Code No: R19ES1209 **R19** SET - 1

I B. Tech II Semester Regular Examinations, December - 2020
NETWORK ANALYSIS
(Com. to ECE, EIE)

Time: 3 hours Max. Marks: 75

Answer any five Questions one Question from Each Unit
All Questions Carry Equal Marks

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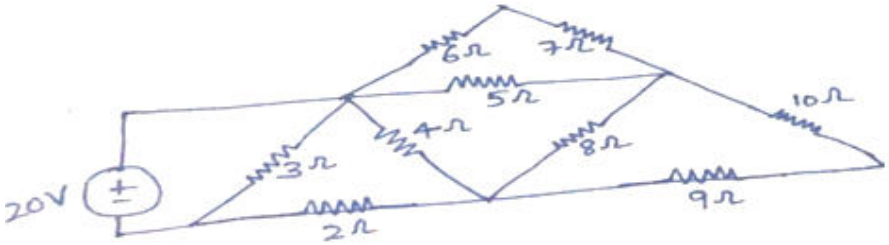
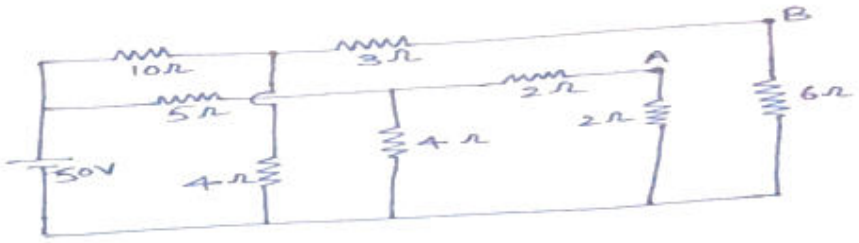
1. a) Explain the following: (8M)
(i) Tree and Co – Tree (ii) Twigs and Links
(iii) Incidence matrix and its properties (iv) Tie – set matrix.

b) Find the current delivered by the source for the following circuit: (7M)

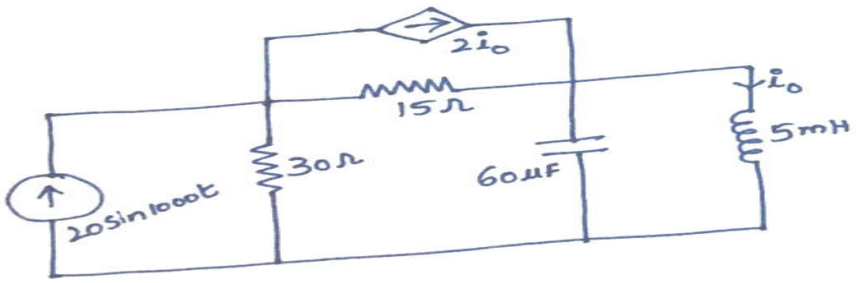


Or

2. a) Determine the voltage V_{AB} for the following circuit. (8M)



b) Find the current i_0 for the following circuit. (7M)



3. a) A function in Laplace domain is given by (7M)

$$M(S) = \frac{S^2 + 10S + 15}{(S+1)(S+2)(S+3)}$$ find M(t)
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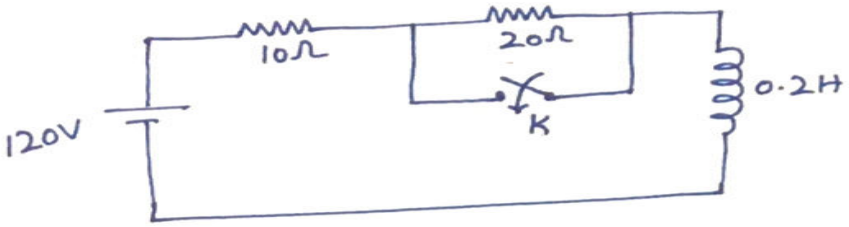
b) A dc voltage of 120 V is applied to the circuit shown below and the switch is open. The switch K is closed at t = 0. Find the complete expression for the current. (8M)

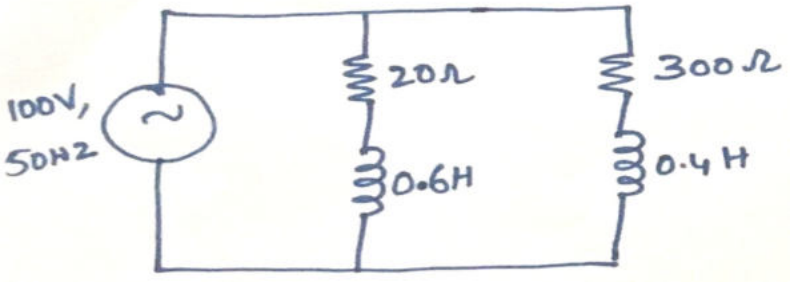


Or

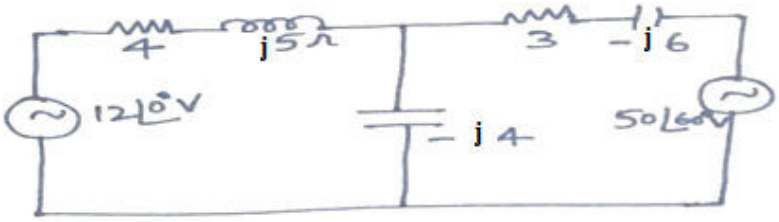
4. a) Explain in detail about the transient response of Series R – C circuit with D.C. Excitation. (8M)

b) A 50 Hz, 415 V(Peak value) sinusoidal voltage is applied at t = 0 to a series R – L circuit having resistance of 6Ω and inductance of 0.3 H. Obtain the expression for the current at any instant "t". Calculate the value of transient current 0.02 sec after switching on. (7M)

