Code: 15A04503

<div style="text-align:right">**R15**</div>

B.Tech III Year I Semester (R15) Regular & Supplementary Examinations November/December 2019
LINEAR INTEGRATED CIRCUITS & APPLICATIONS
(Common to ECE and EIE)

Time: 3 hours   Max. Marks: 70

PART – A
(Compulsory Question)
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1   Answer the following: (10 X 02 = 20 Marks)
   (a) Define CMRR.
   (b) Define Input offset voltage and Input offset voltage.
   (c) In response to a square wave input, the output of an op-amp changed from -3V to +3V over a time interval of 0.25µs. Determine the slew rate of the op-amp.
   (d) An op-amp has D.C gain of 10^4 and gain of 1000 at 500 Hz. Calculate its corner frequency.
   (e) Draw a subtractor using op-amp.
   (f) What is an instrumentation amplifier?
   (g) Explain the applications of practical differentiator.
   (h) What is an active integrator?
   (i) Calculate the number of bits required to represent a full scale voltage of 10 V with a resolution of 5mV approximately.
   (j) Suggest the values of resistor and reference voltage if resolution required is 0.5 V for 4 bit R-2R ladder type DAC.

PART – B
(Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

2   Draw the circuit diagram of differential amplifier with Single input and balanced output. Derive expressions for differential gain A_d, input resistance R_i and output resistance R_o.

OR

3 (a) Define an op-amp. Explain the ideal characteristics of an op-amp.
   (b) What is the need of level translator? Explain the operation of level translator using a neat circuit diagram.

UNIT – II

4 (a) Explain in detail about frequency response of Internally Non compensating op-amp.
   (b) With the flow graph, explain open loop voltage gain as a function of frequency.

OR

5 (a) Derive an expression for output voltage of a closed loop non-inverting op-amp.
   (b) Explain the properties of a practical op-amp.

UNIT – III

6 (a) Explain about current to voltage (I to V) converter with grounded load.
   (b) Design an op-amp differentiator that will differentiate an input signal with f_{max} = 100 Hz.

OR

7 (a) Design a differentiator to differentiate an input signal that varies in frequency from 10 Hz to about 1 kHz. If a sine wave of 1V peak at 1000 Hz is applied to this differentiator draw the output waveforms.
   (b) Explain how op-amp is used as a summer and differentiator.

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UNIT – IV

8 (a) Explain the operation of triangular wave generator and derive the expression for amplitude and frequency of oscillation?

   (b) With neat sketch, explain the operation of Schmitt trigger using op-amp.

OR

9 (a) With a neat circuit diagram, explain the operation of an RC phase shift oscillator using an op-amp.

   (b) What are the modes of operation of IC555? Derive the expression for time delay of a monostable multivibrator.

UNIT – V

10 (a) Explain the working of a weighted resistor D/A converter.

    (b) The digital input for a 4-bit DAC is 0 1 0 1. Calculate its final output voltage.

OR

11 (a) Explain the working of a dual slope A/D converter.

    (b) Enlist the advantages and disadvantages of dual slope ADC.

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