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

I B. Tech II Semester Supplementary Examinations, March - 2022

NETWORK ANALYSIS

(Com. to ECE, EIE)

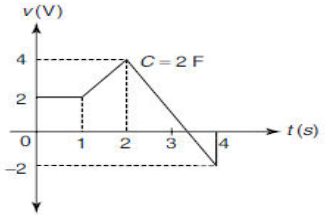
Time: 3 hours Max. Marks: 75

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

Unit - I

1. a) Explain the need for Source transformation and also give its uses (7M)

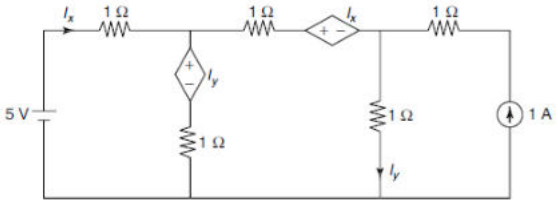
   b) The following voltage shown in the figure is applied to the capacitor of 2F. Draw its current waveform: (8M)



Or

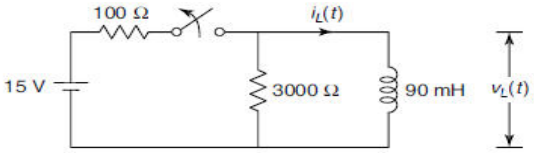
2. a) Explain the following w.r.t Graph Theory: (8M)
   i) Planar graph ii) Non- planar Graph iii) Sub – graph iv) Path
   v) Connected graph vi) Rank of a Graph vii) Tree viii) co - tree

   b) Find the currents I_x and I_y for the following circuit: (7M)



Unit - II

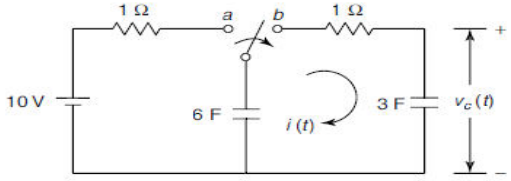
3. For the network shown below, a steady state is reached with the switch closed. The switch is opened at t = 0. Obtain expressions for i_L (t) and v_L(t) (15M)



Or

4. a) Explain the salient points of the Series RLC circuit when excited by a DC Source with the corresponding current responses of it. (8M)

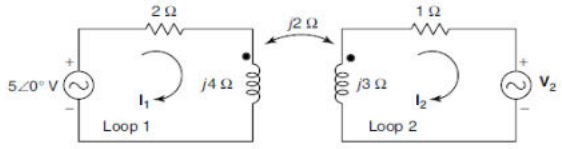
   b) For the following network, the switch is moved from a to b at t = 0. Determine i(t) and v_C(t) using Laplace transform method. (7M)



Unit - III

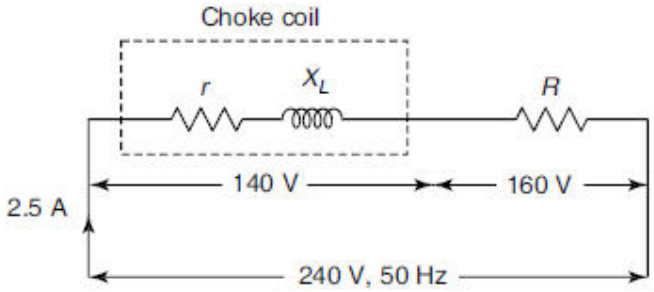
5. a) Derive the Effective inductance for a differential coupling connected two coils L_1 and L_2 connected in series with the coefficient of mutual inductance 'M'. (7M)

   b) Find the voltage V_2 in the circuit shown such that the current in the loop1 is zero. (8M)



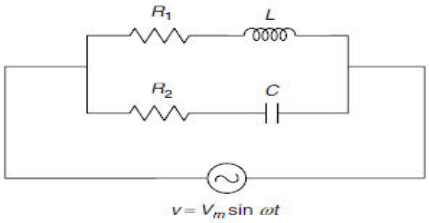
Or

6. A choke coil is connected in series with fixed resistor as shown in Figure below. A 240 V, 50 Hz supply is applied and a current of 2.5 A flows. If the voltage drops across the coil and fixed resistor are 140 V and 160 V respectively, calculate the value of the fixed resistance, the resistance and inductance of the coil, and power drawn by the coil. (15M)



Unit - IV

7. a) Derive the expression for the resonant frequency of the parallel circuit shown in the figure below: (8M)

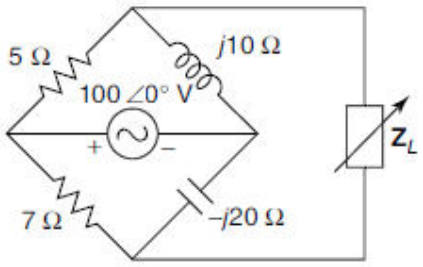


   b) A resistor and a capacitor are connected in series with a variable inductor. When the circuit is connected to a 230 V, 50 Hz supply, the maximum current obtained by varying the inductance is 2 A. The voltage across the capacitor is 500 V. Calculate the resistance, inductance and capacitance of the circuit. (7M)

Or

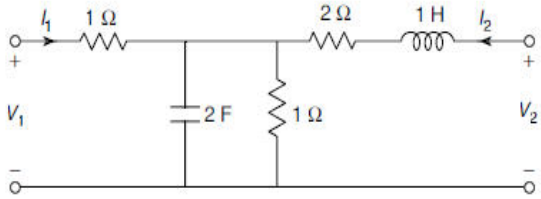
8. a) State and explain Tellegen's theorem (5M)

b) Find the value of Z_L for maximum power transfer in the network shown below and find maximum power. (10M)



Unit - V

9. Find Z – parameter for the following network: (15M)



Or

10. a) Explain the rules to be satisfied for cascading of two port networks (5M)

b) The Z-parameters of a two-port network are Z_{11} = 2.1 Ω, Z_{12} = Z_{21} = 0.6 Ω, Z_{22} = 1.6 Ω. A resistor of 2 Ω is connected across port 2. What voltage must be applied at port 1 to produce a current of 0.5 A in the 2 Ω resistor. (10M)