

Q.P. Code :22709

[Time: Three Hours]

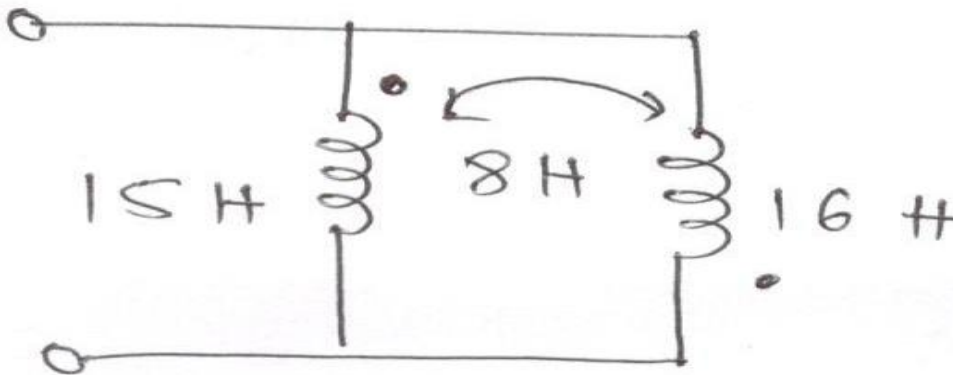
[Marks:80]

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

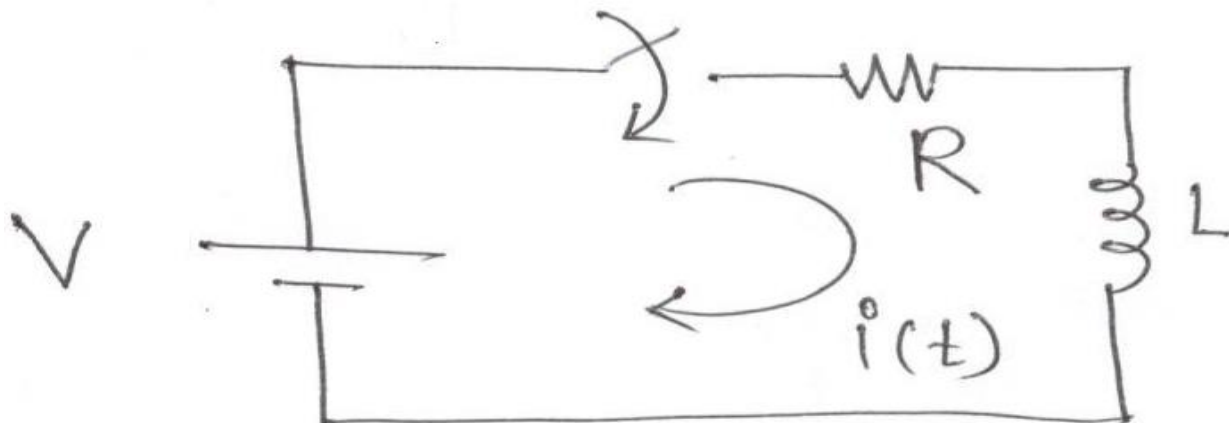
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c) State and prove the condition for reciprocity in terms of Z parameters.

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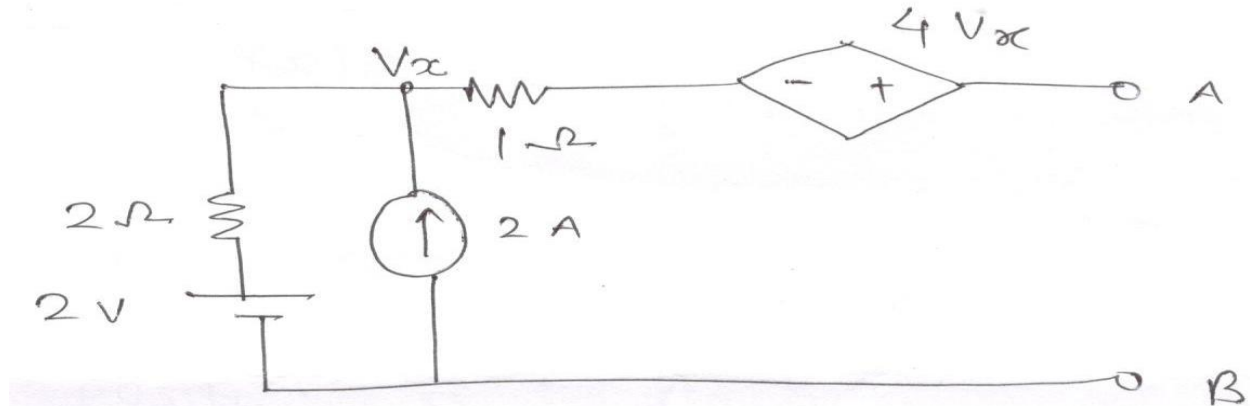
d) Obtain expression for current in the following circuit.

