Code No: R13211 **R13** **SET-1**

I B. Tech II Semester Supplementary Examinations, July/August 2021
NETWORK ANALYSIS
(Com. to ECE, EIE, E Com E)

Time: 3 hours Max. Marks: 70

Note: 1. Question paper consists of two parts (**Part-A** and **Part-B**)
2. Answering the question in **Part-A** is Compulsory
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1. a) What are the different types of dependent sources, describe briefly? (4M)

   b) Given $i(t) = 5 \cos (500t - 120°)$ A, determine the period of the current and the frequency in Hertz. (3M)

   c) What is meant by resonant frequency of RLC series circuit? (3M)

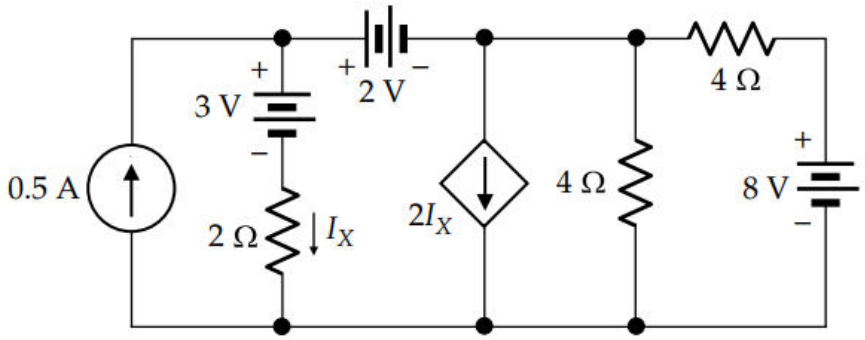
   d) Describe briefly Milliman's theorem with an example. (4M)

   e) Compare the *y*-parameter equations with the node-voltage equations and verify that the *z* and *y* matrices are the inverse of one another. (4M)

   f) Obtain the natural response of RL series circuit. (4M)

PART -B

2. a) By using the nodal analysis determine all node voltages and current, I_X of the circuit shown in figure. (6M)



Figure

   b) Given **A** = 3 + *j*5, **B** = 10 – *j*8, and **C** = *j*12, determine the phasors resulting from the following operations: (i) ABC, (ii) (A/B)C (iii) A/B/C
   Express the result in rectangular and polar forms. (5M)

   c) How do you obtain cut set matrix, describe with an example? (5M)
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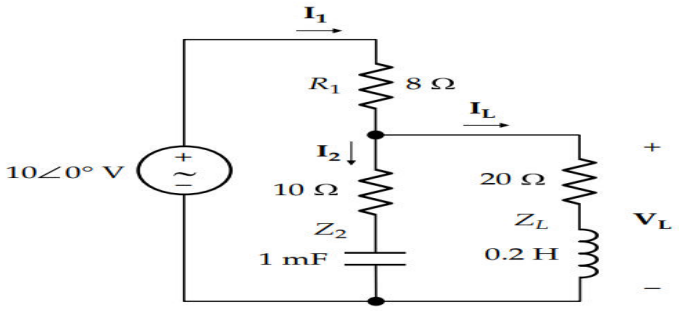
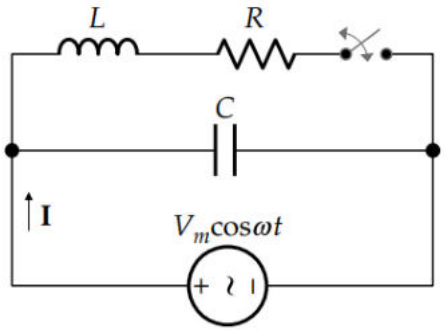
3. a) Given the circuit of figure, determine V_L, I_L, I_1, and I_2, assuming that ω = 100 rad/s. (6M)



Figure

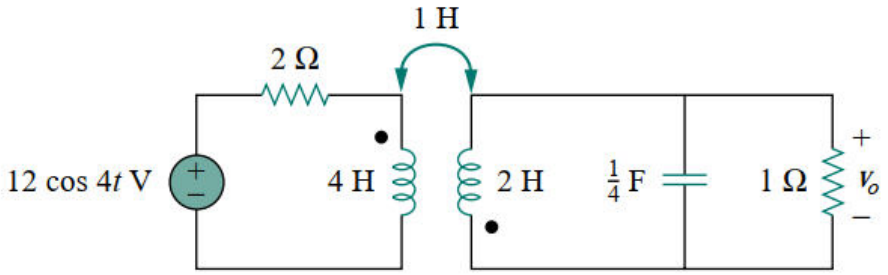
b) The current, I remains the same of the circuit as shown in the figure irrespective of whether the switch is open or closed. Show that underthese conditions $2\omega^2 LC = 1$. (5M)



Figure

c) A capacitor of impedance $Z_C$is connected in parallel with a load of (300 + j450) Ω. Determine $Z_C$so that theequivalent load is purely resistive. (5M)

