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

I B. Tech II Semester Supplementary Examinations, Nov/Dec - 2019

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) How do you apply source transformation if the network contains dependent sources? (4M)

b) Draw the phasor diagram of R-L-C parallel circuit such that net phase angle of the current is leading the voltage. (4M)

c) How do you use dot convention for the conductively coupled circuit? (3M)

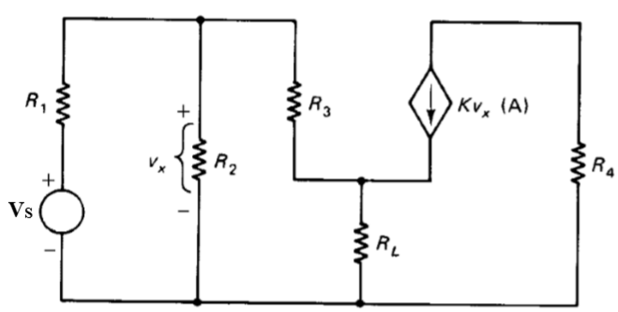
d) How do you use Tellegen's theorem for the circuit having 'n' practical voltage sources are connected to 'm' resistances in parallel? (4M)

e) What are the equivalent transmission lines parameters of two cascaded – pi networks? (4M)

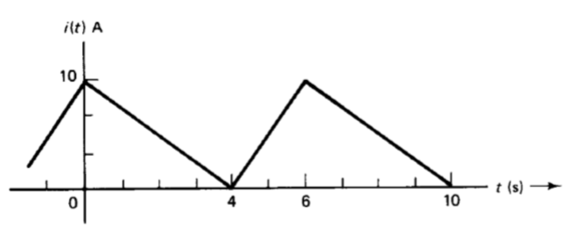
f) What is the natural response of RL parallel circuit? (3M)

PART -B

2. a) Using the mesh analysis find the current drawn and power absorbed by the load resistance, R_L which is equal to 10 Ω of the circuit shown in the following figure. The circuit resistances are R_1 = 5 Ω, R_2 = 10 Ω, R_3 = 5 Ω and R_4 = 20 Ω. Assume that supply voltage, V_S is 120 V. (8M)



b) Find the r.m.s and average value of the current waveform shown in the following figure (8M)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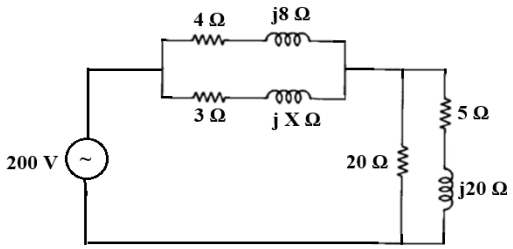
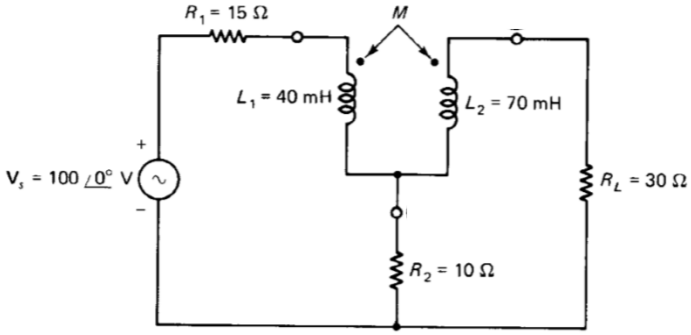
3. a) In the circuit shown in the following figure the power drawn by the 4 Ω resistance is 100 W, find the value of inductor reactance (X) and power absorbed by the 5 Ω resistance. (8M)



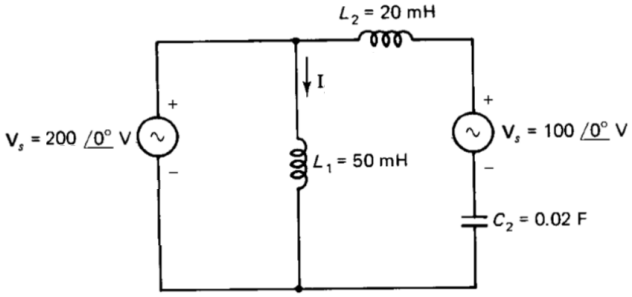
b) A series RC circuit is supplied by a voltage source of (8M)
$v_s = V_0 + V_1 \cos(t/2RC) + V_2 \cos(t/RC) + V_3 \cos(2t/RC)$. Obtain the steady state voltage expressions for voltage across the capacitor and resistance.

4. a) Determine the input current I_1 and output voltage V_2 across R_L of the circuit shown in the following figure. Coefficient coupling M = 0.8 and the supply frequency is 50 Hz. (8M)

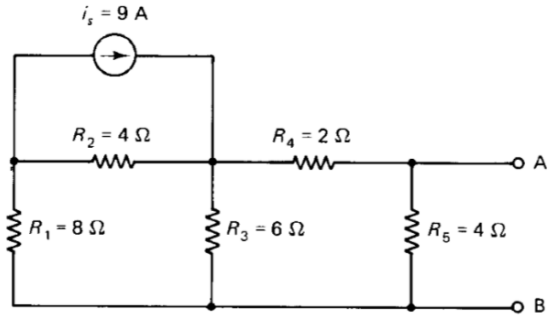


b) An inductor having a resistance of 25 Ω and the quality factor Q_0 of 10 at resonance frequency of 10 kHz is fed from 100 $L0^0$ supply. Calculate the value of inductance required to produce resonance with the coil, resistance of the coil, voltage across the inductor and voltage across the capacitor. (8M)

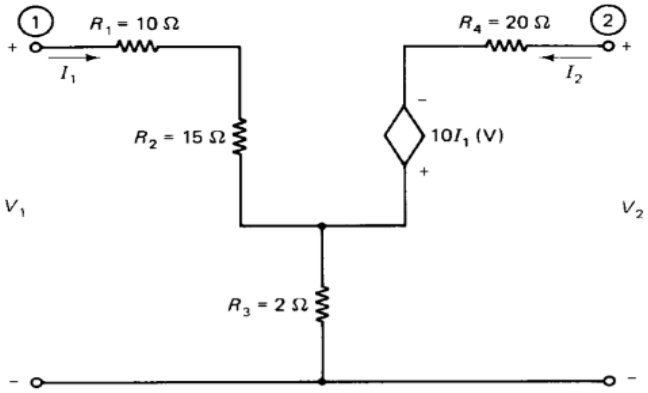
5. a) Find the current I in the following circuit using the super position theorem. (8M)



b) What is the amount of maximum power transferred to the resistance R_1 of the circuit shown in the following figure? Assume that the ac supply voltage is 100 V, 50 Hz which is connected across terminals AB. (8M)



6. For the circuit shown in figure find (i) y-parameters (ii) the expression for input impedance (16M)



7. a) A series RC circuit is driven by $v_s\ (t)$ = 15 u(t), such that v_c = 10 V at t = 100 ms. Determine the values of R and C, assume that $i(0)$ = 0 and v_c (0) = 3 V. (4M)

b) In the circuit of figure switch *S* remains closed until t = 0.25 s and then opened, determine i_L (t) and i_2 (t) by using the Laplace transform method. Assume i_L = 0 at t = 0^-. (12M)