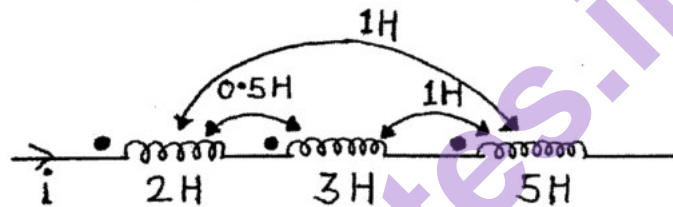


(3 Hours)

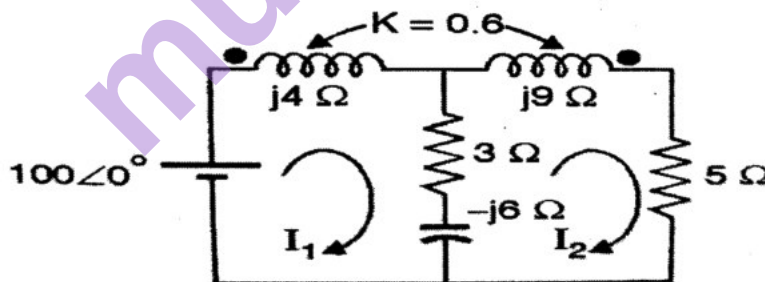
Total Marks: 80

- N.B: (1) Question No. 1 is compulsory.  
 (2) Attempt any **three** questions from the remaining.  
 (3) Figures to the right indicate full marks.  
 (4) Assume suitable data if required.

- Q.1) (a) Obtain Y parameters in terms of Z parameters. (5)  
 (b) Explain the properties of positive real functions. (5)  
 (c) Find the equivalent inductance of the network shown. (5)



- (d) Explain various types of filters (5)
- Q.2) (a) Find currents  $i_1$  and  $i_2$  in the given network using mesh analysis. (10)



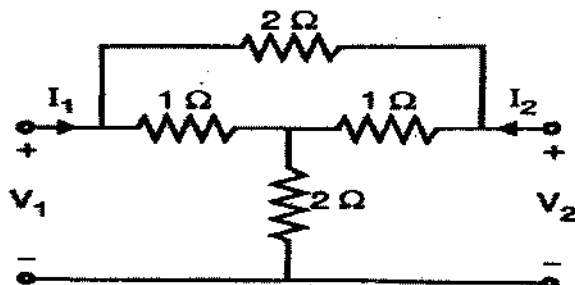
- (b) Test whether the following functions are a positive real functions. (10)

(i)  $F(S) = \frac{S^4 + 3S^3 + S^2 + S + 2}{S^3 + S^2 + S + 1}$

(ii)  $F(S) = \frac{S^2 + 4}{S^3 + 3S^2 + 3S + 1}$

TURN OVER

Q.3) (a) Determine Y parameter of the interconnected network. (10)

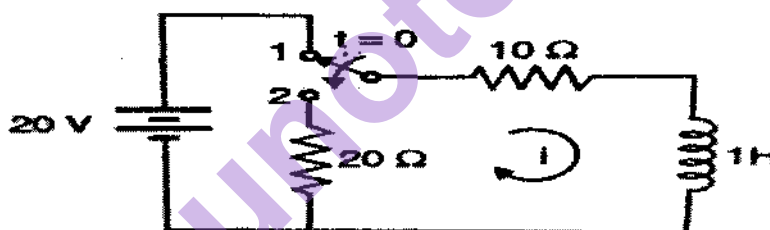


(b) Test whether the following polynomials are Hurwitz polynomials. (10)

(i)  $P(s) = s^4 + 5s^3 + 5s^2 + 4s + 10$

(ii)  $P(s) = 2s^4 + 5s^3 + 6s^2 + 3s + 1$

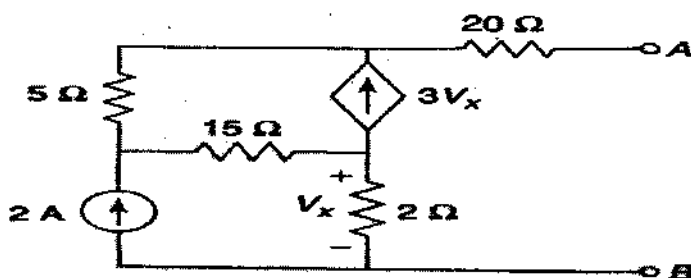
Q. 4) (a) In the circuit given, switch K is changed from position 1 to position 2 at time  $t=0$ . Find  $i$ ,  $\frac{di}{dt}$ ,  $\frac{d^2i}{dt^2}$  at time  $t=0^+$ . (10)



(b) Determine the Foster forms of realization of the RC impedance function. (10)

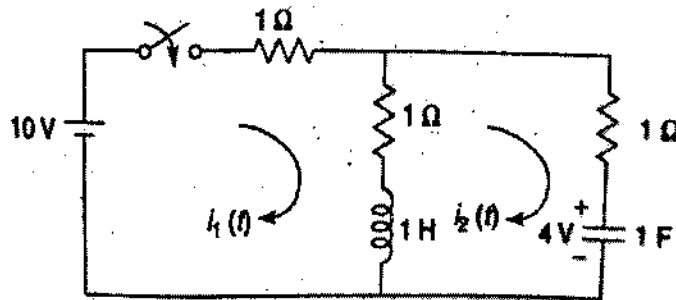
$$Z(s) = \frac{(s+1)(s+3)}{s(s+2)(s+4)}$$

Q.5) (a) Find Norton's equivalent of the following network. (10)

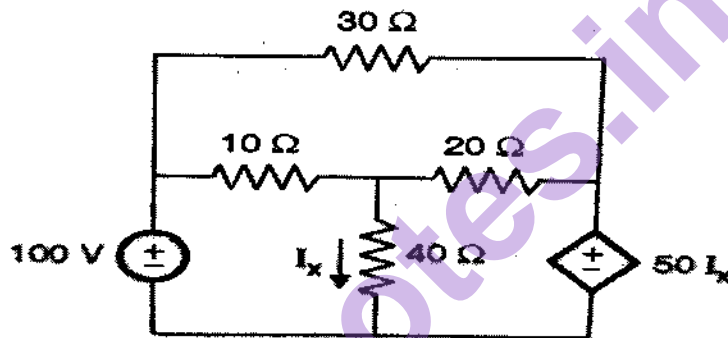


TURN OVER

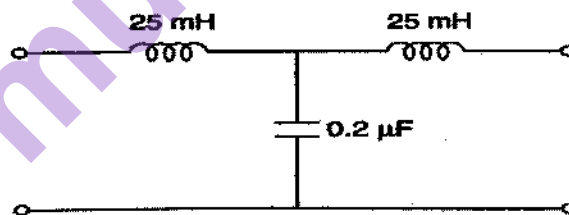
- (b) Find the currents  $i_1(t)$  and  $i_2(t)$  when initial current through the inductor is zero and initial voltage on the capacitor is 4V. (10)



- Q. 6) (a) Find current through  $20\Omega$  resistor using mesh analysis. (10)



- (b) Find the nominal impedance, cut off frequency and pass band for the network. (6)



- (c) Find poles and Zeros of the impedance of the following network and plot pole zero diagram. (4)

