

Q.P. Code :22709

[Time: Three Hours]

[Marks:80]

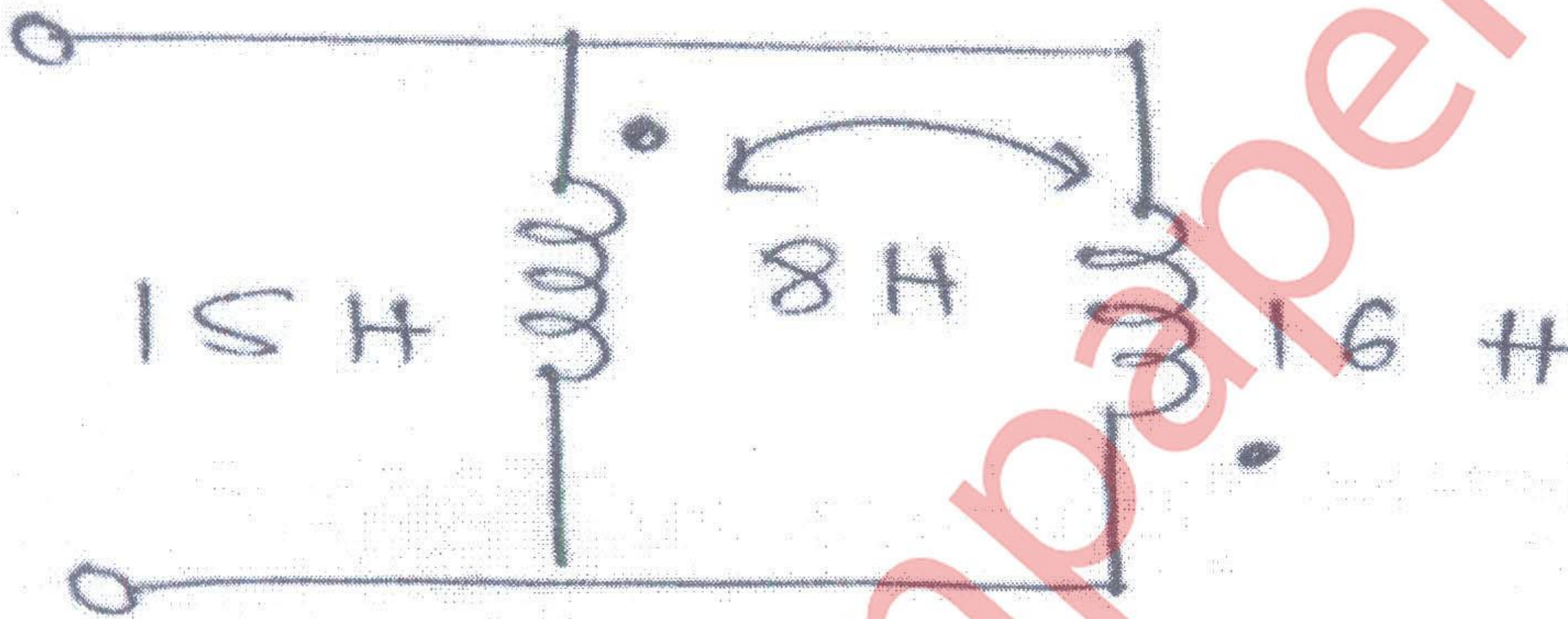
Please check whether you have got the right question paper.

- N.B:
1. Question.No.1 is compulsory.
  2. Solve any three questions out of remaining five questions.
  3. Figures to the right indicate full marks.

Q.1

a) Find the equivalent inductance of the network shown.

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b) Test whether the polynomial  $P(S) = S^4 + 7S^3 + 6S^2 + 21S + 8$  is Hurwitz. Use continued fraction method

