

Roll No.

Total No. of Pages : 02

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B.Tech. (ECE) (Sem-5)
LINEAR INTEGRATED CIRCUITS

Subject Code : BTEC-503-18

M.Code : 78299

Date of Examination : 19-06-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Write briefly :

- a. Explain why the input terminals of an op-amp are named as inverting input and non-inverting input?
- b. What are the disadvantages of just increasing the value of R_E for improving CMRR?
- c. What are the limitations of an ideal integrator?
- d. Give two reasons why open loop op-amp is unsuitable for linear applications.
- e. What is a Schmitt trigger? What are its applications?
- f. What is the working principle of switching regulator?
- g. What is the effect on input resistance if three Op-amps are used as differential amplifier?
- h. What do you understand by precision rectifier? How do they differ from conventional rectifiers?
- i. What are the features of 555 timers IC?
- j. Give the difference between active and passive filters.

SECTION-B

2. How op-amp can be used as an integrator and differentiator?
3. What are the factors that affect the input offset voltage, input bias and input offset currents? Explain the circuit designing for input offset voltage compensation.
4. With help of a neat diagram and waveform, explain the Instrumentation Amplifier circuit.
5. Derive the expression for output frequency and gain of phase shift oscillator.
6. Draw the circuit of a first order and second order active low pass filter and derive its transfer function.

SECTION-C

7. a) Describe PLL with block diagram. Also discuss applications of PLL in phase detector.
b) What is slew rate? What are its causes? Derive the expression of maximum frequency of operation for a desired output swing in terms of slew rate.
8. a) Draw the astable multivibrator using 555 timer and derive its frequency of oscillation.
b) Design an astable multivibrator having an output frequency of 10 KHz with a duty cycle of 25%.
9. The following specifications are given for the dual input balanced output differential amplifier $R_c = 2.4\text{k}\Omega$, $R_1 = 4.5\text{k}\Omega$, $R_{in1} = R_{in2} = 60\Omega$, $+V_{cc} = 10\text{V}$, $V_{EE} = -10\text{V}$, $\beta_{dc} = \beta_{ac} = 100$ and $V_{BE} = 0.715\text{V}$ typically.

Determine :

- a) I_{CQ} and V_{CEQ} values.
- b) Voltage gain A_d .
- c) Input and output resistances.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.