

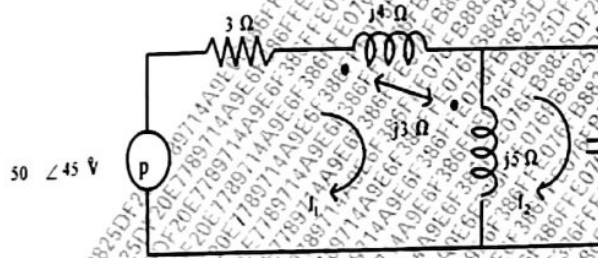
Time: 3 hours

Total Marks: 80

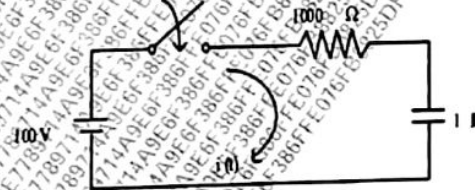
Q.B.

- 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

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



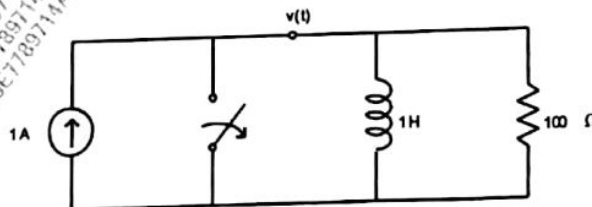
(B) In the network of Fig. switch is closed at $t = 0$. With capacitor uncharged, find value for i and $\frac{di}{dt}$ at $t = 0^+$. 05



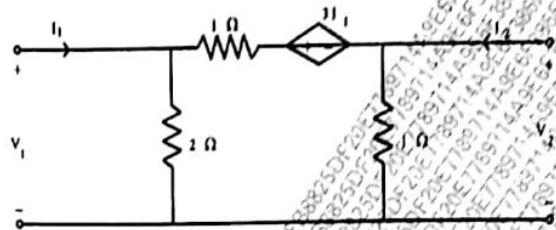
(C) Prove that $AD - BC = 1$ for Transmission parameters. 05

(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

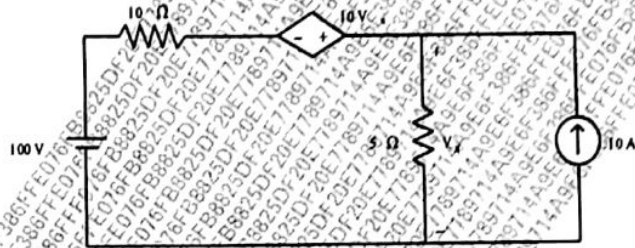
(A) In the network shown in Fig., at $t = 0$, switch is opened. Calculate v , $\frac{dv}{dt}$, $\frac{d^2v}{dt^2}$ at $t = 0^+$. 10



(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



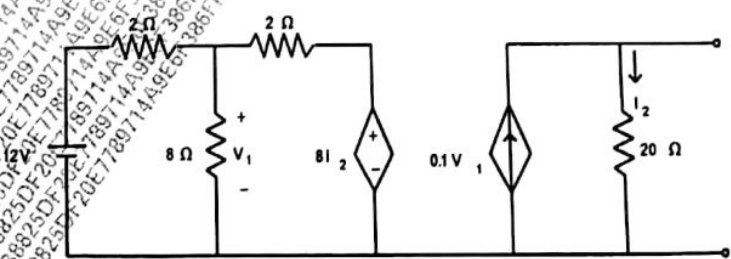
(B) The parameters of a transmission lines are $R = 65\Omega/\text{km}$, $L = 1.6\text{mH}/\text{km}$, $G = 2.25 \times 10^{-6}\text{mmho}/\text{km}$, $C = 0.1\mu\text{F}/\text{km}$. Find
 i) Characteristic Impedance
 ii) Propagation Constant
 iii) Attenuation Constant
 iv) Phase Constant at 1 kHz 10

4 (A) Determine whether following functions are positive real 11

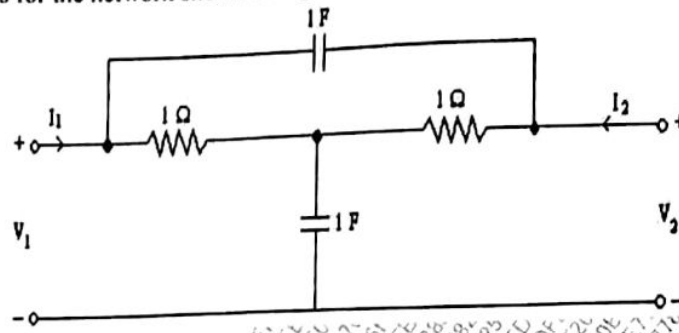
i)
$$\frac{s^2 + 2s + 4}{(s + 1)(s + 3)}$$

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

(B) Find Norton's equivalent network. 15



- 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 $i_2(t)$ in the network of Fig., when switch is closed at $t = 0$. The inductor is initially deenergized. 10

