

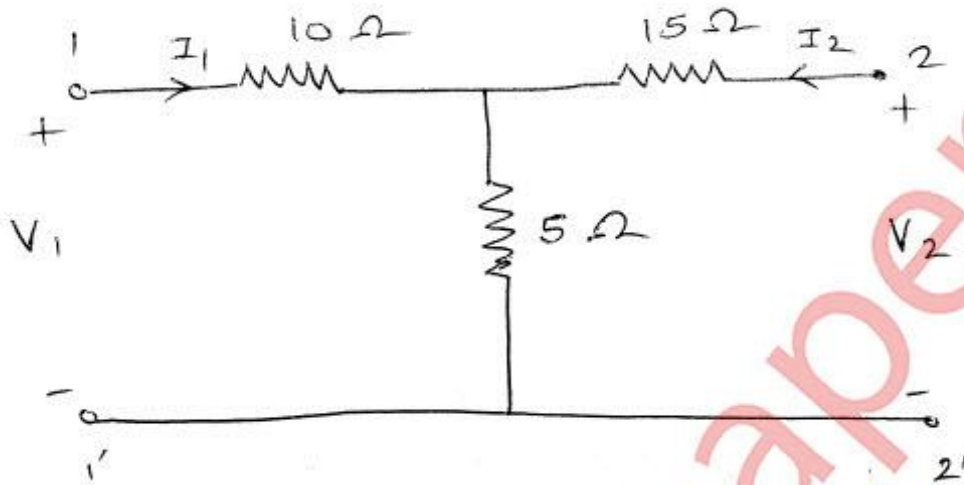
QP Code : 545601

(3 Hours)

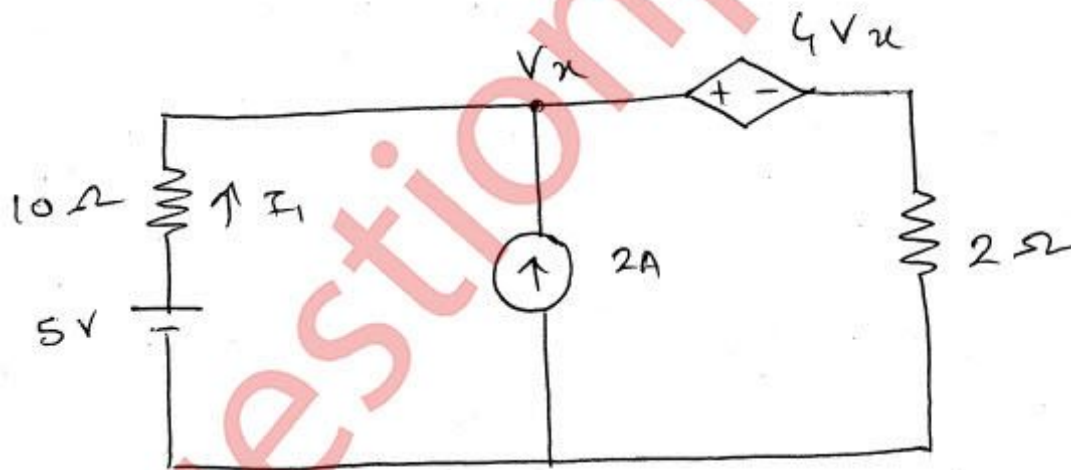
[Total Marks : 80

- N. B. :** (1) Question No. 1 is **compulsory**.
 (2) Attempt any **three** questions from the remaining **five**.
 (3) Assume suitable data with justification if missing.

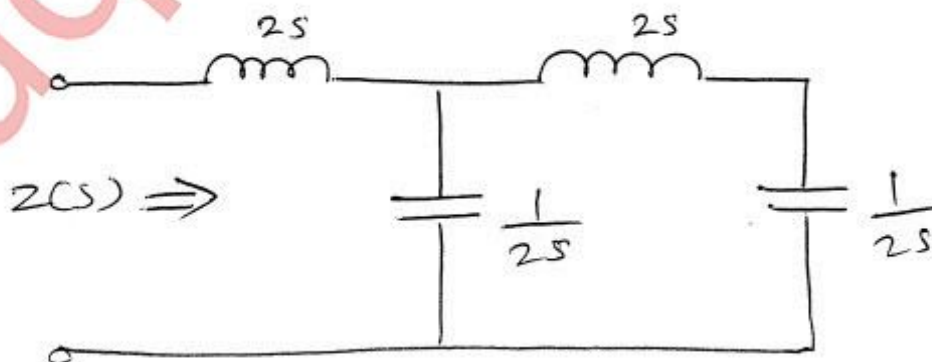
1. (a) Determine the z-parameters for the network shown in the following figure **5**