5. a) Determine the voltage across each element for the circuit shown : (8M)



b) Find the current through each element using Node analysis. (7M)



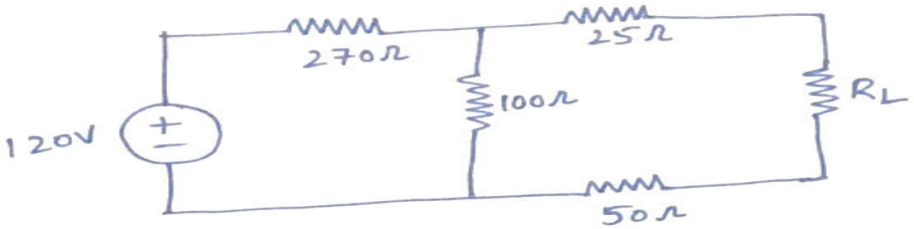
Or

6. a) Prove that for a two mutually coupled opposing series connected inductances L_1 and L_2 have the total inductance equal $L_1 + L_2 - 2M$. (8M)

b) Two coupled coils have self-inductances L_1= 50 mH and L_2= 200 mH, and a coefficient ofcoupling k = 0.5. If coil 2 has 1000 turns, and i_1= 5 sin 400t amperes find the voltage at coil 2and the flux Φ_1. (7M)

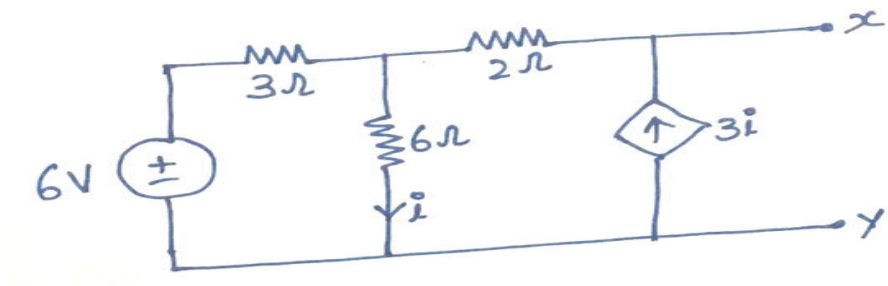
7. a) A 50 μF capacitor, when connected in series with a coil having 40Ω resistance, resonates at 1000 Hz. Find the inductance of the coil. Also obtain the circuit current if the applied voltage is 150 V. Also calculate the voltage across the capacitor and the coil at resonance. (8M)

b) Find the value of R_L for the following circuit to obtain maximum power in R_L. (7M)



Or

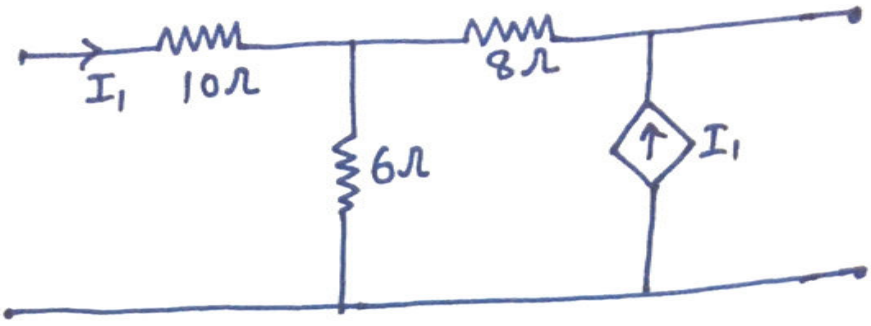
8. a) Find Norton equivalent for the following circuit at x – y terminals: (8M)



b) Explain the features of parallel resonating circuit with neat vector diagram and list the properties of Parallel RLC circuit. (7M)

9. a) Explain the conditions of Reciprocity and Symmetry in terms of various parameters i.e Z, Y, h and ABCD for a two port network. (8M)

b) Determine the Z – parameters for the network Shown: (7M)



Or

10. a) Explain how ABCD – Parameters or Transmission parameters can be derived from a two – port network. (8M)

b) For a Two – port network, Y – parameters are given as below: (7M)
$Y_{11} = 0.3$ mho, $Y_{12} = Y_{21} = -0.1$ mho, $Y_{22} = 0.2$ mho.
Determine transmission parameters.