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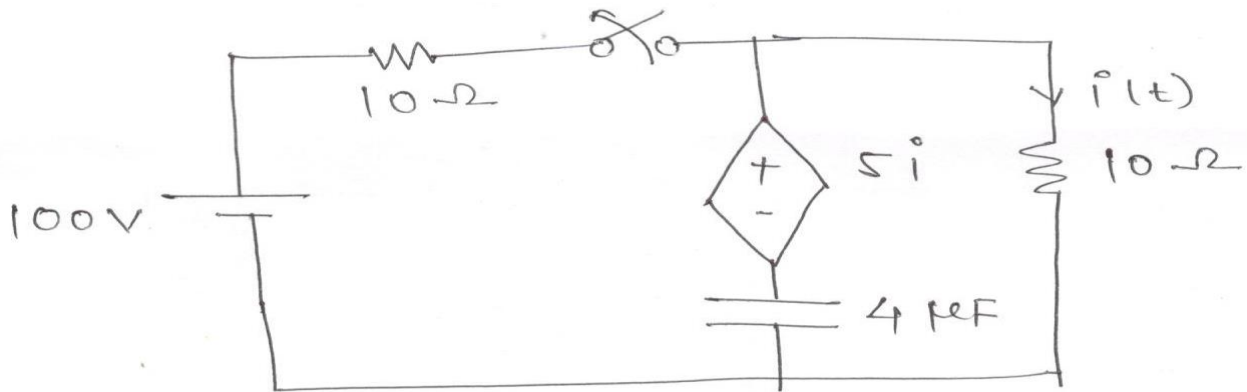


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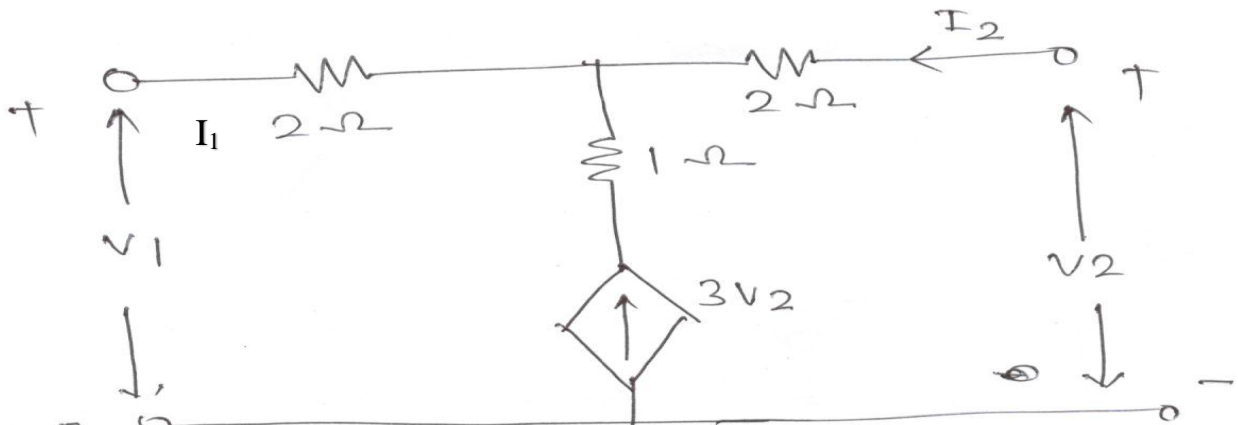
Q.2 a) Obtain Thevenin's equivalent network in the circuit given below for the terminals A and B. 10



