No. of Printed Pages : 3

BIEEE-012

B.Tech. – VIEP – ELECTRICAL ENGINEERING (BTELVI)

Term-End Examination

00466

June, 2016

BIEEE-012 : ACTIVE FILTER DESIGN

Time : 3 hours *Maximum Marks : 70*

Note : *(i) Attempt any **seven** questions.*

(ii) All questions carry equal marks.

(iii) Use of scientific calculator is permitted.

(iv) Missing data may be suitably assumed.

1. Show that the order of the Chebyshev filter to satisfy a set of specifications is always lower than that of the corresponding Butterworth filter. *10*

2. Find the Butterworth approximation function for high pass filter requirements characterized by

A_{min} = 15 dB,

A_{max} = 3 dB,

ω_p = 1000 rad/sec,

ω_s = 500 rad/sec. *10*

3. A low pass filter (LPF) of order 2 is to have f_0 = 10 kHz, Q_0 = 2, gain = 1 and the capacitors' values are 0·1 μF. Realize these specifications using Sallen-Key configuration. *10*

4. Compare Butterworth, Chebyshev and Elliptic magnitude approximations. Find the network function for a third order low pass Butterworth filter and prove that this network function satisfies all the properties. *10*

5. Write about 'phase approximation'. Draw and explain 'Tom Thomas Biquadratic Filter'. Derive the relation for voltage transfer function, if it is used as a high pass filter. *10*

6. Explain in detail, how a leap-frog structure is developed. *10*

7. For the circuit shown in Figure 1, find the transfer functions $\frac{V_0(s)}{V_i(s)}$. Identify the response and determine the filter parameters. Assume ideal Op-Amp. *10*

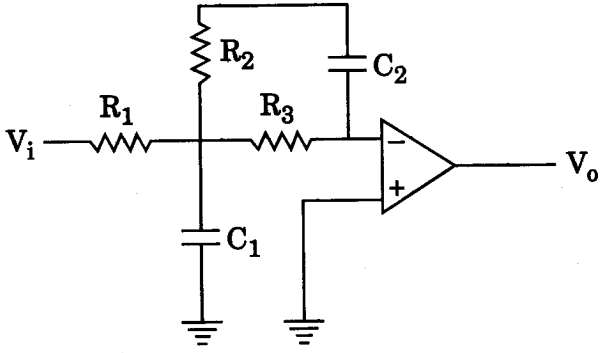

Figure 1

8. Explain the synthesis of LC ladder network using gyrators, with an example. *10*

9. Give the circuit diagram of a KHN filter, obtain the transfer function and identify filter parameters. *10*

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

    (a) Antoniou Gyrators

    (b) Sensitivity Analysis and Single Op-Amp Filters

    (c) Analysis and Design of Band Pass Filter