Code No: R19ES1209 **R19** SET - 2

I B. Tech II Semester Regular Examinations, December - 2020
NETWORK ANALYSIS
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Answer any five Questions one Question from Each Unit
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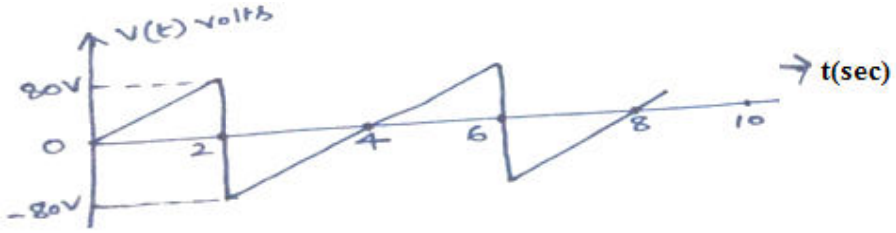
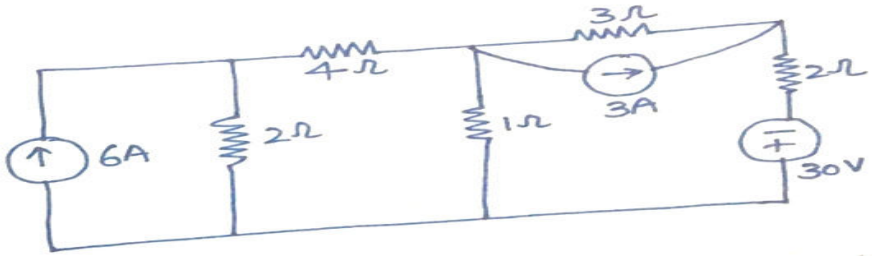
1. a) Define the following: (8M)
(i) Periodic and Aperiodic Waveforms (ii) Phase angle (iii) Instantaneous value
(iv) Peak to Peak value.

b) A pure inductance of 3H has an applied voltage with the waveform shown below. Sketch the corresponding current and power waveform and determine the expression for i. (7M)



Or

2. a) Find the current through 3Ω resistor using mesh analysis. (8M)



b) Explain the principle of Duality with an example. (7M)

3. a) Explain in detail about the transient response of Series R – C circuit with sinusoidal excitation. (8M)

b) A series R – L circuit has R = 30Ω and L = 6H. A dc voltage of 120 V is applied at t = 0. Find (i) the equations for charging current, voltage across R and L, (ii) the current in the circuit 0.6 seconds later and (iii) the time at which the drops across R and L are same. (7M)

Or
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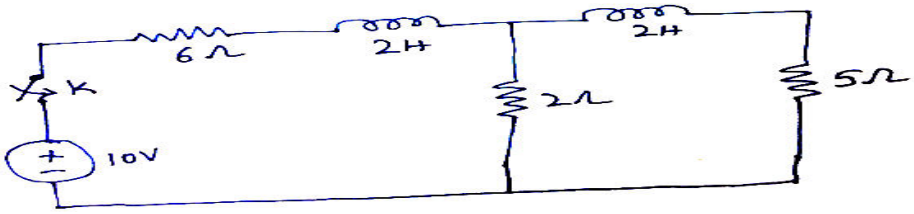
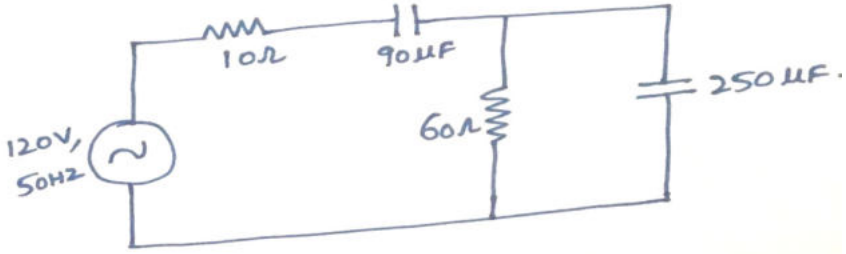
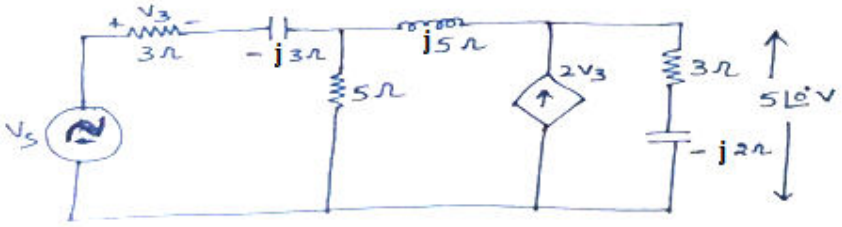
4. Using Laplace transformation technique, find i_2 (t) at t = 0+ following switching at t = 0 of switch K as shown in the circuit. Assume the circuit is previously deenergized. (15M)



5. a) For the circuit shown below, find the total impedance, total current and Phase angle. (8M)

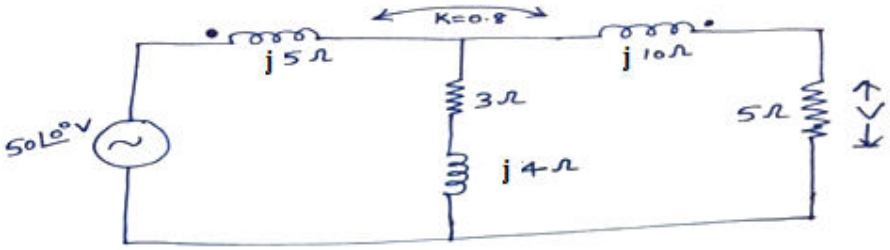


b) Find the value of source voltage from the following circuit. (7M)



