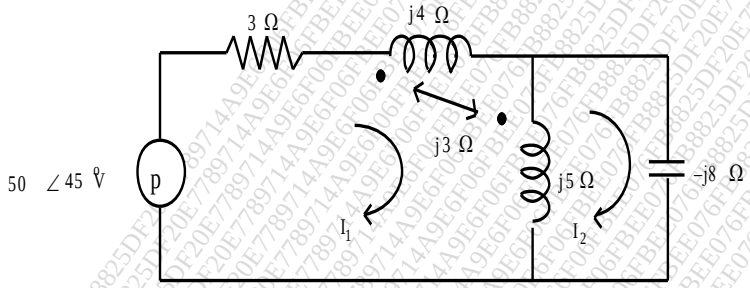
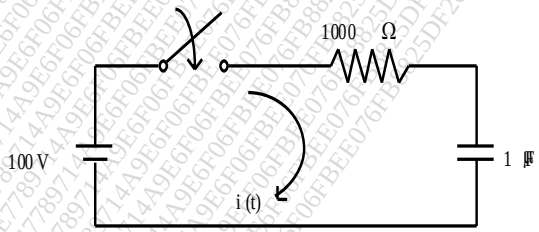
Time: 3 hours Total Marks: 80

N.B.
1) Question No. 1 is Compulsory
2) Out of remaining questions, attempt any three
3) Assume suitable data if required
4) Figures to the right indicate full marks

1 (A) Draw equivalent circuit for given magnetically coupled circuit. **05**



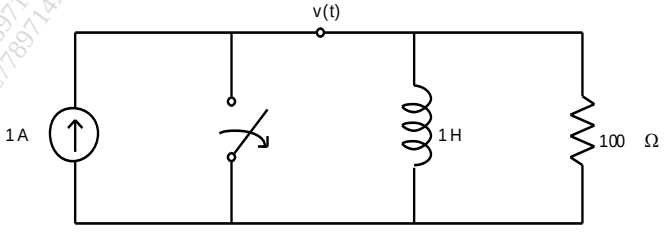
(B) In the network of Fig. switch is closed at t = 0. With capacitor uncharged, find value for i and $\frac{di}{dt}$ at $t = 0^+$. **05**



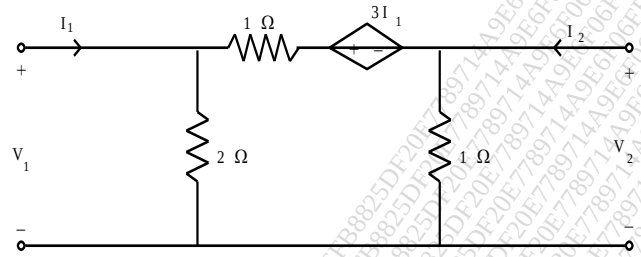
(C) Prove that AD – BC = 1 for Transmission parameters. **05**

(D) Design an m-derived T section high pass filter with a cut-off frequency of 2 kHz. Design impedance of 700Ω and m = 0.6. **05**

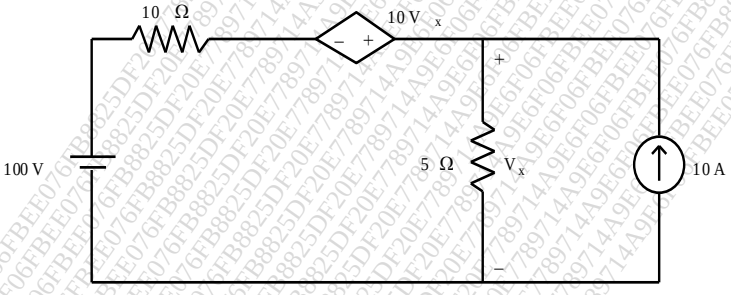
2 (A) In the network shown in Fig., at t = 0, switch is opened. Calculate v, $\frac{dv}{dt}$, $\frac{d2v}{dt2}$ at t = 0+. **10**



(B) For the network shown in Fig., find Y and Z-parameters. **10**



3 (A) Determine the current through 10 Ω resistor in the network of Fig. **10**



(B) The parameters of a transmission lines are R = 65Ω/km, L=1.6mH/km, G = 2.25 mmho/km, C=0.1μF/km. Find **10**

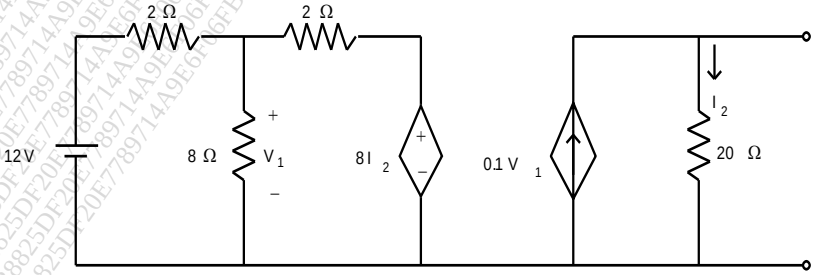
i) Characteristic Impedance
ii) Propagation Constant
iii) Attenuation Constant
iv) Phase Constant at 1 kHz

4 (A) Determine whether following functions are positive real **10**

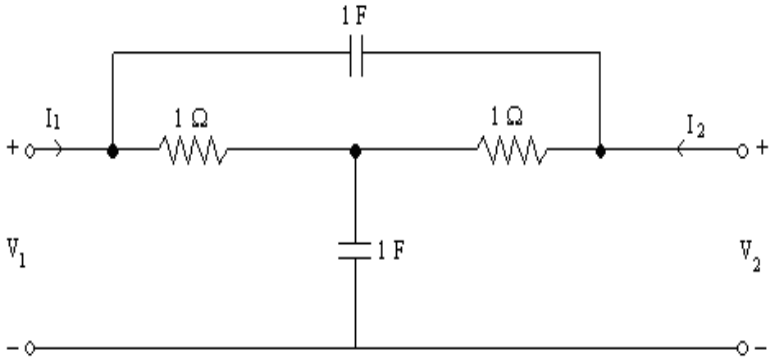
i) $\frac{s^2 + 2s + 4}{(s + 1)(s + 3)}$

ii) $\frac{s^2 + 25s + 25}{s + 4}$

(B) Find Norton's equivalent network. **10**



5 (A) Find Y-parameters for the network shown in Fig. **10**

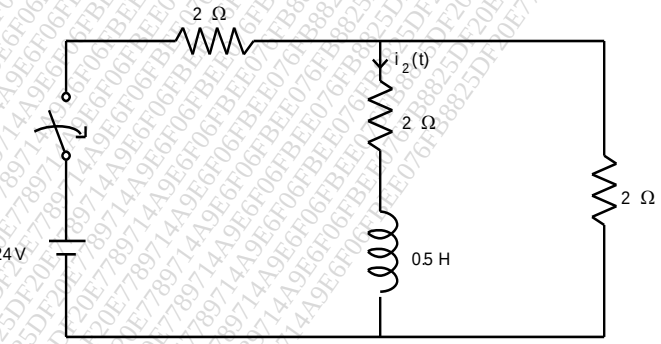


(B) Realize the following functions in Foster II and Cauer I form **10**

$$Z(s) = \frac{2(s^2+1)(s^2+9)}{s(s^2+4)}$$

6 (A) A transmission line has a characteristics impedance of 50 ohm and terminate in a load $Z_L = 25 + j50$ ohm. Use smith chart and Find VSWR and Reflection coefficient at the load. **10**

(B) Determine current i2 (t) in the network of Fig., when switch is closed at t = 0. The inductor is initially deenergized. **10**



****