



B.E. DEGREE EXAMINATIONS: APRIL / MAY 2023

(Regulation 2018)

Fourth Semester

ELECTRONICS AND COMMUNICATION ENGINEERING

U18ECI4202: Analog Electronics and Integrated Circuits

COURSE OUTCOMES

- CO1:** Design and verify feedback amplifiers, LC and RC oscillators.
CO2: Describe the characteristics of operational amplifiers.
CO3: Develop and analyze operational amplifier application circuits.
CO4: Build data converters for the given specifications.
CO5: Operate 555 timer circuit and generate waveforms.

Time: Three Hours

Maximum Marks: 100

**Answer all the Questions:-
 PART A (10 x 2 = 20 Marks)
 (Answer not more than 40 words)**

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| 1. Compare the characteristics of positive feedback and negative feedback. | CO1 | [K ₂] |
| 2. Outline the Barkhausen criteria for oscillations. | CO1 | [K ₂] |
| 3. Interpret the ideal characteristics of an operational amplifier. | CO2 | [K ₂] |
| 4. Interpret the slew rate, if an operational amplifier is necessary to amplify a signal through 4 volts of peak voltage at a 30 kHz of frequency. | CO2 | [K ₃] |
| 5. Define voltage follower circuit. | CO3 | [K ₁] |
| 6. Summarize the need for sample and hold circuit. | CO3 | [K ₂] |
| 7. Define resolution in digital to analog converter. | CO4 | [K ₁] |
| 8. Show the analog to digital converter specifications. | CO4 | [K ₂] |
| 9. Define lock range and capture range in PLL. | CO5 | [K ₁] |
| 10. What is free running multivibrator? | CO5 | [K ₁] |

Answer any FIVE Questions:-
PART B (5 x 16 = 80 Marks)
(Answer not more than 400 words)

11. a) Illustrate the current-shunt topology of the negative feedback amplifier and derive the necessary equations with suitable equivalent circuit. 8 CO1 [K₂]
b) Construct the frequency of oscillations of an RC phase shift oscillator that depends on the resistive and capacitive elements of its feedback network. 8 CO1 [K₂]
12. a) Summarize the DC characteristics of ideal operational amplifier with suitable mathematical relations. 8 CO2 [K₂]
b) Compare and Contrast Wilson Current Mirror and Widlar Current Mirror circuits. 8 CO2 [K₂]
13. a) Analyze the working of inverting and non inverting voltage amplifiers with suitable equations. 8 CO3 [K₄]
b) What is the need for precision diode? Explain the operation of precision rectifiers with neat illustrations. 8 CO3 [K₂]
14. a) Elaborate the working principles of positive and negative clipper circuits. Mention its applications. 8 CO3 [K₂]
b) Distinguish the types of comparators and explain their working with neat diagrams. 8 CO3 [K₂]
15. a) Explain in detail about the working principles of weighted resistor digital to analog converter. 8 CO4 [K₂]
b) Construct a dual slope analog to digital converter and explain its working with neat illustration. 8 CO4 [K₃]
16. a) Illustrate the working principles of monostable multivibrator using IC 555 timer. 8 CO5 [K₂]
b) Explain the operation of PLL with a neat block diagram and mention its applications. 8 CO5 [K₂]