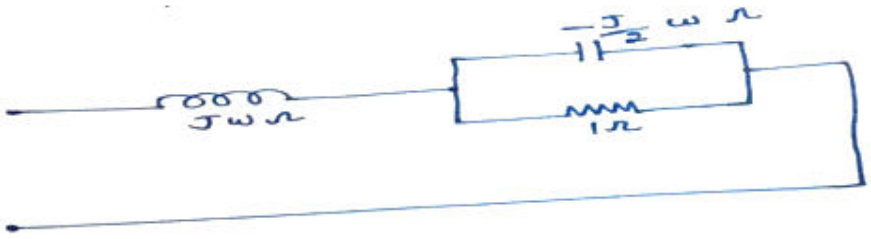
Or

6. a) Compute the voltage V for the coupled circuit shown below: (8M)



b) Explain the following terms: (7M)
(i) Coefficient of Coupling (ii) Dot convention in coupled coils.

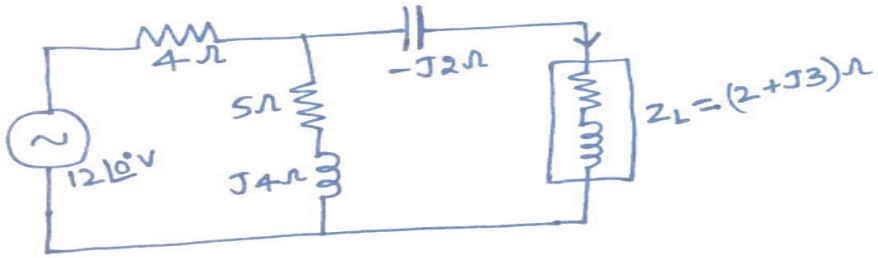
7. a) For the circuit shown below, find the frequency at which this circuit will be at resonance. If the capacitor and inductor are interchanged, what would be the value of the resonance frequency? (8M)



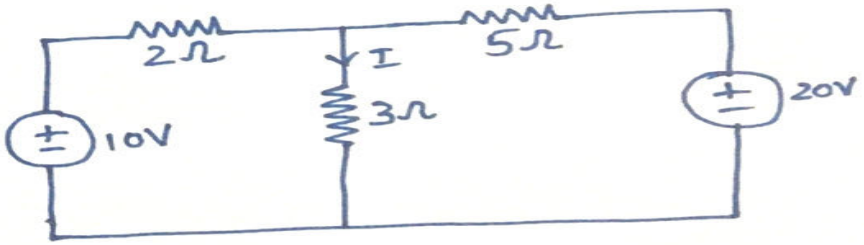
b) A series resonating circuit has a source frequency of 5 KHz and source impedance of (2 + j4) Ω. The load impedance being (10 – jX_C) Ω. Find the value of C provided the power consumed by the resistor is maximum. (7M)

Or

8. a) For the following circuit, determine the current through Z_L using Thevenin's theorem. (8M)

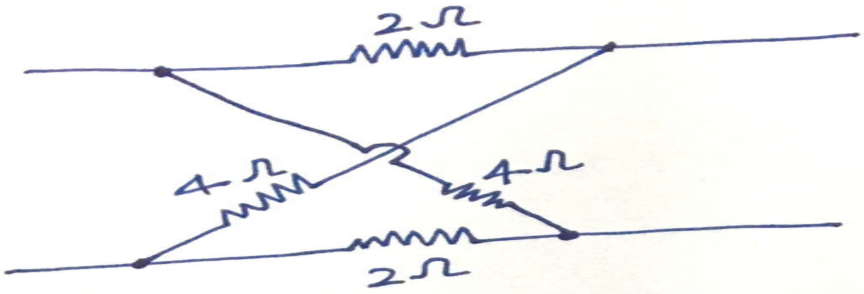


b) Calculate the current I for the following circuit using Millman's theorem. (7M)



9. a) Explain how h – Parameters or hybrid parameters can be derived from a two – port network. (8M)

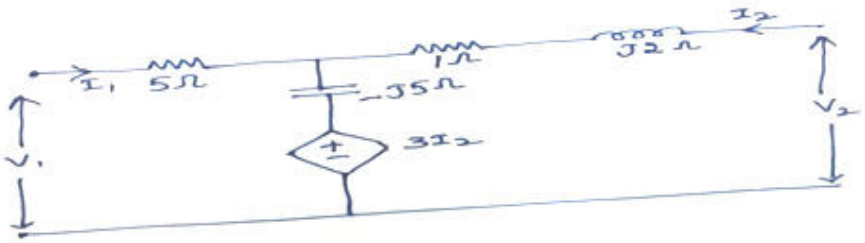
b) Find ABCD parameters for the following network: (7M)



Or

10. a) Derive the inter – relationships between Z – parameters in terms of ABCD parameters. (8M)

b) Determine the Z – parameters for the following network: (7M)



Code No: R19ES1209 **R19** SET - 3

I B. Tech II Semester Regular Examinations, December - 2020
NETWORK ANALYSIS
(Com. to ECE, EIE)

Time: 3 hours Max. Marks: 75

Answer any five Questions one Question from Each Unit
All Questions Carry Equal Marks

