 Marks)**

Answer ALL Questions

- |   | <i>Marks,<br/>K-Level, CO</i> |
|---|-------------------------------|
| 1. Define Slew rate.  | 2,K1,CO1                      |
| 2. List the ideal characteristics of an operational amplifier.                  | 2,K1,CO1                      |
| 3. Differentiate precision rectifier from the conventional rectifier.           | 2,K2,CO2                      |
| 4. Compare the inverting and non-inverting amplifier configuration.             | 2,K2,CO2                      |
| 5. How are square root and square of a signal obtained with multiplier circuit? | 2,K2,CO3                      |
| 6. Define duty cycle in a stable multi vibrator using IC 555.                   | 2,K1,CO3                      |
| 7. Calculate the number of comparators required for realizing a 4bit flash ADC. | 2,K2,CO4                      |
| 8. Define resolution of a data converter.                                       | 2,K1,CO4                      |
| 9. Define switched voltage regulators.  | 2,K2,CO5                      |
| 10. List out the parameters related to the fixed voltage regulators.            | 2,K2,CO5                      |

**PART - B (5 × 13 = 65 Marks)**

Answer ALL Questions

- |  |           |
|--|-----------|
| 11. a) (i) Illustrate the different internal stages of op amp with necessary diagrams.   | 7,K2,CO1  |
| (ii) An operational amplifier with a slew rate of $8 \text{ V}/\mu\text{s}$ is driven by a 250 KHz sine wave. What is the maximum output amplitude at which slew rate limiting is reached? | 6,K2,CO1  |
| <b>OR</b>  |           |
| b) Draw and explain the performance of IC LF155 with a neat sketch.  | 13,K2,CO1 |
| 12. a) With the suitable circuit diagram, explain the operating principle of an instrumentation amplifier and derive its gain.   | 13,K2,CO2 |
| <b>OR</b>  |           |
| b) Define Schmitt Trigger and explain about the working of inverting and non inverting Schmitt triggers in detail.   | 13,K2,CO2 |

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create

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13. a) How would you describe the block diagram of PLL and derive the expression for capture range. 13,K2,CO3

OR

- b) Explain the working of voltage controlled oscillator with neat circuit diagrams. 13,K2,CO3

14. a) (i) Using suitable circuit diagrams describe in detail the operation of a R-2R ladder DAC. Derive the expression for the output voltage. 7,K2,CO4

(ii) The basic step of a 9 - bit DAC is 10.3 mV. If 000000000 represents 0V, calculate the output produced if the input is 101101111. 6,K2,CO4

OR

- b) Explain the operation of a Flash type ADC, using necessary block diagram and graph(s). 13,K2,CO4

15. a) Draw a circuit using an op-amp to generate triangular wave. Explain its operation. 13,K2,CO5

OR

- b) (i) Explain the working principle of IC MF10. 7,K2,CO5

(ii) Explain the working principle of ICL8038 function generator. 6,K2,CO5

**PART - C (1 × 15 = 15 Marks)**

16. a) (i) Design a Timer which should turn on Heater immediately after pressing push button and should hold heater on ON state for 6 seconds. 8,K3,CO6

(ii) Design a monostable multivibrator with pulse duration of 8 ms by using 555 timer IC. 7,K3,CO6

OR

- b) Design a square wave generator and draw the waveform of a 1 kHz using 555 timer for duty cycle of 50%. 15,K3,CO6