- (b) Find current I_1 in the network shown in fig. **5**



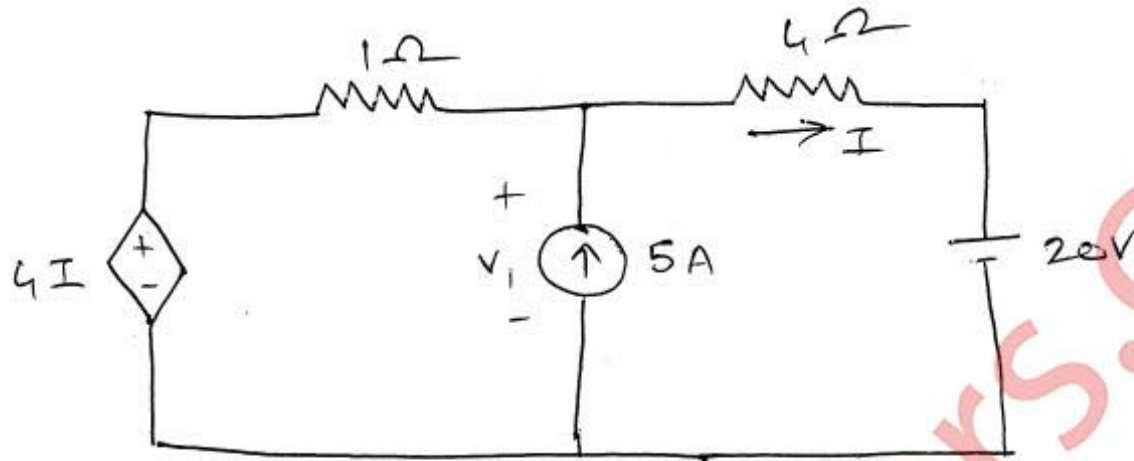
- (c) Determine the driving point impedance function of the one-port network shown **5**



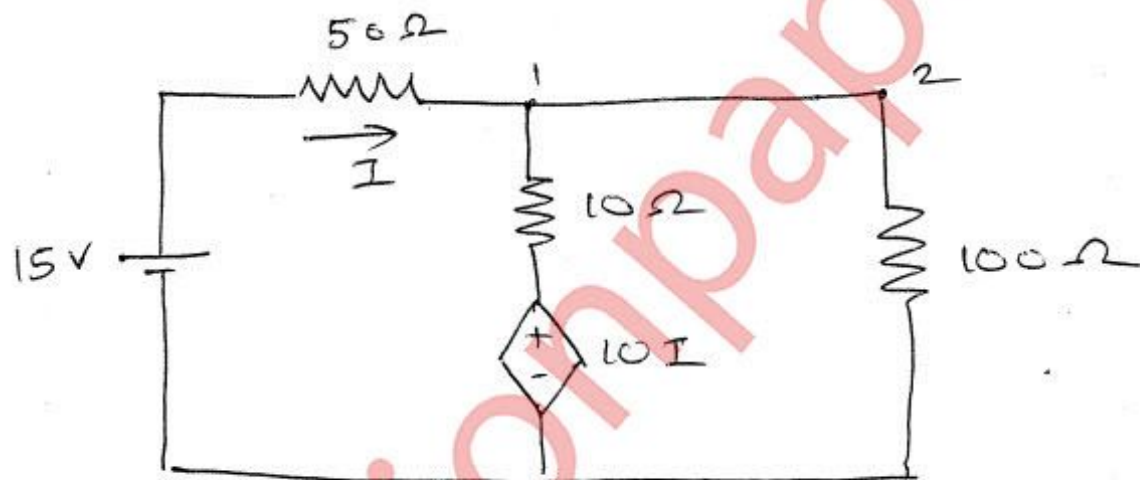
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(d) Test whether $P(s) = s^5 + 12s^4 + 45s^3 + 60s^2 + 44s + 48$ is Hurwitz. **5**

