Code No: R1621044 **R16** SET - 1

II B. Tech I Semester Regular/Supplementary Examinations, October/November - 2019
NETWORK ANALYSIS
(Com to ECE, EIE and ECC)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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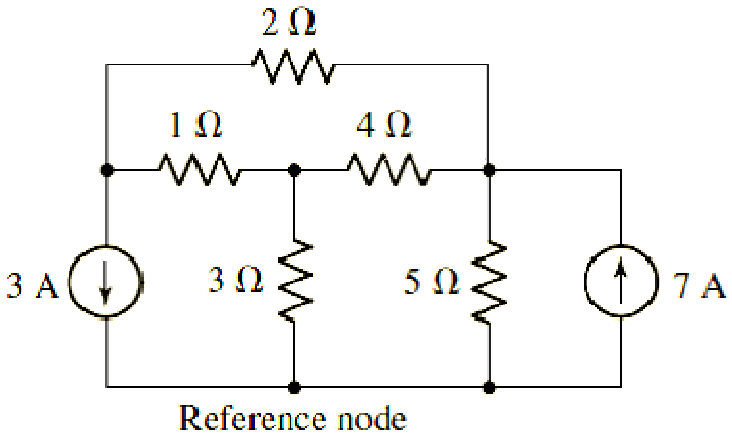
PART –A

1. a) A sine wave has a peak value of 12 V. Determine the RMS value, Average value and form factor. (3M)
   b) What is complex impedance? (2M)
   c) Define Bandwidth. (2M)
   d) The current through a branch in a linear network is 2 A when the input source voltage is 10 V. If the voltage is reduced to 1 V and the polarity is reversed, then determine the current through the branch. (2M)
   e) Write the relationship between Y-parameters and Z-parameters. (2M)
   f) What is meant by transient response? (3M)

PART -B

2. a) For the circuit shown in figure, determine the voltage across each current source. (7M)



   b) Explain the following with an example: (7M)
   (i) Tree and Co-Tree (ii) Twigs and Links

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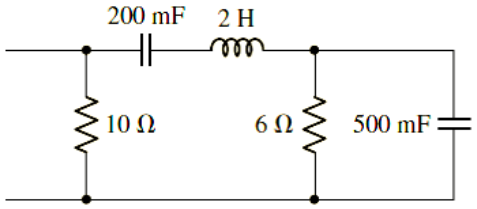
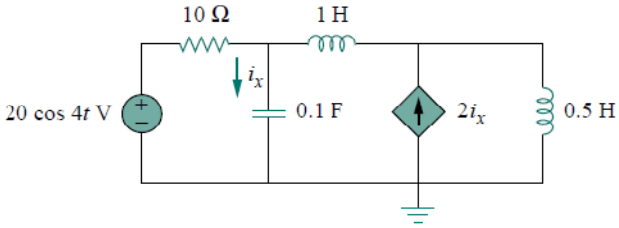
3. a) Determine the equivalent impedance of the network shown in Figure if the operating frequency is 5 rad/s. (7M)



b) Find the current i_x in the circuit shown below by using nodal analysis. (7M)

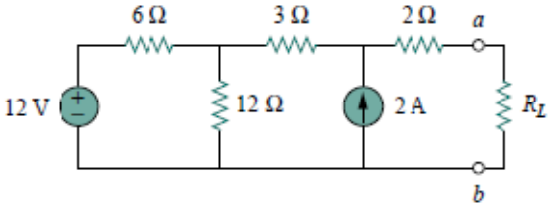


4. a) Explain the dot rule of coupled circuits. (7M)

b) Draw the parallel resonant circuit and derive the expression for resonant frequency. (7M)

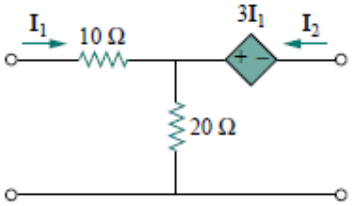
5. a) State and explain Norton's theorem. (7M)

b) Find the value of R_L for maximum power transfer in the circuit shown below. Find the maximum power. (7M)



