

Con. 5106-05.

PR-7392

(REVISED COURSE)

(3 Hours)

[Total Marks : 100 -

- N.B. (1) Question No. 1 is compulsory.
 (2) Attempt any four questions out of remaining six questions.
 (3) Assumption made should be stated clearly.
- List the advantages and applications of switched capacitor filter. 5
 - List the properties of Transfer functions. 5
 - Explain gain equalizers and delay equalizers. 5
 - Compare active and passive filter. 5
 - Explain with neat circuit diagram positive and negative gain single amplifier band pass filter. 8
 - Find the poles of a low pass normalized Chebyshev function if the order of the filter is 2 and attenuation in the pass band is 4dB. 4
 - Determine a value for the Multiplicative constant H such that magnitude response at $\omega = 0$ rad/sec is 1. 4
 - If the above filter is transformed to High pass filter draw its pole zero diagram. 4
 - Determine the network function for a third order high pass filter (normalised) and synthesize it. Draw its magnitude response at $\omega = 0, 1/2, 1$ and 2 rad/sec. 10
 - Synthesize the following filter $Y_T(s) = \frac{Hs^4}{s^4 + s^3 + 3s^2 + s + 1}$ and modify the above circuit such that the termination resistance is 100 Ω and cut-off frequency is 1 KHz. 10
 - Draw a neat circuit diagram of a band pass infinite gain single amplifier filter. Realize it with $f_n = 10$ KHz and $Q = 10$. 10
 - Draw the schematic circuit for a Sallen and Key high pass filter and derive an expression for the voltage transfer function in the standard form for a second order high pass transfer function in terms of parameters W_n, Q and H_0 and hence obtain expression for them in terms of circuit parameters. 10
 - Derive an expression for the state variable filter configuration for a voltage transfer function of a Band pass second order filter given by $\frac{V_2(s)}{V_1(s)} = \frac{-|H|s}{s^2 + a_1s + a_0}$ and draw the configuration. 10
 - List the properties of butterworth function and find network function for a third order low pass Butterworth filter and prove that this network function satisfy all the properties. 10
 - Explain how resistor is realized by a MOS switched capacitor. 8
 - Explain how a leap-frog structure is developed, use this concept and realize fifth order low pass filter. 12
 - What is biquadratic function, Identify the biquadratic parameters $k, \omega_2, \omega_p, Q_p, Q_z$ from the following function. $H(s) = \frac{4s^2 + 36}{2s^2 + 6s + 12}$. 10
 - With the help of neat circuit diagram explain the working of Tow Thomas filter. 10