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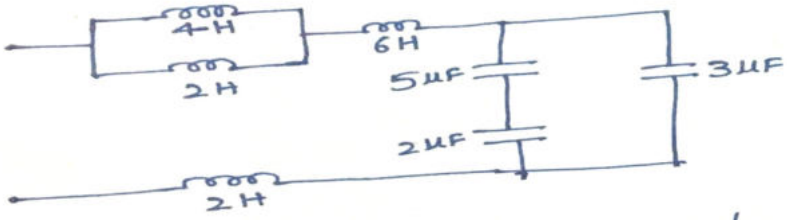
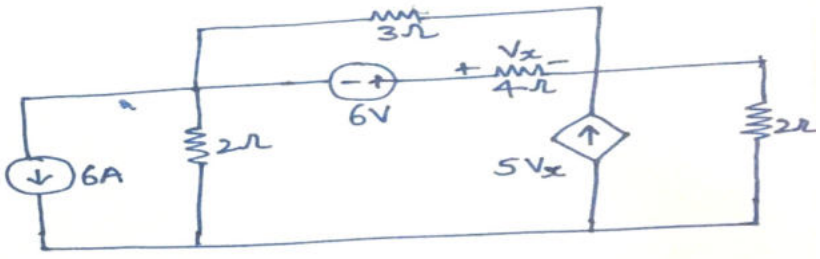
1. a) Explain in detail about the resistance, inductance and Capacitance elements in Electrical networks. (7M)

   b) Simplify the following Circuit: (8M)

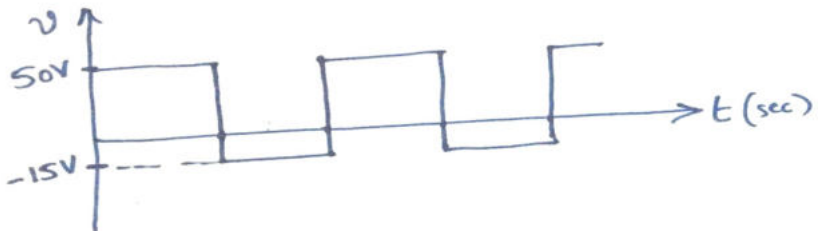


Or

2. a) Find the voltage across 4Ω resistor using node analysis. (8M)



   b) Calculate average and rms value for the following waveform and also find the form factor. (7M)



3. a) Explain in detail about the transient response of Series R – L circuit with sinusoidal Excitation. (8M)
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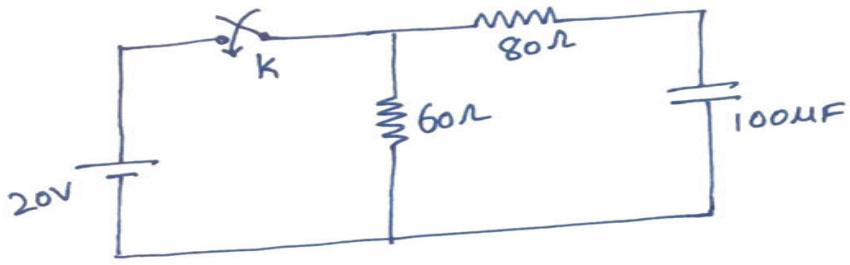
b) For the following circuit, when the circuit Switch K is closed. Find the time when the current from the battery reaches to 50 mA. (7M)

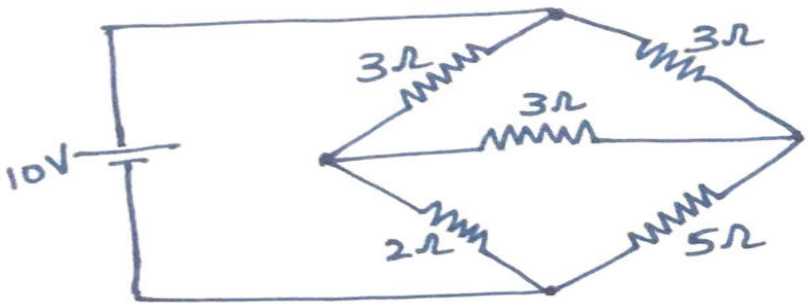


Or

4. a) Distinguish between Over damped condition, Under damped condition and Critically damped condition w.r.t the transient responses. (8M)

b) In a RC series circuit R = 2Ω and C = 0.6F.An exponential voltage $v = 10e^{-t}$ is suddenly applied at t = 0. Obtain i(t). Assume no initial charge in the capacitor. (7M)

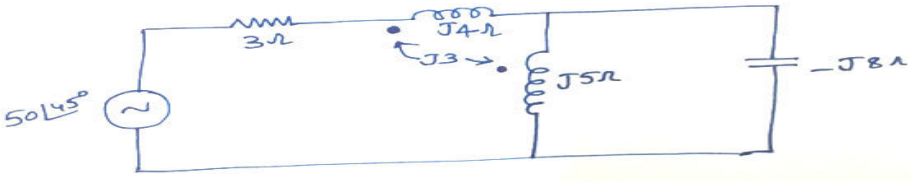
5. a) Find the source current for the following circuit: (8M)



b) A series circuit consists of two pure elements which has the following current and voltage equations: (7M)
$v = 100 \sin(2000t + 60^0)$ V,
$i = 30 \cos(2000t + 300^0)$ A.
Find the elements of the circuit.

