Code No: R21042 **R10** SET - 1

II B. Tech I Semester Supplementary Examinations, June - 2015
NETWORK ANALYSIS
(Com. to ECE, EIE, ECC)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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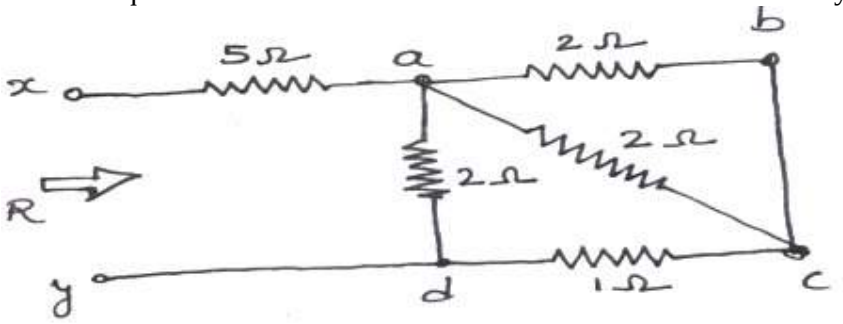
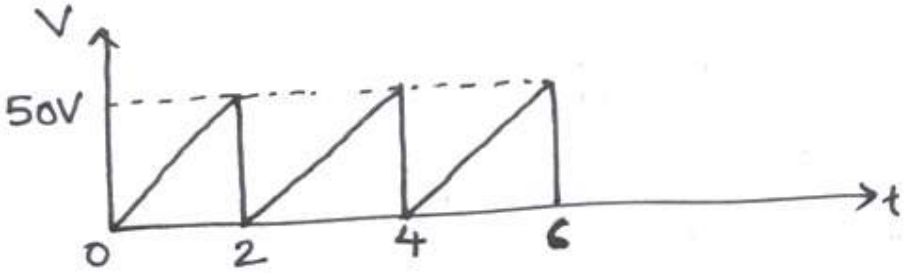
1 a) Explain the classification of Network elements and give suitable examples for each element. [8]

b) Find the equivalent resistance for the circuit shown below across x – y. [7]



2 a) Define and explain the following terms: [7]
i)Root mean square value and ii) Average Value

b) Find the average and effective values of Saw tooth wave form shown below: [8]



3 a) Derive the necessary equations for converting star connected resistances to delta connected resistances. [8]

b) In a series RL circuit the current and voltage are given as I = 4 cos (314t – 20^0) A, V = 10 cos (314 t + 10^0)V. Find the values of R and L. [7]

4 a) Explain the properties of resonance for a series RLC circuit [7]

b) A coil having an inductance and resistance of 50 mH and 100 Ω is connected in series with a capacitor and a 100 V, 1K Hz Source. Obtain the value of capacitance that will cause the resonance in the circuit. Find the circuit current at resonance frequency. [8]
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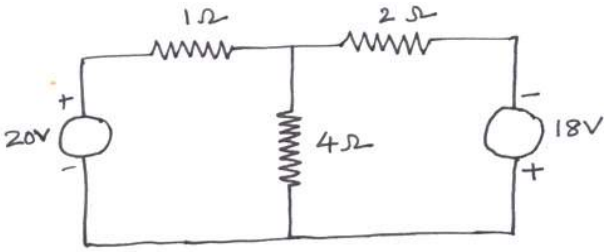
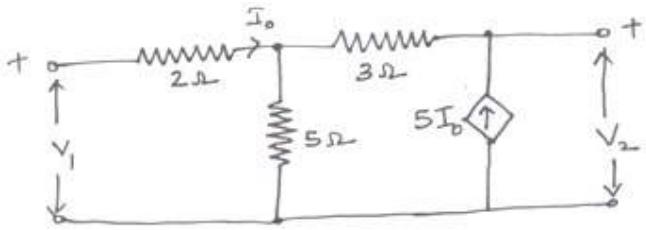
5 a) State and explain compensation theorem [7]

b) Calculate the current in 4Ω resistor for the circuit shown below using Millman's theorem. [8]