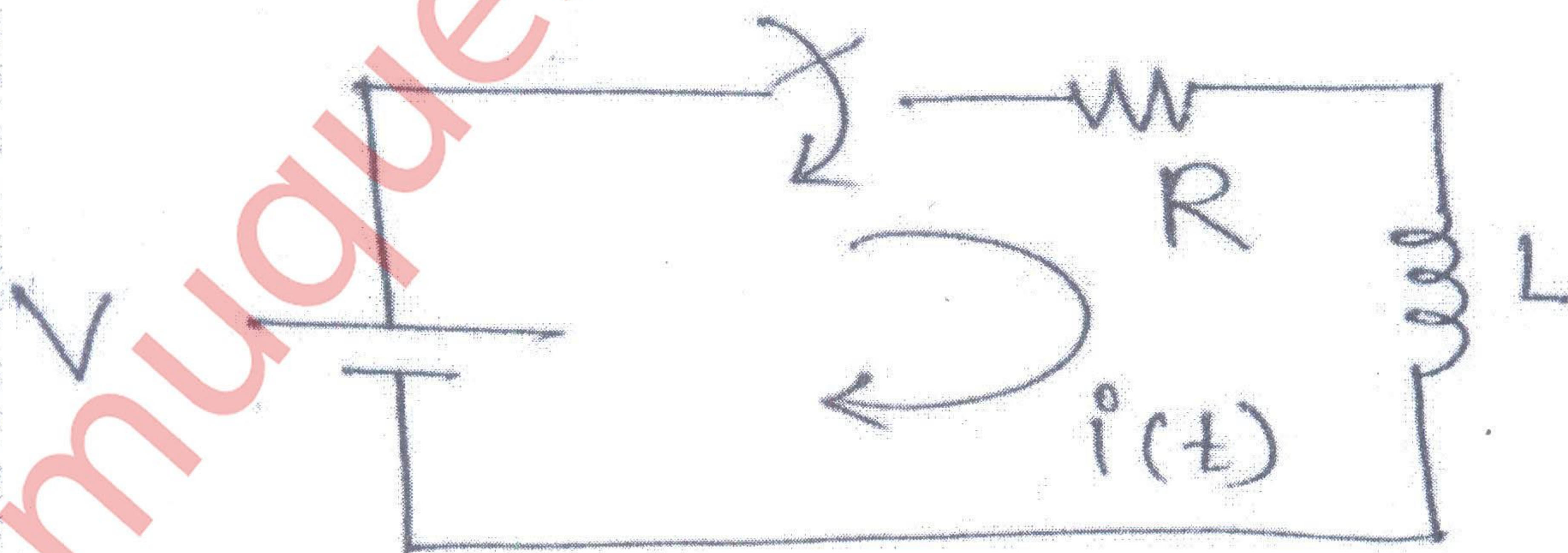
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c) State and prove the condition for reciprocity in terms of Z parameters.

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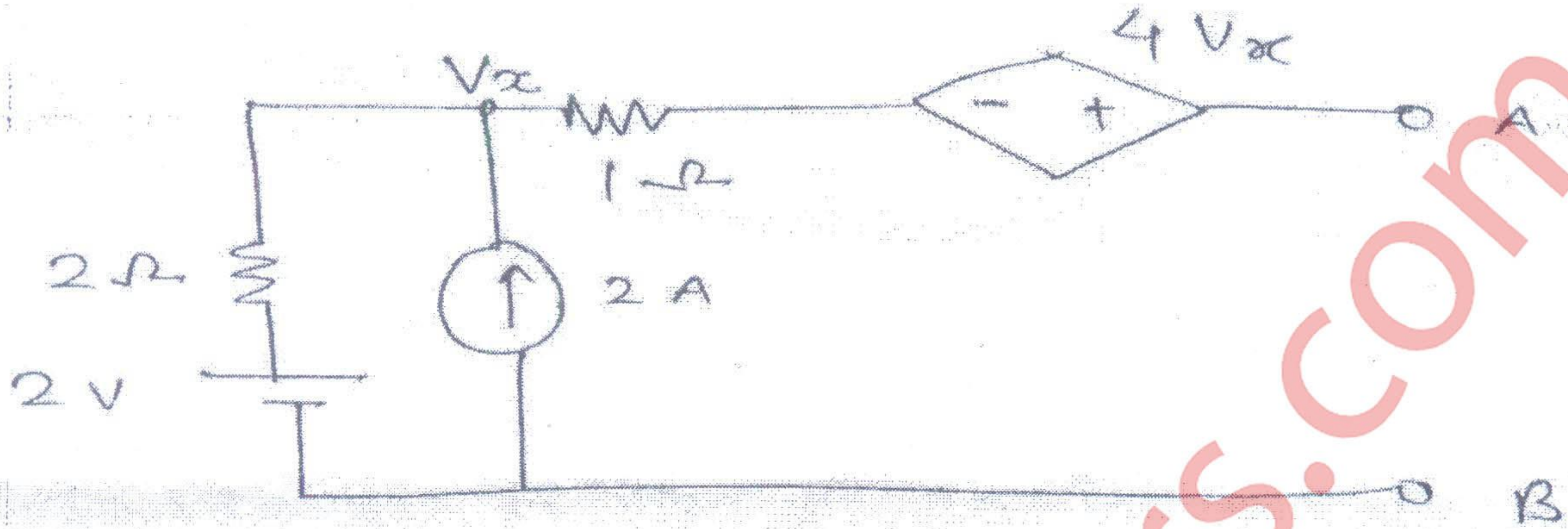
d) Obtain expression for current in the following circuit.

