

1. (a) Compare frequency response of Butterworth, Chebyshev (Type I and Type II) and Elliptical filters. 20
 (b) Explain the principle of switched capacitor filter.
 (c) Compare FIR and IIR filters.
 (d) Compare impulse invariant and bilinear transformation methods in IIR filter design.

2. (a) Mention design steps of Chebyshev filter. How it differs when "N" is odd and when "N" is even ? 10
 (b) Explain Gibb's Phenomenon. State its significance in FIR filter design. 10

3. (a) Convert the analog filter with system function : $H_a(s) = \frac{s+0.1}{(s+0.1)^2+16}$ into a digital filter (IIR type) by means of the bilinear transformation. 20
 The digital filter should have a resonant frequency $\omega_r = \frac{\pi}{2}$.

4. (a) S.T. $S = \frac{2}{T} \frac{(1-z^{-1})}{(1+z^{-1})}$ in bilinear transformation. Also explain mapping between s – plane and z – plane for RL1. 10
 (b) For the given specification $\alpha_p = 3$ dB, $\alpha_s = 15$ dB; $\Omega_p = 1000$ rad/sec and $\Omega_s = 500$ rad/sec design a highpass filter. 10

5. (a) Write Design steps of (FIR) Filter using Kaiser window. 10
 (b) Explain concept of adaptive filter and basic blocks required for its design. 10

6. (a) Explain concept of Decimation Interpolation. 10
 (b) Determine the order and the poles of a lowpass Butterworth filter that has a 3 dB attenuation at 500 Hz and an attenuation of 40 dB at 1000 Hz. 10

7. Write short notes on any four :- 20
 - (a) Higher order filters
 - (b) Subband coding
 - (c) Applications of Weiner filter
 - (d) Step invariant method steps in the design of IIR filter
 - (e) Transfer function of 2nd order lowpass analog Butterworth filter.