2. (a) Find V_1 in the network shown in fig. using superposition theorem. **10**



(b) Find the voltage at node 2 in the network shown in fig. **5**



(c) State and prove initial value theorem. **5**

3. (a) Synthesize the following function in cauer I and cauer II form. **10**

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

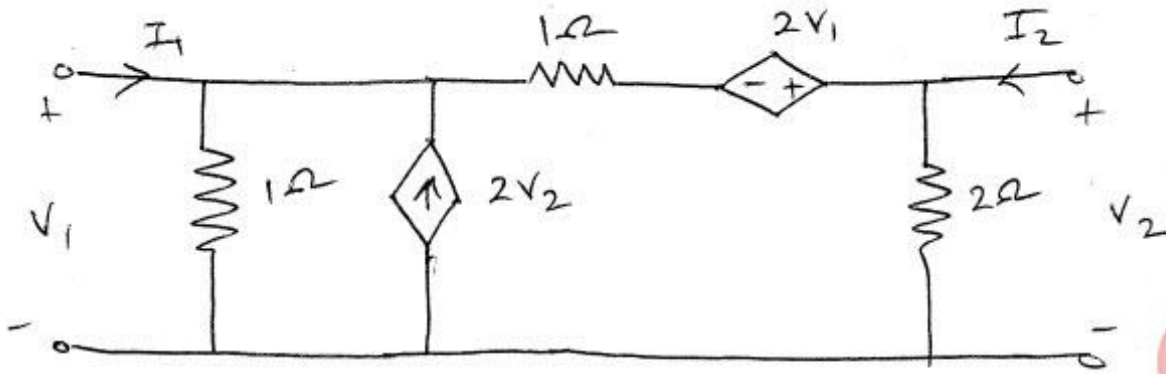
(b) Check if the following function is a positive real function. **5**

$$F(s) = \frac{2s^3 + 2s^2 + 3s + 2}{s^2 + 1}$$

(c) The parameters of a transmission line are $R = 6\Omega/\text{km}$, $L = 2.2 \text{ mH}/\text{km}$, $G = 0.25 \times 10^{-6} \Omega/\text{km}$, $C = 0.005 \times 10^{-6} \text{ F}/\text{km}$. Determine the characteristic impedance and propagation constant at a frequency of 1 GHz. **5**

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4. (a) Find the Y and Z parameters of the network shown in fig. 10

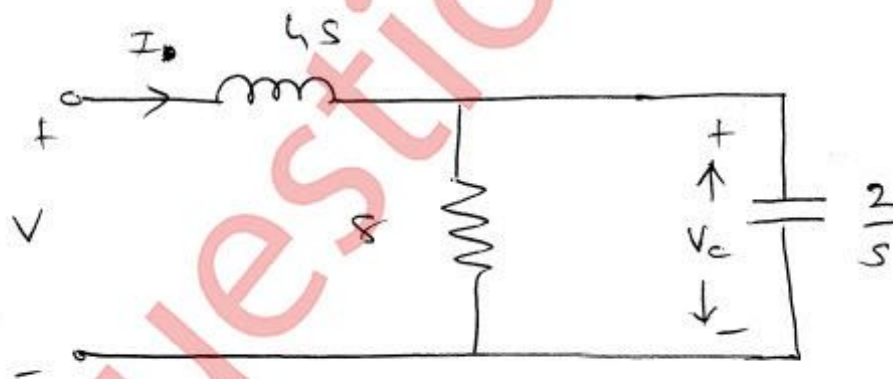


- (b) In the two port n/w shown in fig. compute h-parameters from the following data 5

- (i) with the o/p port short circuited,
 $V_1 = 25V, I_1 = 1A, I_2 = 2A$
 (ii) with the i/p port open circuited,
 $V_1 = 10V, V_2 = 50V, I_2 = 2A$



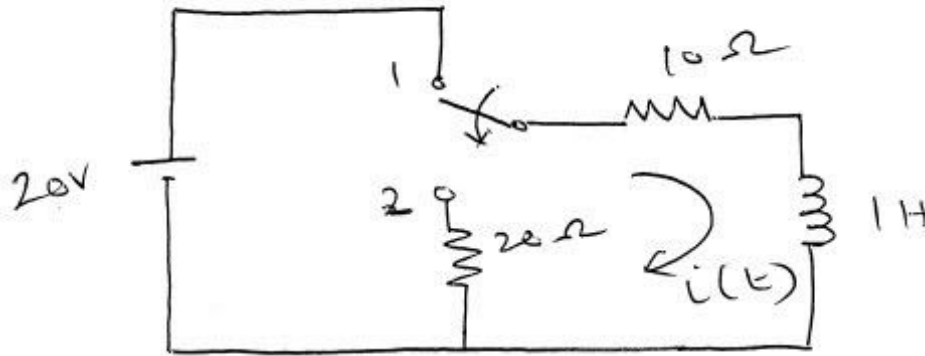
- (c) For the circuit given below, determine $\frac{V_c}{V}$ and draw the pole-zero plot. 5



