Register No.: ..... Name: .....

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

FIFTH SEMESTER B.TECH DEGREE EXAMINATION (Regular), DECEMBER 2022
ELECTRONICS AND COMMUNICATION ENGINEERING
(2020 SCHEME)

Course Code : 20ECT301

Course Name: Linear Integrated Circuits

Max. Marks : 100 **Duration: 3 Hours**

PART A

(Answer all questions. Each question carries 3 marks)

1. A differential amplifier has common mode gain A_c=0.1 and difference mode gain A_d=200. Let the input signals be V_1=1050μV and V_2=950 μV. Calculate the output voltage and CMRR.
2. Define slew rate and explain its effect at the output of an Op-Amp.
3. Design a non-inverting amplifier with gain 11.
4. Distinguish between virtual ground and actual ground.
5. Sketch the circuit of a monostable multivibrator using Op-Amp.
6. Design a first order Butterworth low pass filter with f_L = 1KHz and pass band gain of 3.
7. Draw the functional diagram of 555 Timer IC.
8. Explain the necessity of using low pass filter in a PLL.
9. Define line regulation and load regulation.
10. List the specifications of D/A converter.

PART B

(Answer one full question from each module, each question carries 14 marks)

MODULE I

11. a) Derive the expression for differential mode gain, common mode gain and CMRR of a dual input balanced output differential amplifier. (10)
    b) Explain the working of Widlar current source. (4)

OR

12. a) Explain the block diagram of an Op-Amp. (6)
    b) Explain i) equivalent circuit of Op-Amp ii) transfer characteristics of Op-Amp. (8)

MODULE II

13. a) Explain the working of an inverting comparator with necessary waveforms. (5)
    b) Describe the working of an instrumentation amplifier using Op-Amp and transducer bridge. (9)

OR

14. a) Explain the working of a temperature compensated logarithmic amplifier. (7)

b) Explain the working of practical differentiator with necessary diagrams and analyze its frequency response. (7)

MODULE III

15. a) State the Bark-Hausen criteria for oscillation. Derive the frequency of oscillation for an RC phase shift Oscillator. (8)

b) Design an astable multivibrator which produce square wave of frequency 2 KHz and V_{P-P} of 10V. (6)

OR

16. a) Explain how free running square waveform can be generated using Op-Amp. (7)

b) Derive the transfer function of a second order high pass filter. (7)

MODULE IV

17. a) Explain the working of a monostable multivibrator using 555 timer IC with relevant waveforms and functional diagram. Derive an expression for the pulse width. (10)

b) Describe how frequency multiplication can be achieved using a PLL. (4)

OR

18. a) Explain the working of an astable multivibrator using 555 timer IC with relevant waveforms and functional diagram. Derive the expression for frequency of oscillations. (10)

b) Illustrate the principle of operation of a PLL with suitable diagrams. (4)

MODULE V

19. a) Describe the working of a current foldback protection circuit in regulators. (6)

b) Explain the working of a R-2R ladder D/A converter. (8)

OR

20. a) Explain the working of low voltage regulator using IC723. (7)

b) Illustrate the operation of dual slope ADC with a functional diagram. (7)

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