Or

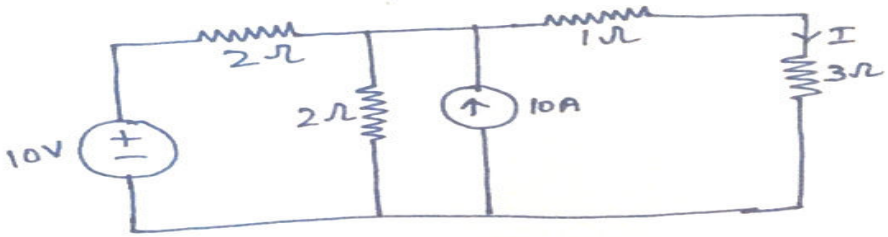
6. a) Find the voltage across the 5Ω reactance: (8M)



b) Prove that for a two mutually coupled aiding series connected inductances L_1 and L_2have the total inductance equal $L_1 + L_2 + 2M$. (7M)

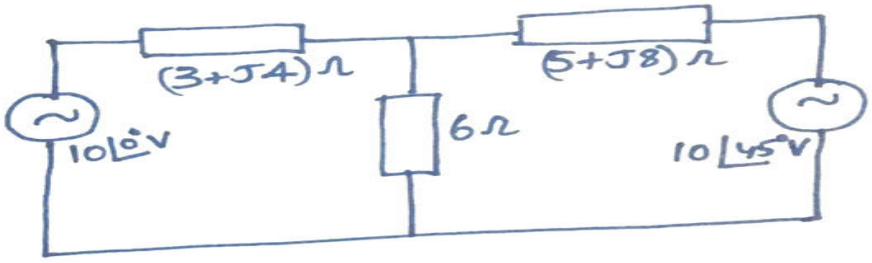
7. a) Derive the relation between the band width of the series RLC resonating circuit with Quality factor (Q). (8M)

   b) Determine the current 'I' in the network using Thevenin's Theorem. (7M)

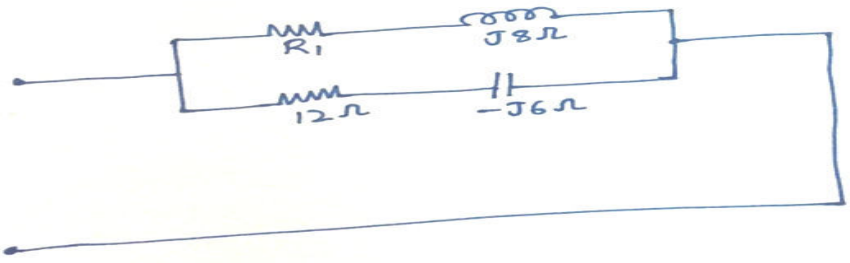


Or

8. a) For the following circuit determine the current through 6Ω resistor using Norton's theorem. (8M)

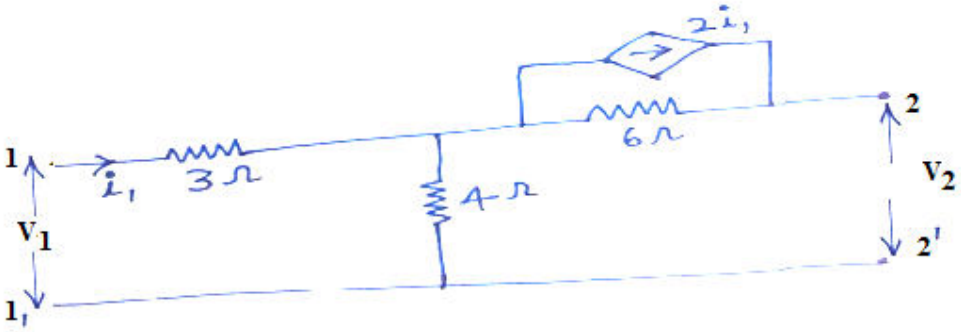


   b) Find the Value of R_1 such that the circuit shown below is resonant. (7M)



9. a) Derive the inter – relationships between Y – parameters in terms of h – parameters. (8M)

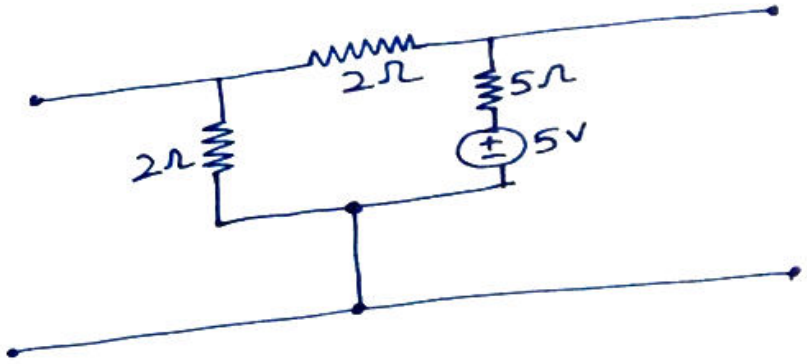
   b) Find the Hybrid parameters for the network Shown: (7M)



