

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

Paper ID : 2295030

Roll No.

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B.TECH

Regular Theory Examination (Odd Sem - VII) 2016-17

FILTER DESIGN

Time : 3 Hours

Max. Marks : 100

SECTION - A

1. Attempt all 10 parts from the following:(10×2=20)
 - (a) Why Analog filters are used?
 - (b) Draw the frequency response of all the filters in comparison with ideal filters response.
 - (c) Find the response of high pass filter.
 - (d) Differentiate between active and passive filters.
 - (e) Design a low pass filter at cutoff frequency of 1 KHZ with a pass band gain of 2.
 - (f) What is frequency warpping?
 - (g) What are the key filter parameters.
 - (h) Differentiate between chebyshev and butterworth filters.
 - (i) Define the term input offset voltage and explain its significance in practical circuits.

- (j) Draw inverting and non inverting opamp configuration.

SECTION - B

**2. Attempt any 5 parts from the following 8 parts :
(5×10=50)**

- a) Design an opamp ckt to satisfy the relationship
 $V_o = 2V_1 + V_2 - V_3$
 Use assumptions that none of the input voltage will exceed 10 V. Design the circuit so that no resistor dissipates in excess of 0.1 w.
- b) Determine the frequency response of Biquad circuit.
- c) Prepare an asymptotic bode plot for both magnitude and phase for the give transfer function.

$$T(s) = \frac{1000(1 + .25s)(1 + 0.1s)}{(1 + s)(1 + .025s)}$$

- d) Twenty five identical first order all pass filters are connected in cascade what is the resulting value of α_0 if the over all delay at $\omega = 10000$ rad/s is 2ms and the delay at 1500 rad/s is 1ms.
- e) For all second order filters(lpf,hpf,bpf,notch filters,all pass filters) draw its magnitude response, pole location diagram and write TF equation.
- f) Discuss GUILLEMEN'S Algorithm.
- g) Define CMRR. Explain the significance of relatively large value of CMRR.

- h) Design a second order low pass filter at high cutoff frequency of 1KHZ. Also draw the frequency response.

SECTION - C

**Note : Attempt any 2 parts from the following 3 parts :
(2×15=30)**

3. Design a band pass filter to the attenuation specification with $\alpha_{min} = 20dB$ and $\alpha_{max} = 0.5dB$. The response is to be chebyshev in pass band which extend from 500-1000 rad/s. The circuit employed in design is to make use of 0.1 uf capacitor
4. The IC 741 is connected as non inverting amplifier and is required to have closed loop gain of 20. What is its bandwidth. Is the circuit stable.
5. Discuss butterworth response in context to low pass filter.