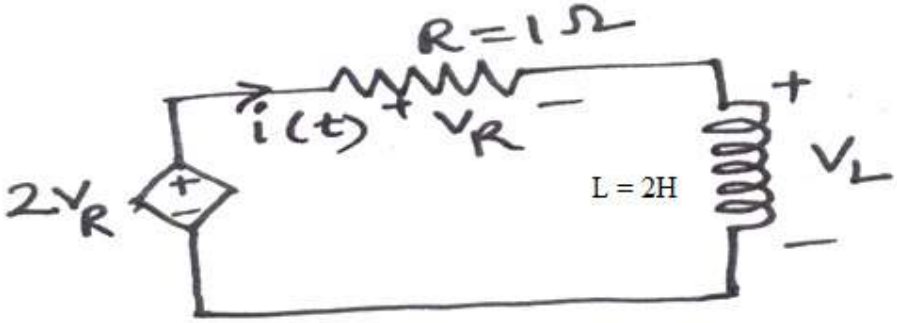


6 Obtain Z – Parameters and transmission parameters for the circuit shown below. [15]



7 a) What are the merits and demerits of Laplace transform [8]

b) Given that current in the circuit at t = 0 is 5A. Obtain i(t) at $t = 0^+$ for the figure shown below: [7]



8 a) Analyze m – derived low pass filter. [8]

b) Explain Band elimination filter [7]

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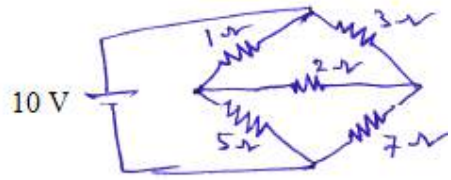
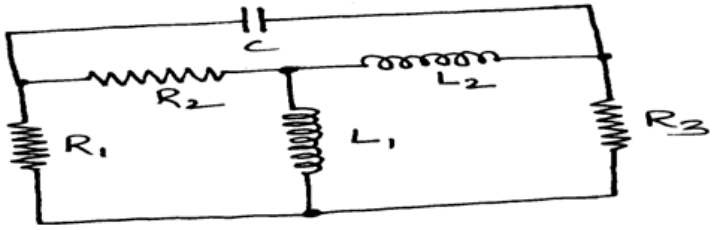
1 a) State and explain Kirchhoff's voltage and current Law [8]

b) Determine the power supplied by the 10V battery for the network shown in below figure [7]



2 a) Define the following terms [8]
i)Tree ii)Graph iii)node iv)Degree of a Node v)Link

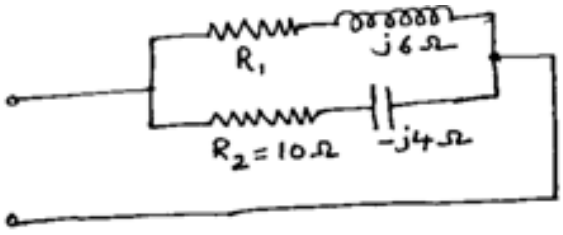
b) A network is shown in the figure below: Draw its graph. [7]



3 A circuit consists of a resistance of 15Ω, a capacitance of 300 μF and an inductor of 0.06H all in series. If the supply voltage is 240V,50 Hz applied to the ends of circuit. Calculate i) current in the coil ii) Potential difference across each element iii) the frequency at which the power factor is unity. [15]

4 a) Explain the effect of resistance and inductance on the frequency response curve. [7]

b) Find the value of R_1 such that the given circuit in figure is resonant. [8]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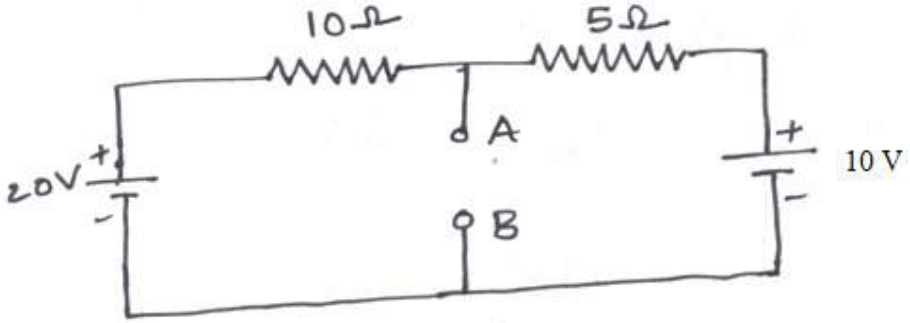
Code No: R21042 **R10** SET - 2