Or

10. a) Explain how Y – Parameters or Short circuit admittance parameters can be derived from a two – port network. (8M)

b) Determine Y – parameters for the following Network: (7M)



Code No: R19ES1209 **R19** SET - 4

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NETWORK ANALYSIS
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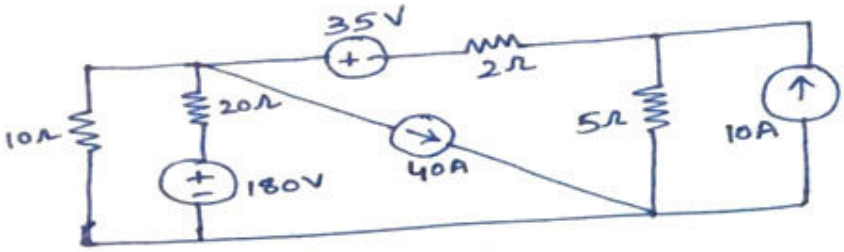
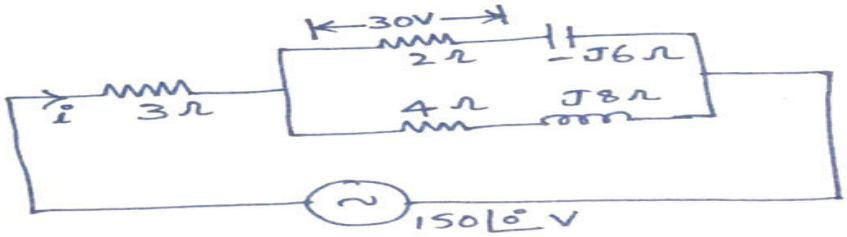
1. a) Define the following terms: (8M)
(i) Current (ii) Voltage (iii) Power (iv) Energy (v) Active and Passive sources

b) For the network shown find the current in the 10Ω resistor. (7M)

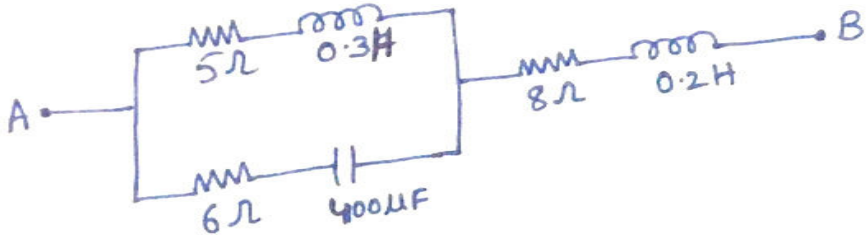


Or

2. a) Find the current i for the following circuit. (8M)



b) For the following circuit, what voltage is to be applied across A –B terminals so that a current of 8A will flow in the capacitor? Take f = 50 Hz. (7M)



3. a) Explain in detail about the transient response of Series R – L circuit with D.C. Excitation. (8M)
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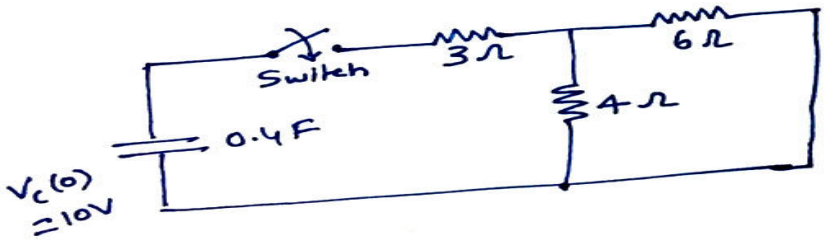
b) For the following network, find the expression of discharging voltage of the capacitor at $t = 0^+$ following switching at $t = 0$. (7M)

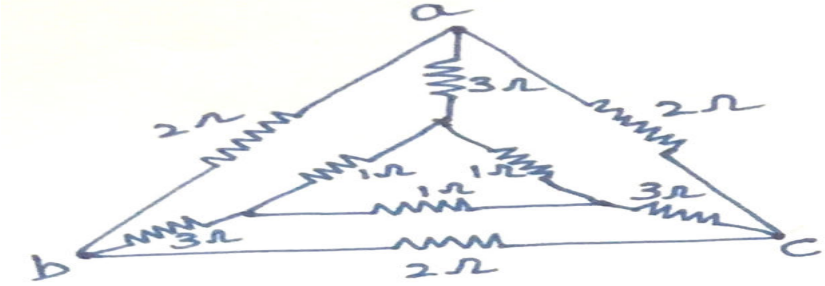


Or

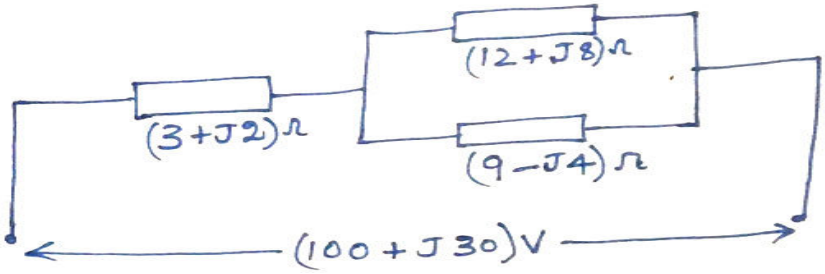
4. a) Explain in detail about the transient response of Series RLC circuit withac Excitation. (8M)

b) A series RL circuit is energized by a voltage V_o (t) = 4t u(t). Find i(t)for R = 2Ω and L = 3H. (7M)