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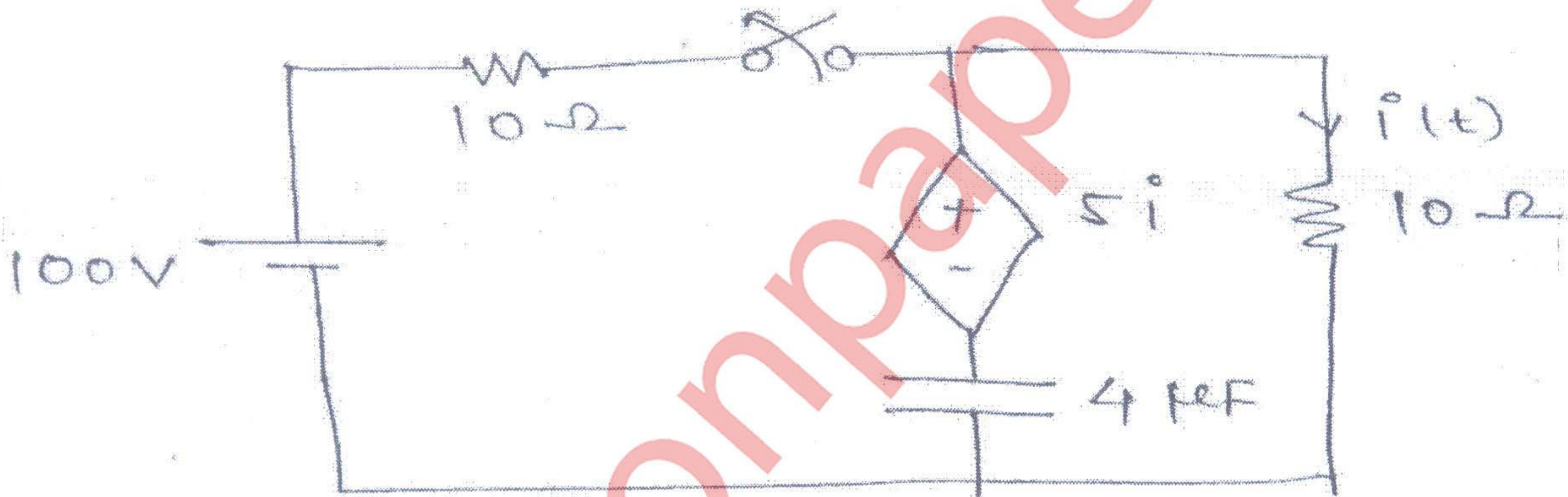