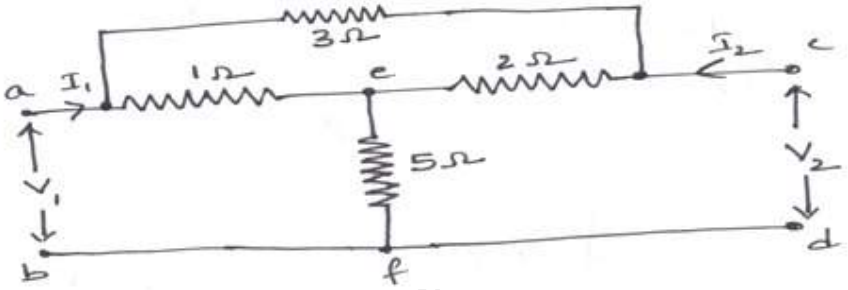
5 a) State and explain Norton's theorem [7]

b) Determine Norton's equivalent circuit at terminals AB for the circuit shown in figure below



[8]

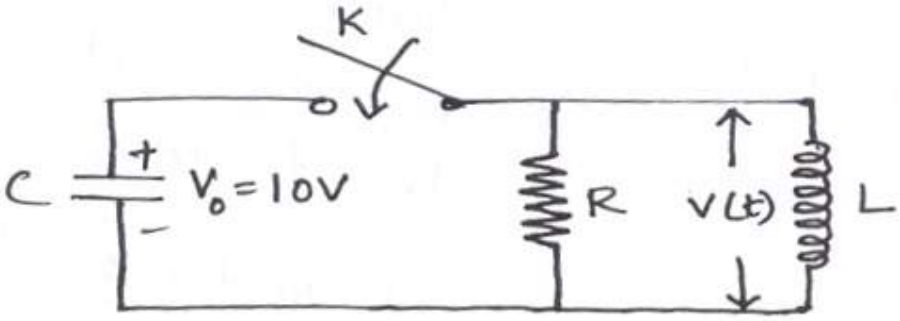
6 a) Obtain open circuit parameters and loop equations of the network shown in figure below:



[8]

b) Derive the relation between Z – parameters and ABCD parameters. [7]

7 The following figure represents a parallel RLC circuit where R = 0.1Ω , L = 0.5 H and C =1 F. Capacitor has an initial voltage of 10V with polarity shown in figure. The switch K is closed at time t = 0. Obtain V(t)



[15]

8 a) What are Active and Passive filters? List the advantages of active filters over passive filters. [8]

b) A T- section low pass filter has series inductance 80 mH and shunt capacitance 0.022 μF. Determine the cut – off frequency and nominal design impedance. [7]

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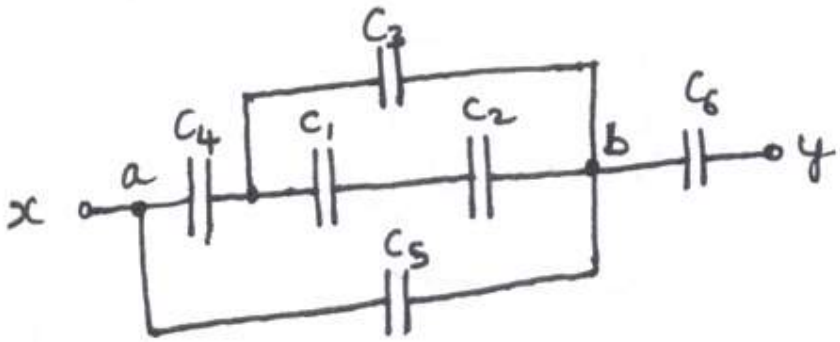
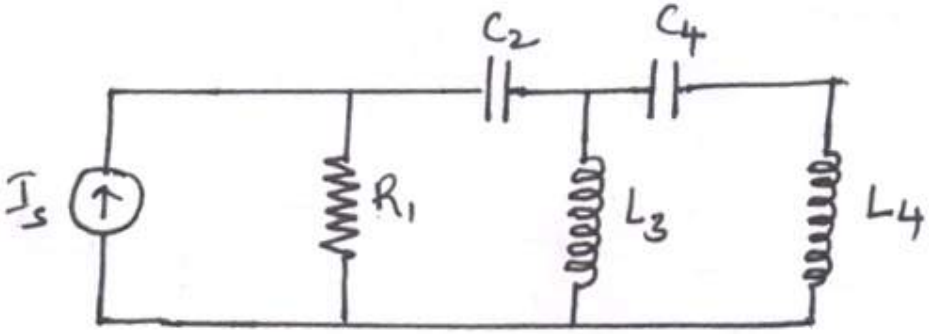
1 a) Define and explain the following terms: [7]
i) Resistance ii) Inductance iii) Capacitance.
b) Find the equivalent capacitance across x-y. [8]



