



Printed Pages : 4

TEC-507

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 3000

Roll No.

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B. Tech.**(SEM. V) EXAMINATION, 2007-08****ANALOG INTEGRATED ELECTRONICS***Time : 3 Hours]**[Total Marks : 100**Note : (1) Attempt all questions.**(2) Use semilog paper if required.***1. Answer any four questions of the following : $5 \times 4 = 20$**

- (a) Why are low closed-loop gains avoided with uncompensated opamps ? – Explain.
- (b) Discuss various methods of implementing pole-zero compensation of an opamp.
- (c) Draw the circuit which applied lead compensation to an inverting opamp. Verify that a phase lead is introduced by the circuit element added.
- (d) Explain the difference between band width, transient response and slew rate. Also derive the slew rate equation for an opamp.
- (e) Explain the causes of slew rate in an opamp.

3000]  **1****[Contd...**

- (f) Define the following :
- (1) Break frequency
 - (2) Circuit stability
 - (3) Unity gain frequency
 - (4) Frequency response of an opamp.

2. Answer any **four** questions of the following : **5×4=20**

- (a) For an instrumentation amplifier shown in Fig. 1 below, verify that

$$V_0 = \left(1 + \frac{R_2}{R_1} + \frac{2R_2}{R} \right) (V_2 - V_1)$$

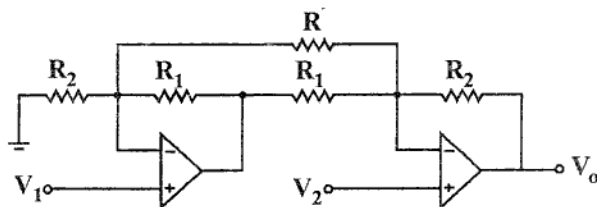


Fig. 1

- (b) Explain the operation of an ac amplifier with a single power supply.
- (c) Draw the circuit of a voltage to current converter if the load is (1) floating and (2) grounded. Is there any limitation on the size of the load when grounded? Explain its working.
- (d) Draw and explain the working of an instrumentation amplifier. Also obtain input and output voltage relationship for an instrumentation amplifier.

- (e) Design an opamp differentiator that will differentiate an input signal with $f_{\max} = 100 \text{ Hz}$. Draw the output waveform for a cosine wave of 1V peak at 100 Hz applied to the differentiator.
- (f) Identify the following circuit. Obtain v_o of the following circuit.

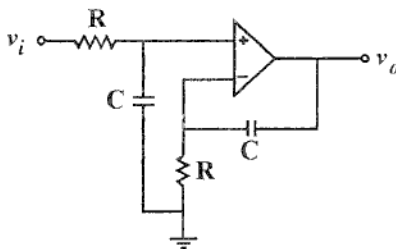


Fig. 2

3 Answer any **four** questions of the following : $5 \times 4 = 20$

- (a) State the three ways filters can be classified and explain the characteristics of each.
- (b) Discuss the difference between a Butterworth, a Chebyshev and a Cauer filter and compare their responses.
- (c) Design a wide band pass filter with $f_L = 400 \text{ Hz}$, $f_H = 2 \text{ kHz}$ and a pass band gain = 4. Draw a frequency response plot for the filter on semilog paper. Calculate the value of Q for the filter.
- (d) Show that for second order low pass Butterworth filter

$$f_H = \frac{1}{2\pi \sqrt{R_2 R_3 C_2 C_3}}$$



- (e) Draw and explain the principle of working of digital to analog converters with R and 2R resistors.

4 Answer any **two** questions of the following : **10×2=20**

- (a) Draw that circuit of pulse generator using an opamp. Explain its operation by referring to the capacitor waveform.
- (b) Draw the circuit of Astable multivibrator and explain its operation by referring to the capacitor waveform.
- (c) Draw the circuit of a fast half-wave rectifier and explain its operation. How is this circuit converted into an average detector ?

5 Write short notes on any **two** of the following : **10×2=20**

- (1) PLL
- (2) 555 timer and its application
- (c) Voltage regulator.