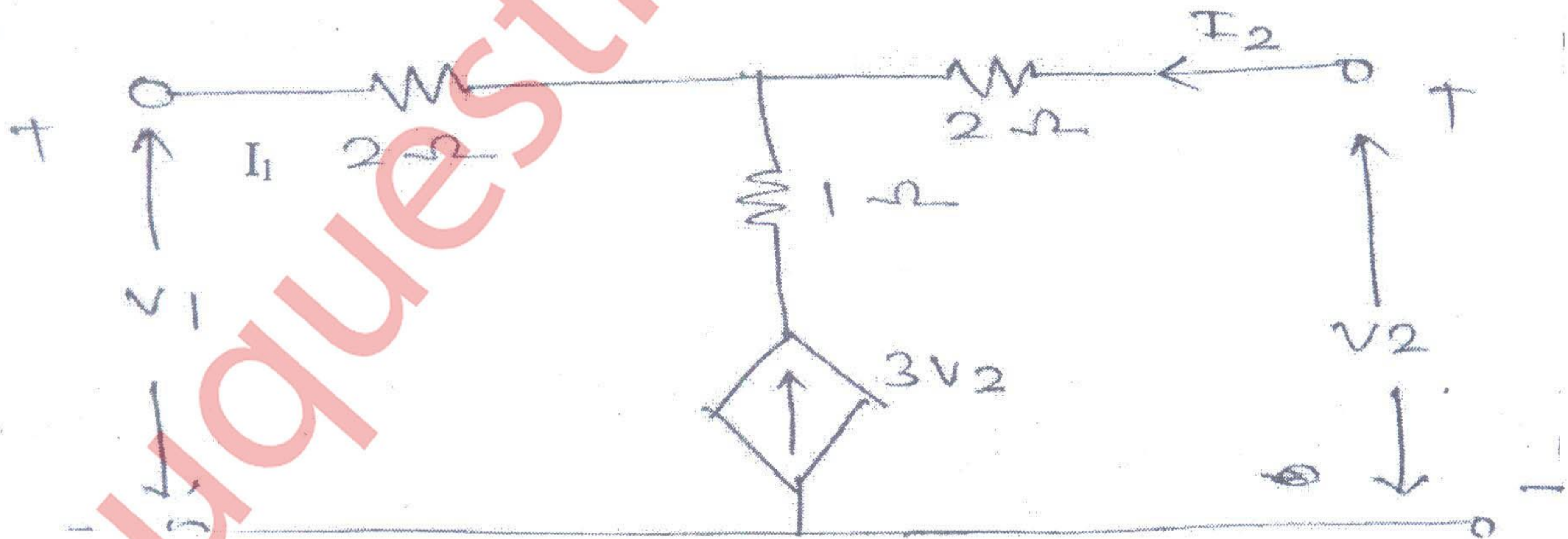
Q.2 a) Obtain Thevenin's equivalent network in the circuit given below for the terminals A and B. 10



b) For the network shown find the current  $i(t)$  when the switch is opened at  $t = 0$  10



Q.3 a) Find Y parameter of the network shown in below figure. 10





b) Realise foster-I and caur- II of the following impedance function

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$$z(s) = \frac{(S + 1)(S + 3)}{S(S + 2)}$$

