

(REVISED COURSE)

(3 Hours)

[Total Marks : 100]

N.B.(1) Attempt any **five** questions.(2) Assume **suitable** data if **necessary** and **state** it.(3) Draw **neat** diagrams whenever **required**.

1. (a) Draw a neat circuit diagram of positive and negative feedback Infinite gain single amplifier band pass filter. Find out its transfer function. Derive expression for  $\omega_n$ ,  $\theta$  and  $H_0$ . 12
- (b) Design a II<sup>nd</sup> order Infinite gain positive and negative feedback band pass filter to meet the following requirements :— 8
- $\omega_n = 1000$  rad/sec  
 $\theta = 10$   
 $|H_{0(BP)}| = 10.1$
2. (a) Realise the following transfer function using an LC network terminated in a  $0.5 \Omega$  resistance :— 10
- $$T_{(s)} = \frac{s^2 + 4}{s^3 + 2s^2 + 2s + 2}$$
- (b) Draw the circuit configuration for Generalized Impedance Converter (GIC). Analyse it and determine transmission parameters. 10
3. (a) List properties of an Inverse-Chebeshhev function. 8
- (b) Determine the network function for an Inverse-Chebeshhev magnitude characteristics having a maximum of 1dB attenuation at 0.5 rad/sec in the passband and a minimum of 20 dB attenuation in the stopband at all frequencies greater than 1 rad/sec. 12
4. (a) Draw a neat circuit diagram of a Akerberg Mossberg filter and derive the expression for its voltage transfer function having low pass characteristics. 10
- (b) Find the Butterworth approximation for a low pass filter whose requirements are characterized by :— 10
- $A_{\max} = 0.5$  dB,       $A_{\min} = 12$   
 $W_p = 100$  rad/sec       $W_s = 400$  rad/sec.
5. (a) How is Leap-frog structure is developed ? Use this concept to realize a third order low pass filter. 10
- (b) Explain and draw neat circuit diagram of inverting, non-inverting and lossy integrator using parasitic insensitive switched capacitors. 10
6. (a) By using method of constraint derive the expression for voltage transfer function of a finite gain low pass II<sup>nd</sup> order filter. 10
- (b) Draw and explain "Two Thomas Biquadratic Filter". Derive relation for voltage transfer function, if it is used as a band pass filter. 10
7. Write short notes on any **two** :— 20
- (a) State variable filter
- (b) Switched capacitor Akerberg Mossberg filter
- (c) Properties of Butterworth and Chebeshhev functions.