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



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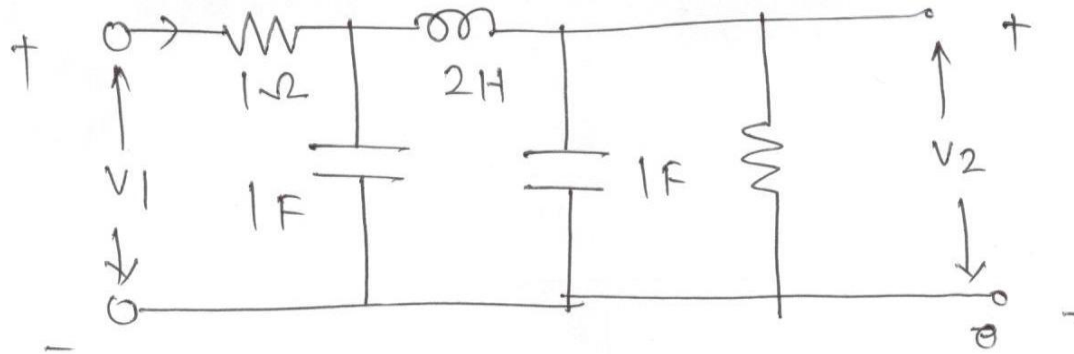
b) Realise foster-I and caur- II of the following impedance function

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

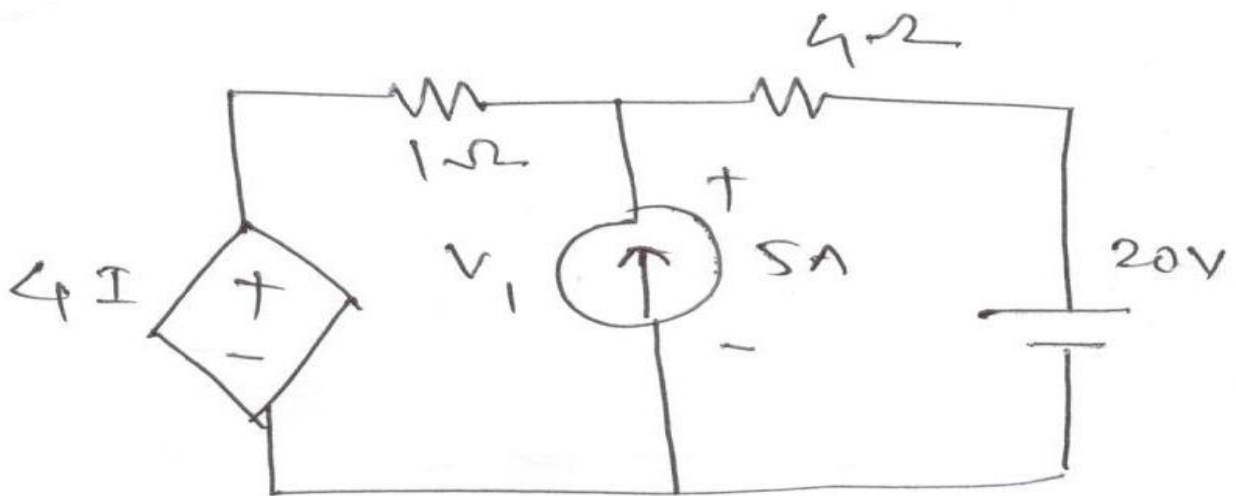
Q.4 a) Test whether $F(S) = \frac{S(S+3)(S+5)}{(S+1)(S+4)}$ is positive real function. 05

b) Determine the voltage transfer function $\frac{V_2}{V_1}$ for the network given 10



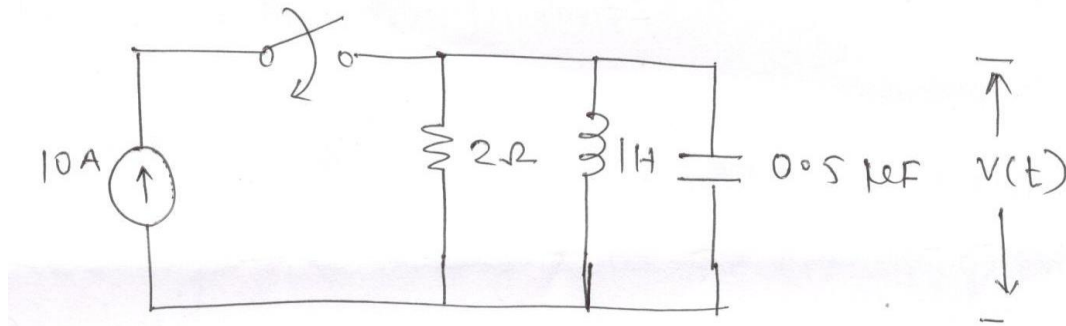
c) Find The voltage V_1 in given figure below