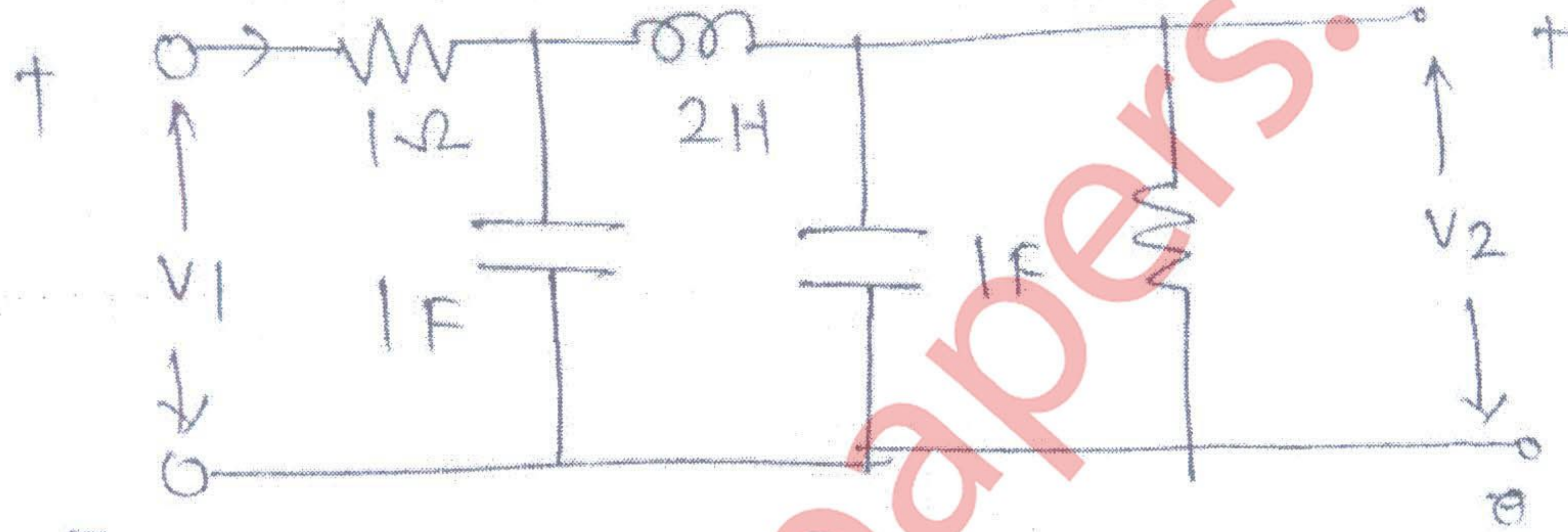
Q.4

a) Test whether  $F(S) = \frac{S(S+3)(S+5)}{(S+1)(S+4)}$  is positive real function.

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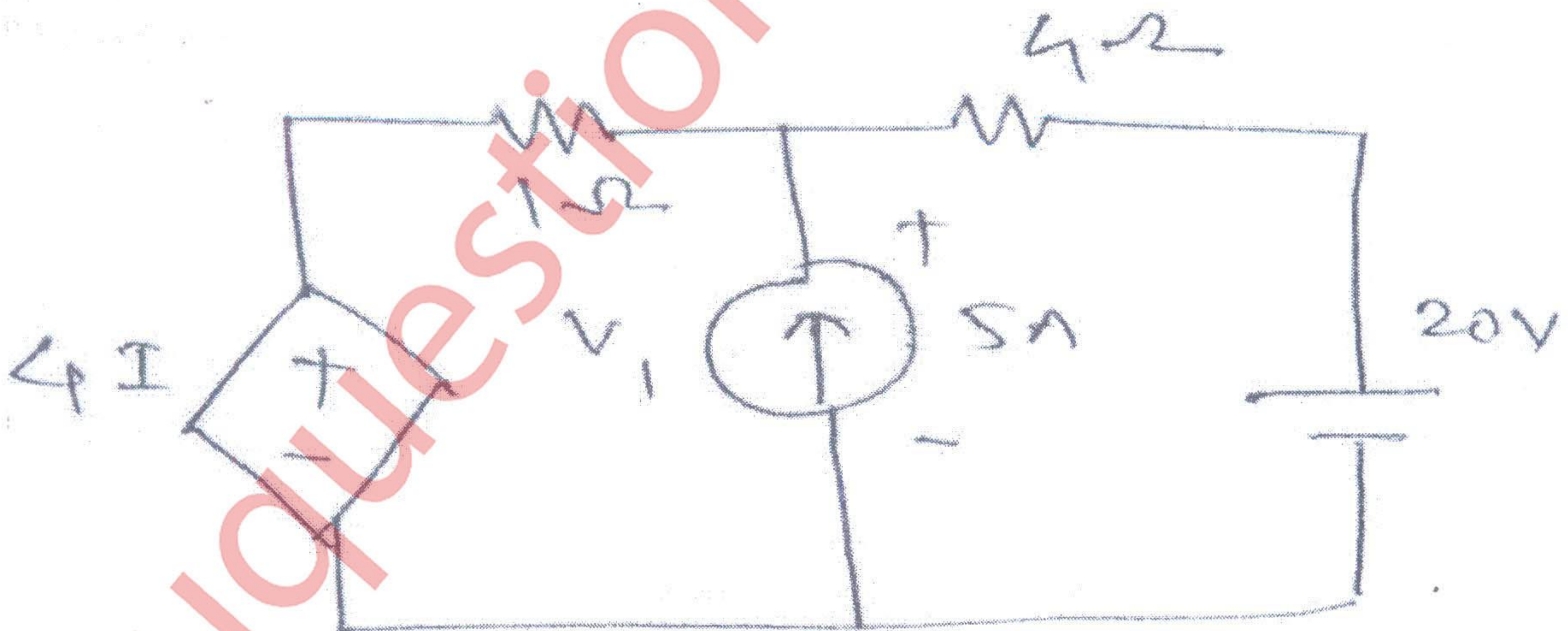
b) Determine the voltage transfer function  $\frac{V_2}{V_1}$  for the network given

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c) Find The voltage  $V_1$  in given figure below

