B.E. / B.Tech. Instrumentation Engineering (Model Curriculum) Semester-IV
IN405 / IN405M - Linear Integrated Circuits

P. Pages : 2

Time : Three Hours

2358

Max. Marks : 80

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Notes : 1.   All question carry marks as indicated.
         2.   Due credit will be given to neatness and adequate dimensions.
         3.   Assume suitable data wherever necessary.
         4.   Illustrate your answers wherever necessary with the help of neat sketches.

1. A) Draw the circuit of duel input balance output differential amplifier circuit. Derive the equation for operating point VCEQ, ICQ, by using DC analysis.   **8**

   B) The common mode input to a certain differential amplifier having differential gain of 112 is $2 \sin 2\pi(100t)$ volts. Determine common mode output if CMRR is 55 dB.   **8**

OR

2. A) Discuss the necessity of dc level shifter in op-amp. Draw and explain any one dc level shifter circuit.   **8**

   B) Differentiate between ideal and practical characteristics of OP-amp.   **8**

3. A) Explain virtual ground concept with example.   **8**

   B) Draw and explain circuit diagram of differentiator. Also derive an expression for the output in terms of input.   **8**

OR

4. A) For a non-inverting amplifier shown in figure below, determine   **8**
       a) A_V b) V_0
       c) I_L d) I_0 .
       Take $R_L = 10k\Omega$
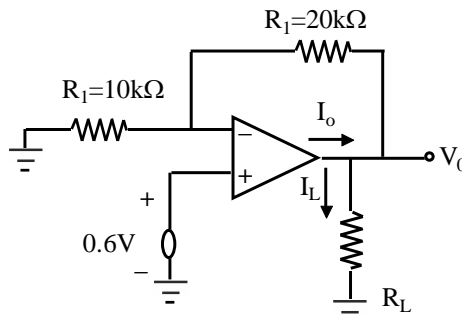
   B) Determine the output voltage for the inverting summing amplifier circuit. Also give the expression for summing, averaging and scaling.   **8**

5. A) Draw a first order low pass Butterworth filter. Also derive the expression for frequency.   **8**

	B)	What is band pass filter? Which are the two types of band pass filter? Explain any one.	**8**

<div align="center">**OR**</div>

6.	A)	Design a first order high pass filter at a cut off frequency of 2khz with a pass band gain of 2. Also plot its frequency response.	**8**
	B)	Draw the circuit of a Wien bridge oscillator and derive an expression for its frequency of oscillation.	**8**
7.	A)	Explain working of zero crossing detector and its application.	**8**
	B)	Discuss operation of Schmitt trigger with neat circuit diagram and waveforms.	**8**

<div align="center">**OR**</div>

8.	A)	Explain the working of sample and hold circuit with neat diagram.	**8**
	B)	Discuss the working and construction of binary weighted resistor DAC.	**8**
9.	A)	Draw block diagram of phase locked loop and explain its working.	**8**
	B)	Write note on: i) Low voltage regulator using 723. ii) Adjustable regulator using 78XX.	**8**

<div align="center">**OR**</div>

10.	A)	Explain the working of IC 555 in monostable mode with neat waveform.	**8**
	B)	Design square wave generator using IC 555 having output frequency 10KHz and duty cycle 25%.	**8**

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