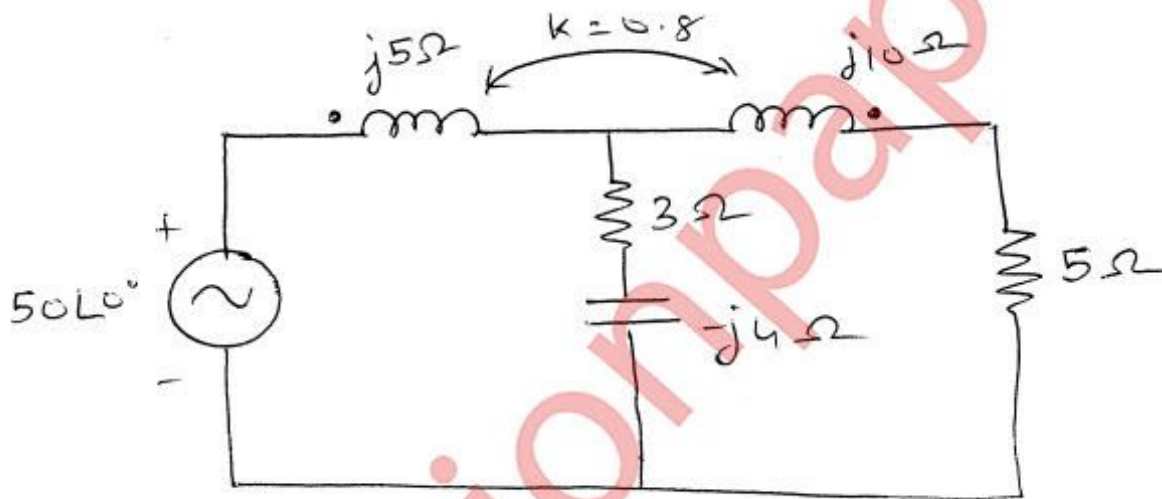
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5. (a) In the network shown in fig. switch is changed from position 1 to position 2 at $t = 0$, steady state condition having reached before

switching. Find the values of i , $\frac{di}{dt}$ and $\frac{d^2i}{dt^2}$ at $t = 0^+$.

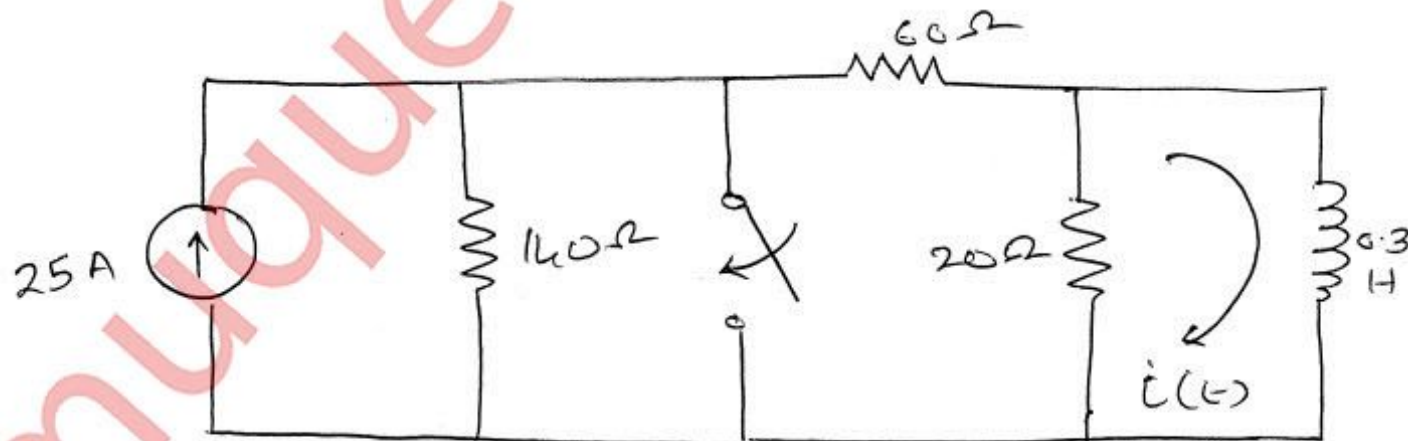


- (b) Find the voltage across the 5Ω resistor in the network shown in figure. 5



- (c) Explain the RF behaviour of transmission line for various conditions. 5

6. (a) Find the current $i(t)$ for $t > 0$ 10



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(b) Synthesize the following using the Foster I realization.

5

$$F(s) = \frac{(s+1)(s+5)(s+3)}{s(s+2)(s+6)(s+4)}$$

(c) Draw the following normalized quantities on a Smith Chart.

5

- (i) $(3 + j3)\Omega$
- (ii) $(1 - j2)\Omega$
- (iii) $(2)\Omega$
- (iv) $(j1)\Omega$