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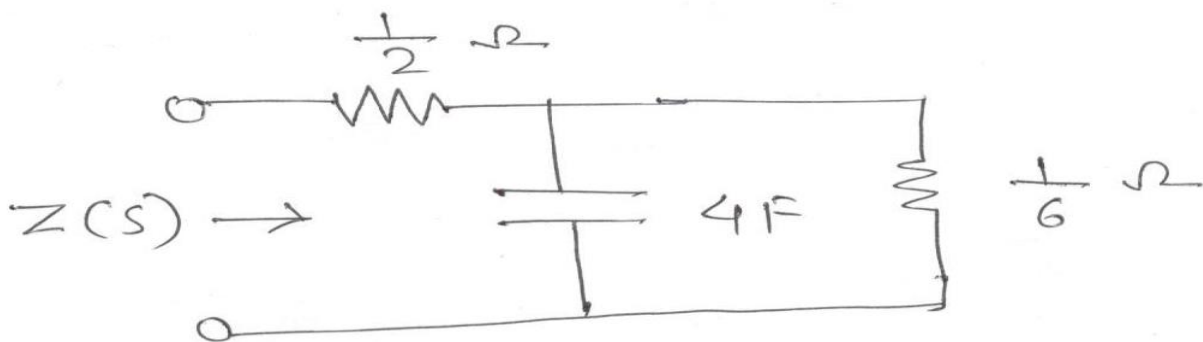


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- Q.5 a) For the network shown the switch is closed at $t = 0$. Determine V , $\frac{dv}{dt}$ and $\frac{d^2v}{dt^2}$ at $t = 0^+$ 10



- b) The constants of a transmission line are 05
 $R = 6 \Omega / \text{km}$ $L = 2.2 \text{ MH/km}$
 $G = 0.25 \times 10^{-6} \text{ S/km}$ $C = 0.005 \times 10^{-6} \text{ F/km}$
 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. 05

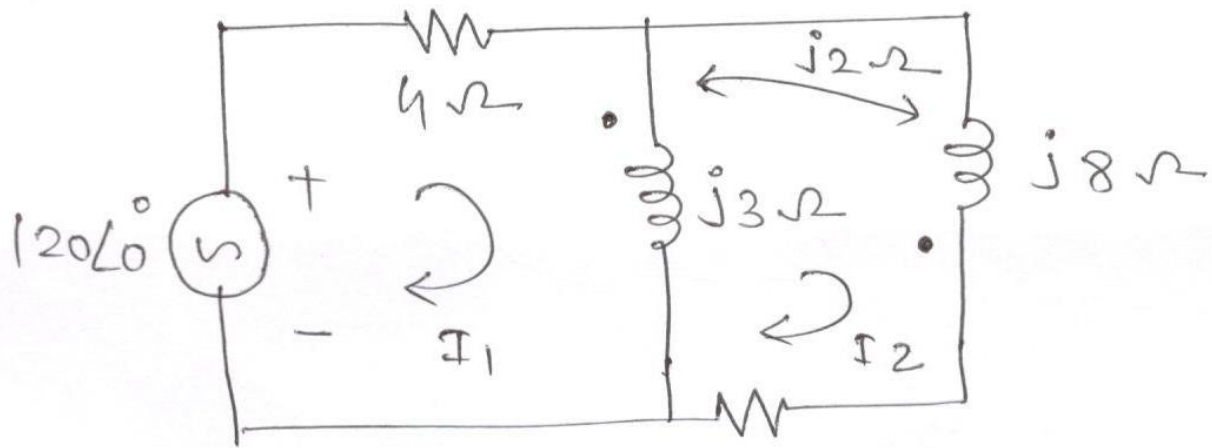


- Q.6 a) A lossless 75Ω transmission line is terminated by an impedance of $150 + j150 \Omega$. Using Smith chart find 05
 a) VSWR
 b) Reflection Coefficient

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

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$6\ \Omega$

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

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