

Register No.: Name:

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

FIFTH SEMESTER B.TECH DEGREE EXAMINATION (S), FEBRUARY 2023

ELECTRONICS AND COMMUNICATION ENGINEERING

(2020 SCHEME)

Course Code : 20ECT301

Course Name: Linear Integrated Circuits

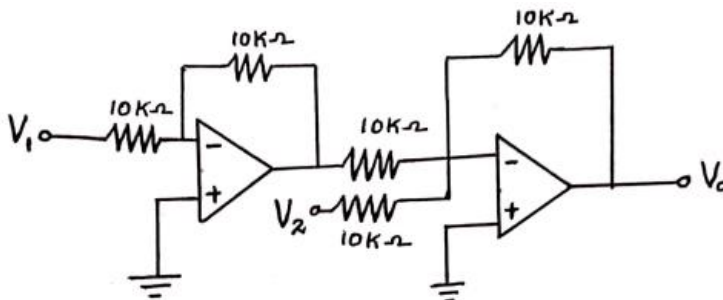
Max. Marks : 100

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 $V_1=1050\mu\text{V}$ and $V_2=950\mu\text{V}$. Calculate the output voltage and CMRR.
2. Define input offset current and input bias current of an op-amp. Give its typical value.
3. List out the important features of an instrumentation amplifier.
4. Calculate V_o for the circuit below for $V_1=5\text{V}$ and $V_2=2\text{V}$.



5. Design a first order low pass filter with a cut off frequency of 5KHz and pass band gain of 1.5.
6. List the advantages of active filters over passive filters.
7. Sketch the pin diagram of timer IC 555 and write the function of each pin.
8. Design a timer which should turn ON heater immediately after pressing a push button & should hold heater in ON state for 6 seconds.
9. Define line regulation & load regulation of a voltage regulator.
10. A 12 bit DAC has a step size of 8mV. Determine the full scale output voltage and percentage resolution. Also find the output voltage for the input of 011101110001.

PART B

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

MODULE I

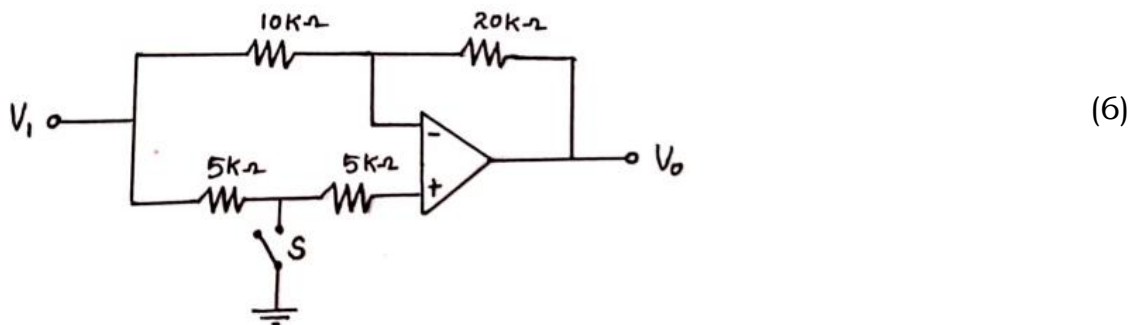
11. a) Analyze the dual input balanced output differential amplifier configuration and derive expression for input resistance, output resistance and CMRR. (10)
- b) The 741C is used as an inverting amplifier with a gain of 50. The sinusoidal input voltage has a variable frequency and maximum amplitude of 20mV peaks. What is the maximum frequency of the input at which the output will be undistorted? Assume that the amplifier is initially nulled. (4)

OR

12. a) Derive the expression for output current of a Wilson current source circuit in terms of reference current. (7)
- b) Explain pole-zero compensation method of an op-amp. (7)

MODULE II

13. a) Draw the circuit of temperature compensated log amplifier and prove that output voltage is independent of saturation current. (8)
- b) Calculate the gain of the amplifier circuit when (i) switch S is off (ii) switch S is on.



OR

14. a) Explain the working of a full wave rectifier with neat diagrams. (8)
- b) Design a Schmitt trigger circuit for $V_{LTP}=+2V$, $V_{UTP}=+3V$. (6)

MODULE III

15. a) Derive the transfer function of first order wide band pass filter using op-amp. (6)
- b) Explain the working of op-amp astable multivibrator for duty cycle not equal to 50%. (8)

OR

16. a) Explain the working of triangular wave generator using op-amp. (6)

- b) Derive frequency of oscillation of a RC phase shift oscillator. (8)

MODULE IV

17. a) Explain the working of monostable multivibrator using functional diagram of 555 IC. (8)
- b) Design an astable multivibrator using 555 timer for a frequency of 2 KHz and a duty cycle of 75%. Assume $C=0.1\mu\text{F}$. (6)

OR

18. a) Explain the working of PLL with suitable diagram. (8)
- b) Explain any two applications of PLL. (6)

MODULE V

19. a) Explain the working of weighted resistor DAC. Mention its drawback. (8)
- b) Define any three specifications of DAC. (6)

OR

20. a) Explain current fold back & current boosting circuit using IC723 voltage regulator. (8)
- b) Explain the working of successive approximation type converter using neat diagram. (6)