2 a) Explain the principle of Duality [7]
b) Draw the dual network for the circuit shown in figure below: [8]



3 a) Explain the concept of complex Impedance and admittance [7]
b) Explain the response of series RLC circuit for sinusoidal excitation. [8]

4 a) Define coefficient of coupling (K) and explain the dot rule for coupled circuits. [7]
b) In an ideal transformer, the mutual inductance is 10 H, number of primary and secondary turns are 50 and 200. Obtain the value of primary current to produce 0.5 Wb flux to link with the secondary coil. [8]
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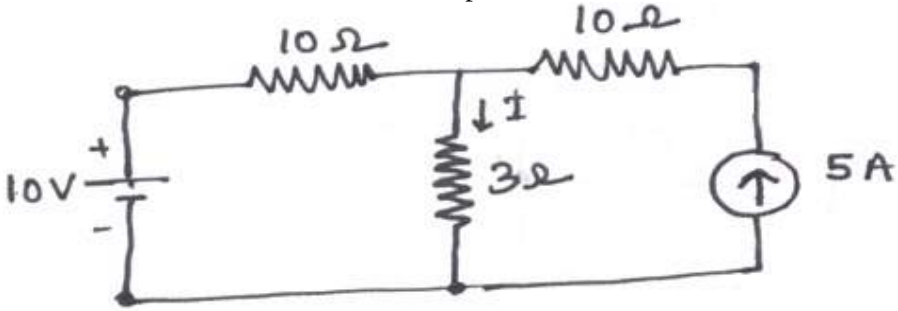
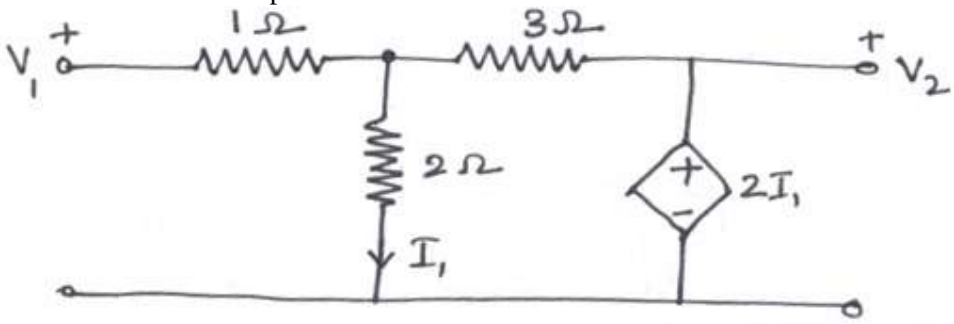
Code No: R21042 **R10** SET - 3

5 a) State and explain superposition theorem [7]

b) Calculate the current across the 3 Ω resistor for the circuit shown below using super position theorem and also calculate the power across 3Ω resistor. [8]



6 a) Obtain the short circuit parameters for the network shown below: [8]



b) Derive the relation between Z – parameters and Y – parameters. [7]

7 a) Obtain the transient response of RL series circuit having DC excitation. [7]

b) A series RL circuit having R = 25 Ω and L = 5H. A dc voltage of 100 V is applied at t = 0. Find the equations for current and voltage across R and L. [8]

8 a) Compare m –derived and prototype filters. [7]

b) Design a m –derived low pass filter(T) section having design resistance R_o = 500Ω, cut – off frequency f_c = 1500 Hz and infinite attenuation frequency f_α = 2000Hz. [8]

