Con-2174-05. AM-6949

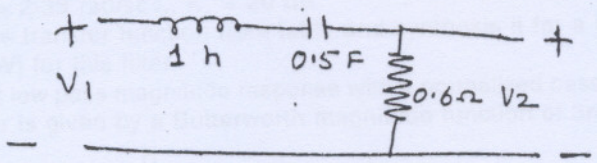
(REVISED COURSE)

(3 Hours) [Total Marks : 100

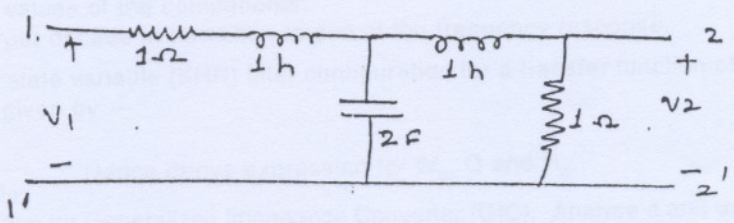
N.B. (1) Question No. 1 is **compulsory**.
(2) Attempt any **four** questions out of remaining **six** questions.
(3) Assumption made should be **clearly** stated.

1. (a) Compare Active and Passive filter. 5
(b) Compare Butterworth, Chebyshev and Elliptic magnitude approximations. 6
(c) Explain the principle of realization of a resistor in a switched capacitor filter. 5
(d) Explain with an example, how higher order (more than two) active filters are realized. 4

2. (a) Derive voltage transfer function for a general single amplifier acitve filter. 10
(b) For the n/w, find the normalised voltage transfer function and the frequency denormalized voltage transfer function, when the centre frequency changed to 10^4Hz, find the corresponding element values and draw the circuit. 10



3. (a) Show that driving point admittance at port 1 has the poles that are same as that of the voltage transfer function $\frac{V_2(s)}{V_1(s)}$ 10



(b) Determine the order of Butterworth response that realise the following specification and also find the Butterworth function. 10
wp = 1 rad/sec kp = 3dB
ws = 2 rad/sec ks = 15dB.

4. (a) By using method of constraint derive the expression for voltage transfer function of a finite gain high pass Sallen-Key filter. 10
(b) Design equal resistance, equal capacitance high pass filter with Q = 0.707 and cutoff frequency of 5 KHz. Draw the circuit 10

5. (a) Derive transfer function for a second order infinite gain low pass single amplifier filter. Hence realize an infinite gain single amplifier filter for following specification. 12
fn = 1 KHz, Q = 0.707, $|H_0|$ = 5 Choose C = 0.01 μF 8
(b) Explain how a leap-frog structure is developed. 10

6. (a) Derive the expression for a state variable configuration using three amplifier. Specify the expression for Lp, Hp and Bp output. 10
(b) Explain and draw neat circuit digram of inverting, non inverting and lossy integrators using parasitic insensitive switched capacitors. 8

7. (a) What is Biquadratic function. 12
(b) Draw and explain 'Tow Thomas Biquadratic filter'. Derive relation for voltage transfer function, if it is used as a high pass filter.