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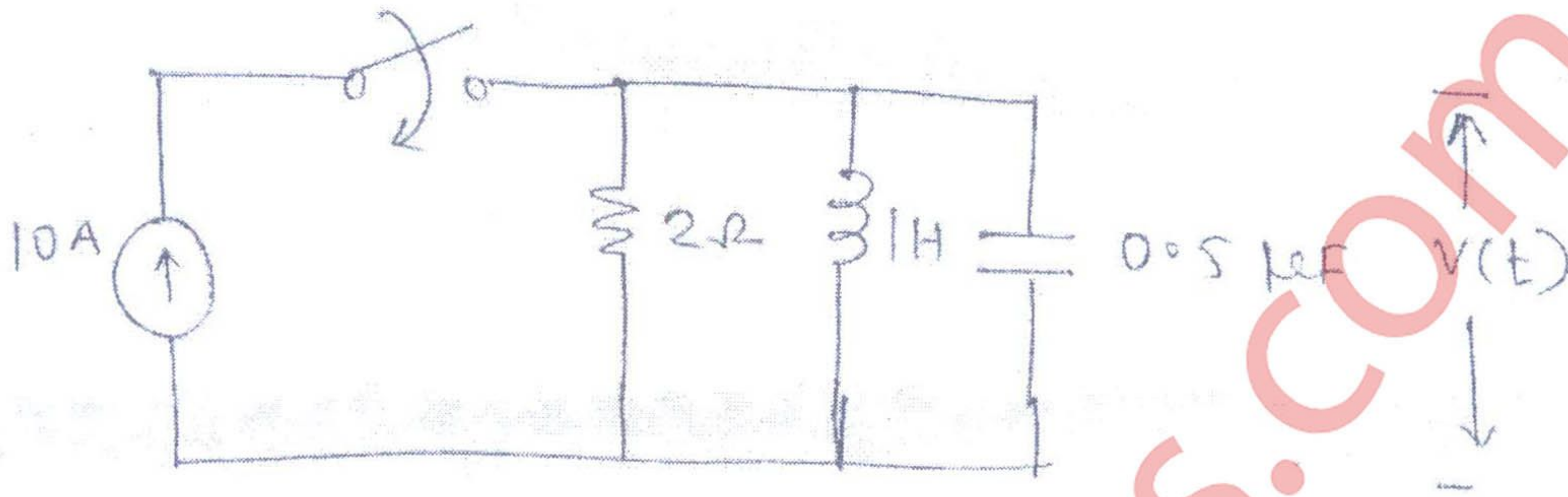




Q.5

- a) For the network shown the switch is closed at  $t = 0$ . Determine  $V$ ,  $\frac{dv}{dt}$  and  $\frac{d^2v}{dt^2}$  at  $t = 0^+$

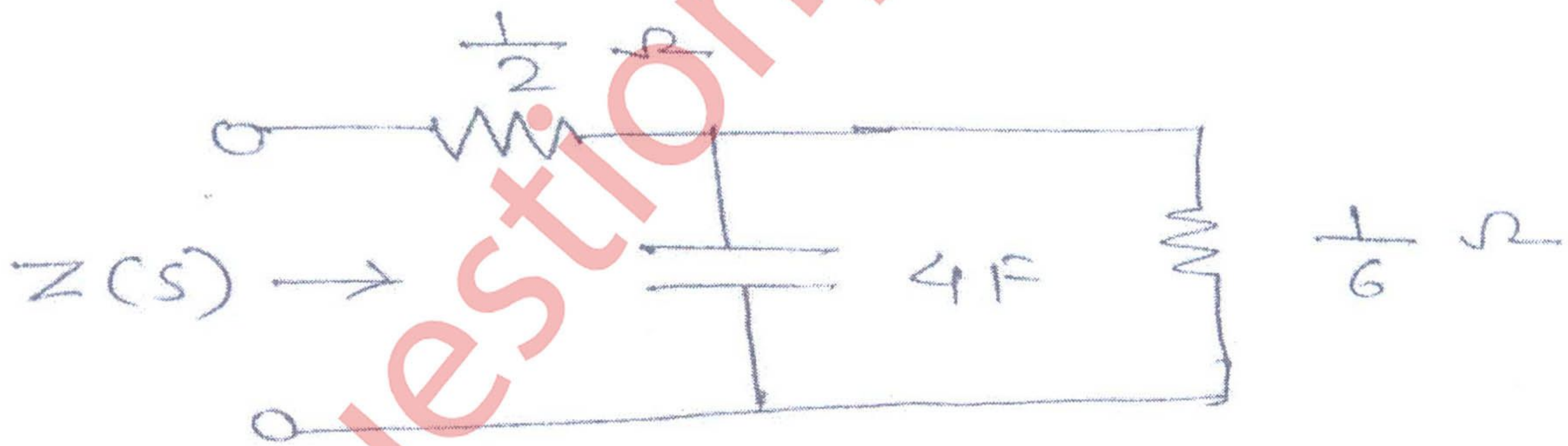
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- b) The constants of a transmission line are  
 $R = 6 \Omega / \text{km}$   $L = 2.2 \text{ MH/km}$   
 $G = 0.25 \times 10^{-6} \text{ U/km}$   $C = 0.005 \times 10^{-6} \text{ F/km}$   
 Determine the characteristics impedance and propagation constant, attenuation constant and phase shift constant at 1 kHz
- c) Determine the poles and zeros of the impedance function  $Z(S)$  in the network shown.