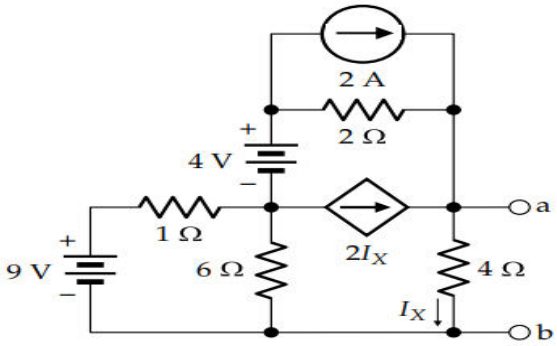
4. a) In the circuit of figure, (i) find the coupling coefficient, (ii) Calculate V_o, (iii) determine the energy stored in the coupled inductors at t = 2 s. (8M)



Figure

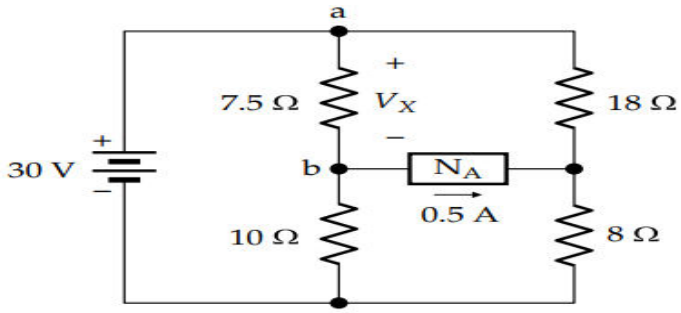
b) A series RLC network has R = 2 kΩ, L = 40 mH, and C = 1 μF. Calculate the impedance atresonance and at one-fourth, one-half, and twice, the resonant frequency. (8M)

5. a) Derive Thevenin's Equivalent Circuit looking into terminals 'ab' as shown in the figure, (i) keeping the 6 Ω resistor in place, (ii) temporarily removing this resistor. (8M)



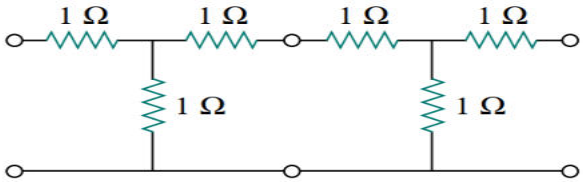
Figure

b) Determine V_X in figure by using the substitution theorem between nodes 'ab', where 'N_A' is an unspecified circuit that passes a current of 0.5 A. (8M)



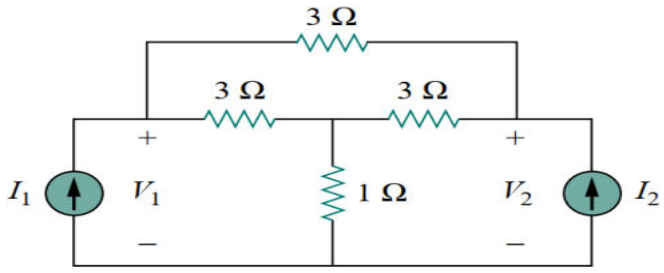
Figure

6. a) Determine the ABCD parameters of the circuit in figure, by partition the circuit into sub-circuit and cascade them? (8M)



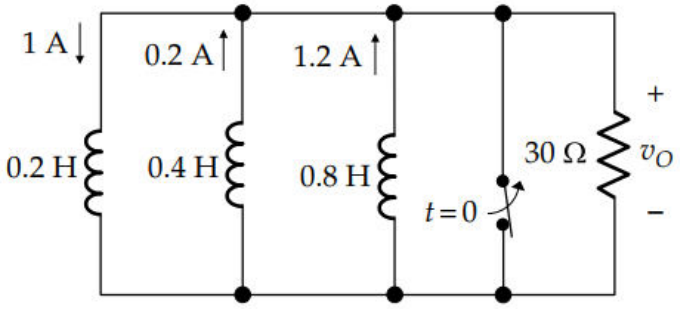
Figure

b) In the bridge circuit of figure, I_1 = 10 A and I_2= – 4 A. (i) Find V_1 and V_2 using y parameters. (ii) Confirm the results in part (i) by direct circuit analysis. (8M)



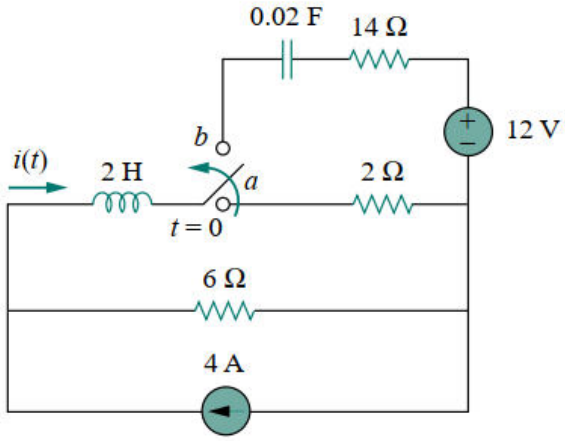
Figure

7. a) The three inductors in figure have the initial currents shown. The switch is opened at $t = 0$.Determine $v_o(t)$ for $t > 0$ and the final currents in the inductors. (8M)



Figure

b) The switch in the circuit of figure is moved from position *a* to *b* at $t = 0$. Determine $i(t)$ for $t > 0$. (8M)



Figure