

CTL

Q. P. Code: 24590

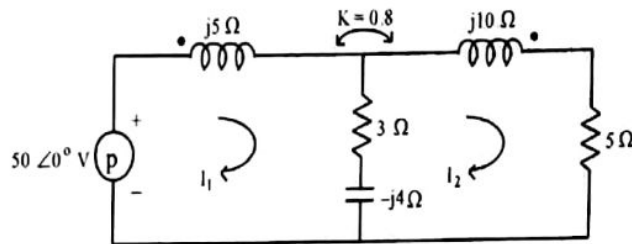
Time: 3 hours

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

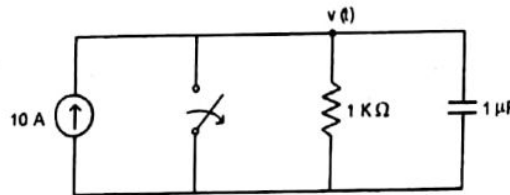
1 (A) Draw equivalent circuit for given magnetically coupled circuit.



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(B) In the given network of Fig., switch is opened at $t = 0$. Solve for v and $\frac{dv}{dt}$ at $t = 0+$.

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

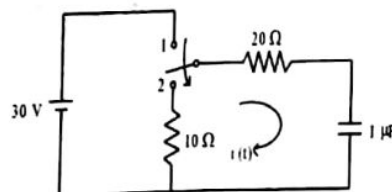
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(D) Define the following parameter of transmission lines:

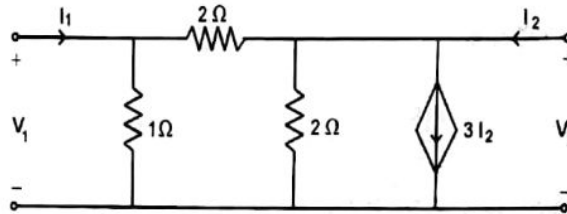
- i) Input impedance
- ii) Characteristic Impedance
- iii) VSWR
- iv) Reflection Coefficient
- v) Transmission Coefficient

2 (A) In the network shown in Fig., switch is changed from position 1 to position 2 at $t = 0$, steady condition having reached before switching. Find the values of i , $\frac{di}{dt}$ and $\frac{d^2i}{dt^2}$ at $t = 0+$.

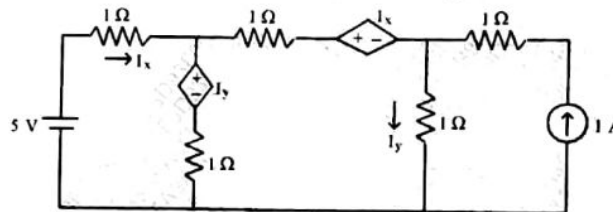
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(B) For the network shown in Fig., find Z and Y-parameters. 10



3 (A) Find currents in the three meshes of network shown in Fig. 10



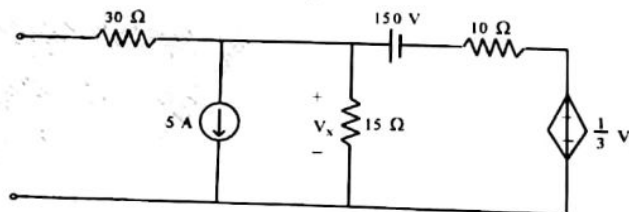
(B) The parameters of a transmission lines are $R = 65\Omega/\text{km}$, $L=1.6\text{mH}/\text{km}$, $G = 2.25 \text{ mmho}/\text{km}$, $C=0.1\mu\text{F}/\text{km}$. Find 10

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

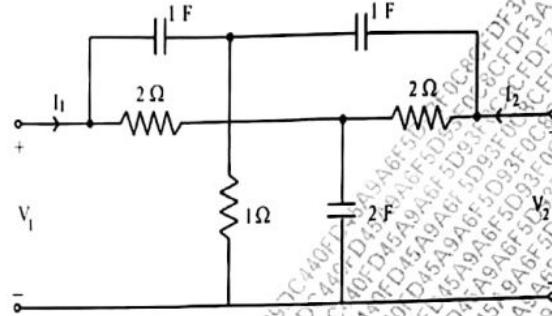
4 (A) Determine whether following functions are positive real 10

- i) $\frac{s^4 + 3s^3 + s^2 + s + 2}{s^3 + s^2 + s + 1}$
- ii) $\frac{s(s+3)(s+5)}{(s+1)(s+4)}$

(B) Obtain Thevenin equivalent network of Fig. 10



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



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

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

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.

(B) In the network of Fig. switch is in position 'a' for a long time. At $t = 0$ switch is moved from a to b. Find $v_2(t)$. Assume that the initial current in 2 H inductor is zero.

