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BIEEE-012

00911

B.Tech. In ELECTRICAL ENGINEERING (BTELVI)

Term-End Examination

June, 2013

BIEEE-012 : ACTIVE FILTER DESIGN

Time : 3 hours *Maximum Marks : 70*

Note : *(i) Attempt any seven questions.*
*(ii) All question carry **equal** marks.*
*(iii) Use of scientific calculator is **allowed**.*

1. (a) What is the difference between active and passive filters ? Explain it in the context of advantages of active filters over passive filters. 5

   (b) Find the loss at $W_s = 40$ rad/sec for a fifth order Butterworth filter that has a maximum loss of 1 dB at the passband edge frequency, $W_p = 10$ rad/sec. 5

2. (a) Explain, how source of inefficiency is remedized by elliptic approximation method in comparison to other approximation methods ? 5

   (b) With the help of circuit diagram, explain the operation of first order high pass filter. 5

3. Write down the second order gain function along with loss and pole-zero plot for LPF, HPF, BPF and delay equalizer. 10

4. Classify commonly used single op-amp biquad topologies. Also find the transfer function of any one type of biquadtopology. 10

5. Draw and explain the operation of first order low pass filter. Also derive the expression for the gain. 10

6. (a) Derive the expression for the frequency response of first order bandpass filter. 5

   (b) Write down various sensitivity relationships related to various biquadratic parameters (like K, Wp, Qp). 5

7. Write short notes on the following : 2x5=10

   (a) Tow - Thomas Biquad

   (b) Antoniou Gyrators

8. (a) Explain Resonant frequency, Quality factor and gain of the op - amp filter. 5

   (b) How can we connect lower order filters in order to obtain higher-order filters ? 5

9. (a) Write down the advantages and disadvantages of active RC filters over Switched-Capacitor (SC) filters. 5

(b) Give the advantages of leap - frog realisation. Also draw the schematic diagram of leap frog coupled topology. 5

10. How Frequency Dependent Negative Resistors (FDNR) are used for the transformation of active RC equivalent of the LC ladder network ? 10