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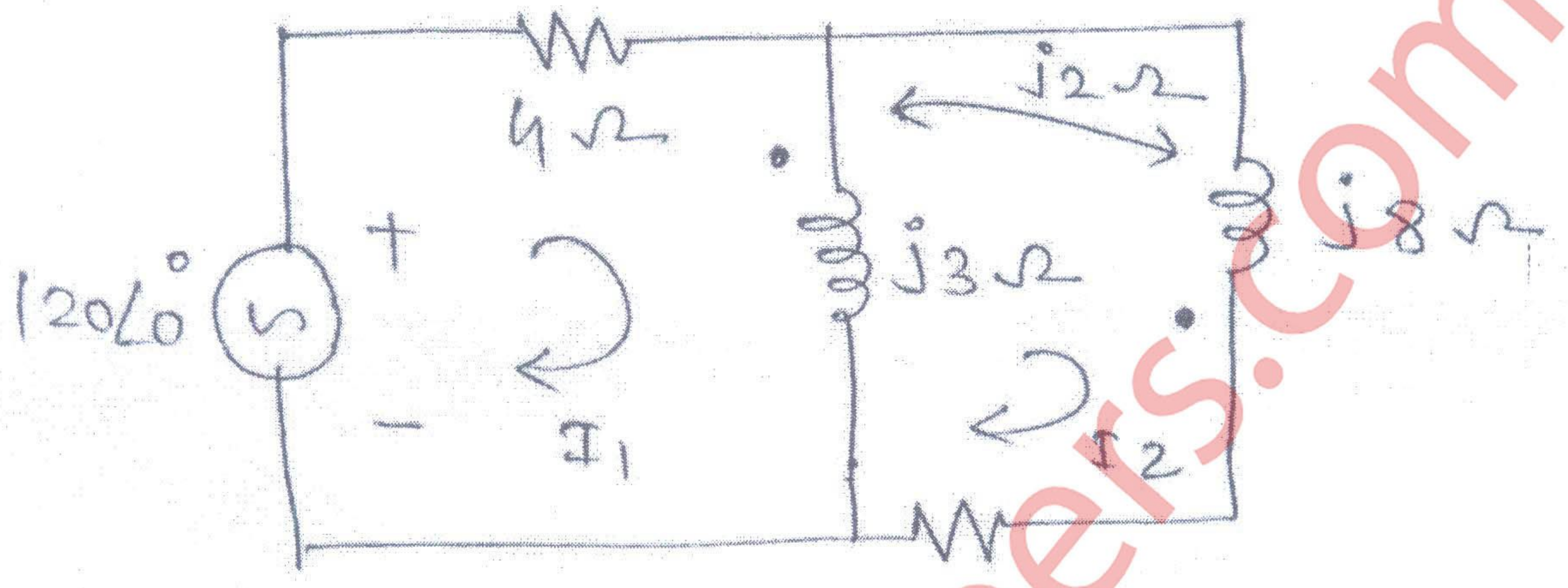
Q.6

- a) A lossless  $75 \Omega$  transmission line is terminated by an impedance of  $150 + j150 \Omega$ . Using Smith chart find  
 a) VSWR  
 b) Reflection Coefficient

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b) Find the Current through  $6\ \Omega$  resistor using mesh analysis in the circuit given below. 10



c) Write short note on initial conditions and final conditions of R, L, C, Components 05