5. a) Find the equivalent resistance R_{a-b} for the network shown: (8M)

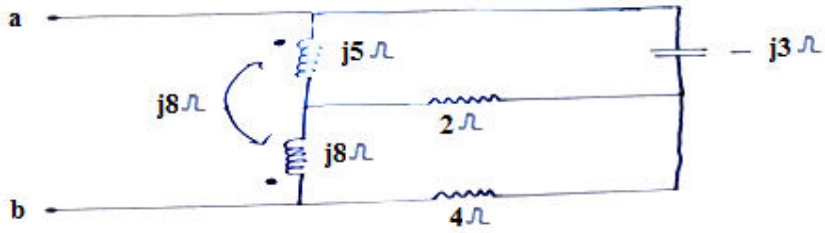


b) For the following circuit find the current through each element: (7M)



Or

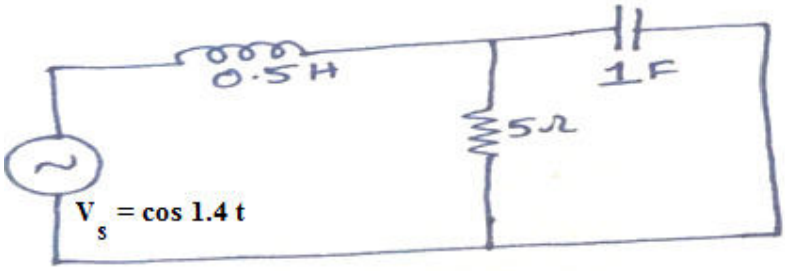
6. a) Find the input impedance at terminals ab for the coupled circuit shown below: (8M)



b) Explain the following terms: (7M)
(i) Self Inductance (ii) mutual Inductance

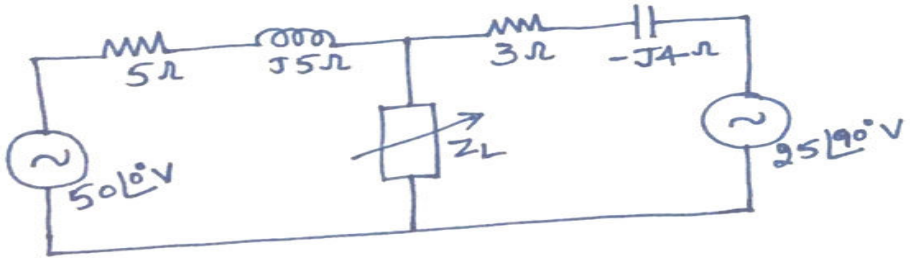
7. a) Explain the procedural steps of resonance in series RLC circuit along with its properties. (8M)

b) Show that the following circuit is resonant at supply frequency. (7M)

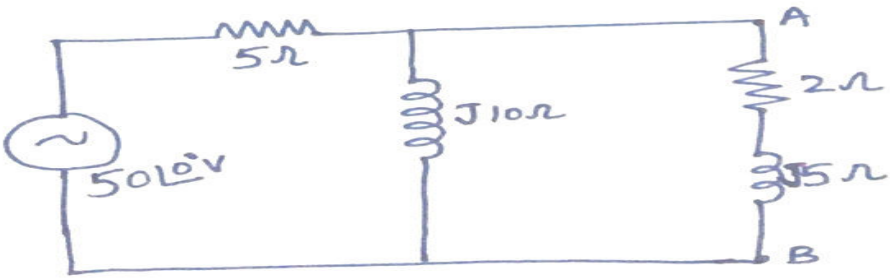


Or

8. a) For the following network at what load Z_L will receive maximum power? (8M)

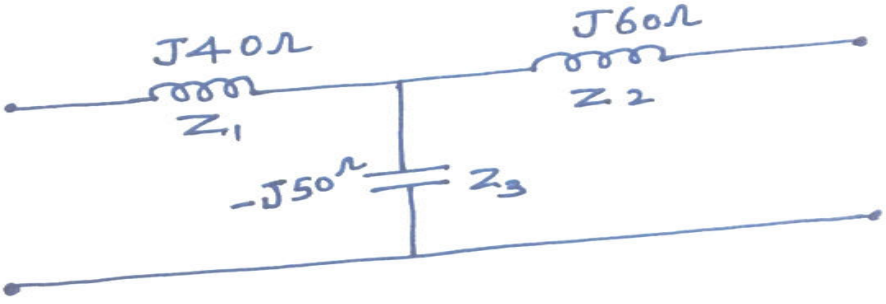


b) In the following network, the 2Ω resistor is changed to 4Ω. Determine the resulting change in current ΔI through the load impedance, using compensation theorem. (7M)



9. a) Explain how Z – Parameters or open circuit impedance parameters can be derived from a two – port network. (8M)

b) Find Y – parameters for the network shown: (7M)



Or

10. a) Explain the following types of Interconnections of Two port networks: (8M)
(i) Series Connection (ii) Cascade connection and (iii) Parallel Connection

b) Determine the transmission parameters of the circuit shown in figure below: (7M)