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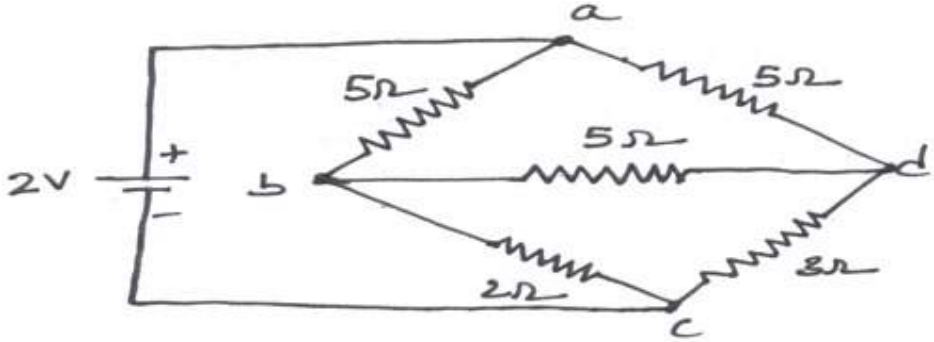
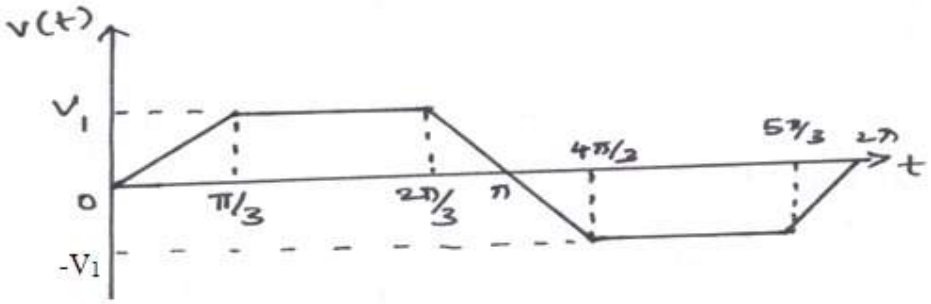
1 a) Explain the different types of sources in detail [8]

b) Find the source current for the circuit shown below: [7]



2 a) Define form factor and peakl factor and also explain its significance. [7]

b) Determine the form factor for the wave form given below: [8]



3 a) Explain the phase relations for the i) pure resistor ii) pure inductor iii) pure capacitor with phasor representations [7]

b) Explain the response of parallel RLC circuit for sinusoidal excitation [8]

4 a) Explain the difference between self inductance and mutual inductance [7]

b) From the following data, find the self and mutual inductances of the two windings 1 and 2 of ideal transformers operating in a linear zone [8]
N_1 = 500 turns N_2 = 750 turns I_1 = 2A, $Ø_1$ = 10mWb, $Ø_{12}$ = 6mWb.
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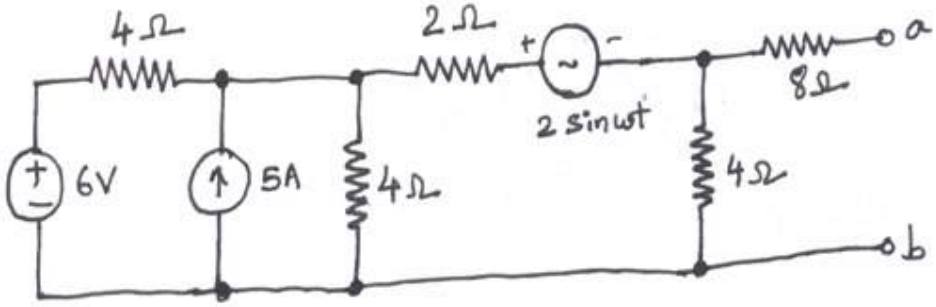
Code No: R21042 **R10** SET - 4

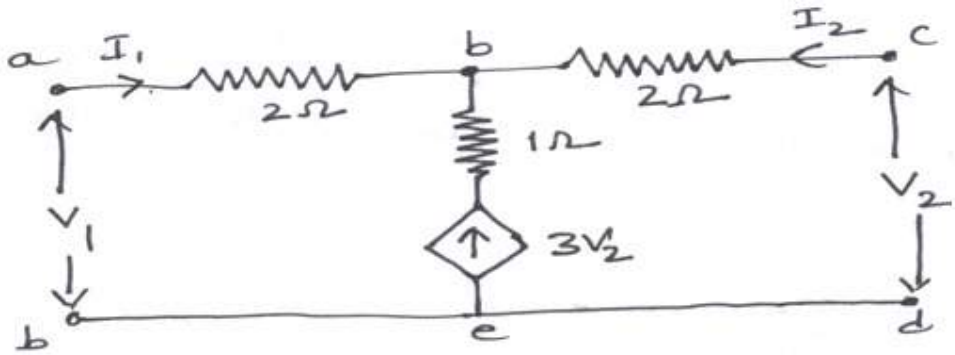
5 a) State and explain Norton's theorem [7]

b) Find the thevenin's equivalent circuit for the network shown below:



[8]

6 a) Find Y –Parameters for the network shown below:



b) Derive the relation between Y –parameters and ABCD parameters. [7]

7 a) Obtain transient response of RC circuit having DC excitation. [8]

b) Calculate the time taken by a capacitor of 1 μF and in series with a 1MΩ resistance to be changed up to 80 % of the final value. [7]

8 a) Explain about the classification of filters, along with the characteristics of each type of filter. [8]

b) Design a Low pass filter. [7]