| BIEEE-012 |

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

Term-End Examination

□□∠⊟∃ December, 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.   What are the advantages and limitations of active filters ? Realize the following specification with a maximally flat magnitude response :   *10*

α_{min} = 18 dB,

α_{max} = 0·25 dB,

ω_p = 1000 rad/sec,

ω_s = 1400 rad/sec.

2. Determine the input impedance (Z_{in}) for the circuit shown in Figure 1. Also draw the passive equivalent of the circuit. *10*
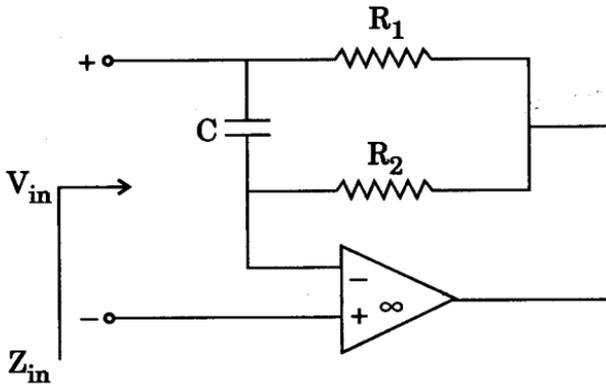
Figure 1

3. Design a 2-pole Butterworth low pass filter with cut-off frequency of 100 kHz. What is the formula for its gain as a function of frequency ? What is the attenuation (in dB) at $f = 5 f_c$? *10*

4. What is OPAMP ? Also explain the characteristics of an Ideal OPAMP. *10*

5. What is the use of bridged-T Network in active filters ? Explain with examples. *10*

6. Realize and draw a schematic circuit for a second order finite gain single amplifier active RC band pass filter. Obtain expressions for ω_n and Q in terms of circuit parameters. *10*

7. Design a single amplifier biquad with $f_0 = 5$ kHz, $Q_0 = 15$, midband gain $H = 36$ dB and $C = 5$ nF. Draw the resulting circuit. *10*

8. What do you understand by "Universal Active Filter" ? Give the categorization of multiple OPAMP filters and also write their advantages and disadvantages. *10*

9. Give the structure of LP, HP and BP. Explain each of them. *10*

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

    (a) Inverse Chebyshev Approximations

    (b) Frequency-dependent Negative Resistors

    (c) Cascading Technique

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