6. a) Explain about Z-parameters of a two port network. (7M)

b) Find the transmission parameters of the following two port network: (7M)



7. a) A parallel RLC circuit having an inductance of 10 mH and a capacitance of 100 μF. Determine the resistor values that would lead to overdamped and underdamped responses. (7M)

b) Discuss about modeling of inductors in s-domain. (7M)

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Time: 3 hours Max. Marks: 70

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2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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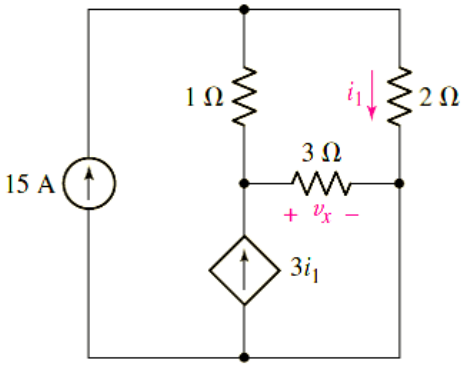
PART –A

1. a) Define Form factor and Peak factor. (2M)
   b) Define impedance. (2M)
   c) Define Quality factor. (2M)
   d) Write short notes on Tellegen's theorem. (3M)
   e) What is a two port network? Explain. (3M)
   f) Write the differential equation for the parallel RLC circuit. (2M)

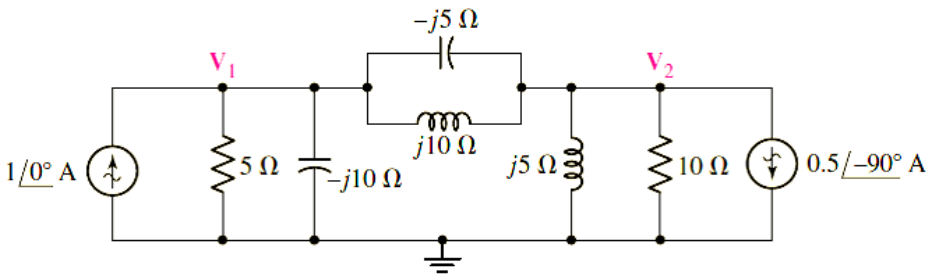
PART -B

2. a) Determine the power supplied by the dependent source shown in figure. (7M)



   b) What is an incidence matrix? Write the properties of incidence matrix. (7M)

3. a) Explain about star to delta conversion. (7M)
   b) Determine the time domain node voltages $v_1(t)$ and $v_2(t)$ shown in circuit: (7M)



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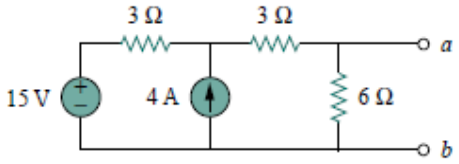
4. a) What is coupling coefficient? Derive the expression for it. (7M)

   b) A series connected circuit has R = 4 Ω and L = 25 mH. (7M)
   (i) Calculate the value of C that will produce a quality factor of 50.
   (ii) Find ω_1 , ω_2 and bandwidth.

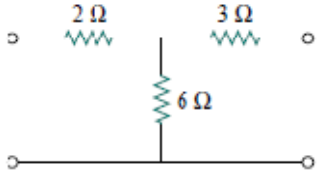
5. a) What is maximum power transfer theorem? Explain it. (7M)

   b) Find the Norton's equivalent circuit for the following circuit. (7M)

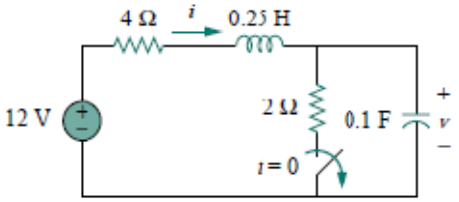


6. a) Explain about Y-parameters of a two port network. (7M)

   b) Find the hybrid parameters of the following two port network: (7M)



7. a) The switch in the following circuit has been closed for a long time. It is open at t = 0. Find (7M)
   (i) $i(0^+)$, $v(0^+)$ (ii) $di(0^+)/dt$, $dv(0^+)/dt$ (iii) $i(\infty)$, $v(\infty)$



   b) Discuss about modeling of capacitors in s-domain. (7M)

Code No: R1621044 **R16** SET - 3

II B. Tech I Semester Regular/Supplementary Examinations, October/November - 2019
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2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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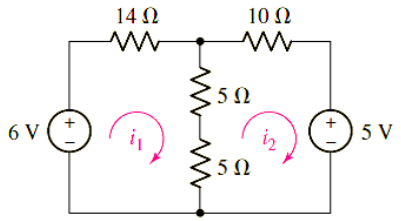
PART –A

1. a) Define RMS value and Average value. (2M)
   b) What is meant by steady state response? (3M)
   c) A parallel resonant circuit is composed of the elements R = 8 kΩ. L = 50 mH and C = 80 nF. Compute ω_0. (2M)
   d) State reciprocity theorem. (2M)
   e) What is meant by cascade connection? Explain. (3M)
   f) Define time constant. (2M)

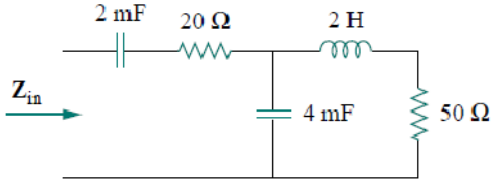
PART -B

2. a) Determine the currents i_1 and i_2 in the circuit shown below. (7M)

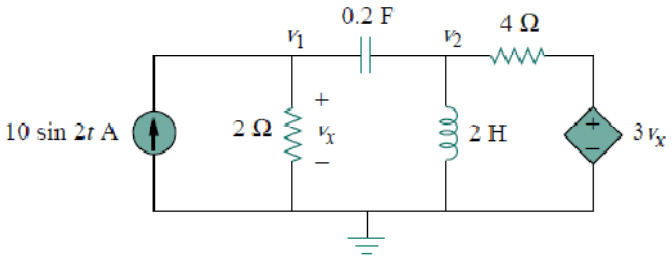


   b) Explain about phasor representation and write the advantages of it. (7M)

3. a) Determine the input impedance of the following circuit. Assume ω = 10 rad/s. (7M)



   b) Find v_1 and v_2 in the following circuit using nodal analysis. (7M)



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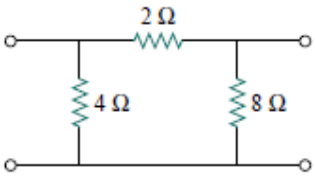
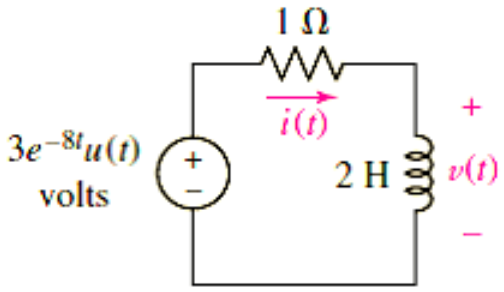
4. a) Explain the concept of mutual inductance with necessary equations. (7M)
   b) Derive the expression for resonant frequency of series resonant circuit. (7M)

5. a) Explain about superposition principle and write the advantages of it. (7M)
   b) Prove that the maximum power transfer to the load when the load resistance equals the Thevenin's resistance as seen from the load. (7M)

6. a) Explain about h-parameters of a two port network. (7M)
   b) Obtain Y- parameters of the following circuit. (7M)



7. a) Discuss about step response of an RL circuit. (7M)
   b) Calculate the voltage v(t) shown in figure, given an initial current $i(0^-) = 1$ A using Laplace transform method. (7M)



Code No: R1621044 **R16** SET - 4

II B. Tech I Semester Regular/Supplementary Examinations, October/November - 2019
NETWORK ANALYSIS
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Time: 3 hours Max. Marks: 70

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2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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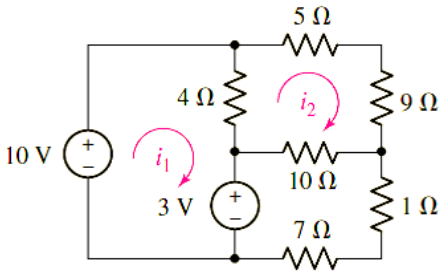
PART –A

1. a) Write short notes on source transformation. (2M)
   b) The voltage v = cos (60t + 45^0) is applied to a 0.1 H inductor. Find the steady state current through the inductor. (3M)
   c) What is significance of coefficient of coupling? (2M)
   d) A load is connected to a network. At the terminals to which the load is connected, R_{Th} = 10Ω and V_{Th} = 40 V. Find the maximum power supplied to the load. (3M)
   e) What is meant by reciprocal network? (2M)
   f) What is overdamped response? (2M)

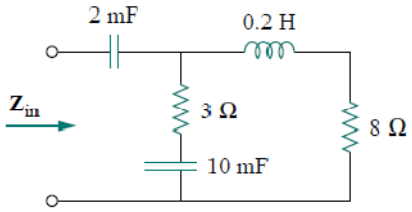
PART -B

2. a) Determine the currents i_1 and i_2 in the circuit shown below. (7M)

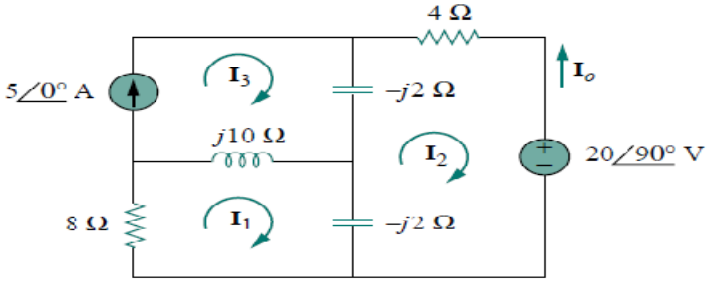


   b) Explain the concept of principle of duality. (7M)

3. a) Find the input impedance of the circuit shown in figure. Assume that the circuit operates at ω = 50 rad/s. (7M)



   b) Determine the current I_0 in the following circuit using mesh analysis. (7M)



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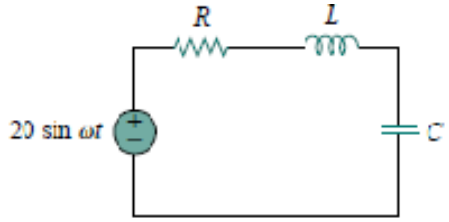
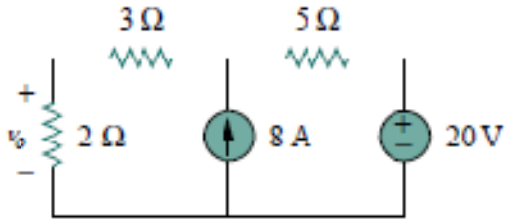
4. a) Explain the concept of self inductance with necessary equations. (7M)

   b) In the circuit shown below, R = 2 Ω, L = 1 mH and C = 0.4 μF. (7M)
   (i) Find the resonant frequency and the half-power frequencies.
   (ii) Calculate the quality factor and bandwidth.



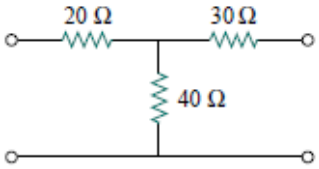
5. a) State and explain thevenin's theorem. (7M)

   b) State superposition theorem and find v_0 in the following circuit using it. (7M)



6. a) Explain about transmission line parameters of a two port network. (7M)

   b) Determine the Z- parameters of the following circuit. (7M)



7. a) Discuss about step response of an RC circuit. (7M)

   b) Determine the voltage $v_c(t)$ shown in figure, given an initial voltage $v_c(0^-) = -2$ V using Laplace transform method. (7M)