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Code: 13A04101

B.Tech II Year I Semester (R13) Regular & Supplementary Examinations December 2015

NETWORK ANALYSIS

(Electronics and Communication Engineering)

Time: 3 hours Max. Marks: 70

PART – A

(Compulsory Question)

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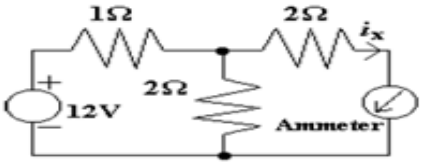
1 Answer the following: (10 X 02 = 20 Marks)

(a) The value of i_x shown in following figure is:-----



(b) Define Tree and Co-Tree.

(c) Write the limitations of superposition theorem.

(d) A network N is to be connected to load of 500 ohms. If the Thevenin's equivalent voltage and Norton's equivalent current of N are 5 volts and 10mA respectively, calculate the current through the load.

(e) The Q-factor of a parallel resonance circuit consisting of an inductance of value 1mH, capacitance of value 10^{-5} F and a resistance of 100 ohms is.

(f) Define resonant frequency.

(g) Define Reciprocity theorem.

(h) Explain maximum power transfer theorem.

(i) What do you mean by the state? What are state variables?

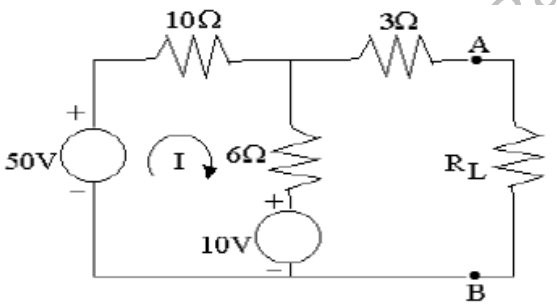
(j) Write the applications of different types of filters?

PART – B

(Answer all five units, 5 X 10 = 50 Marks)

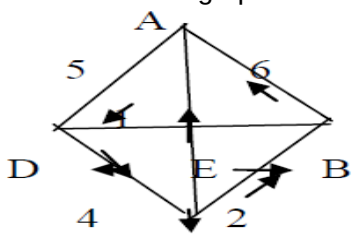
UNIT – I

2 Obtain the Thevenin's equivalent of the network shown in figure below. Then draw the Norton's equivalent network by source transformation.



OR

3 (a) For the directed graph shown bellow obtain the cut set matrix.



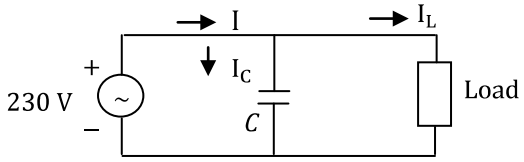
(b) State and prove superposition theorem and Millman's theorem.

Contd. in page 2

UNIT – II

4 (a) An inductive coil, having resistance of 8 Ω and inductance of 80 mH, is connected in series with a capacitance of 100 μ*F* across 150 V, 50 Hz supply .Calculate: (i) The current. (ii) The power factor. (iii) The voltages drop in the coil and capacitance respectively.

(b) The power consumed in the inductive load as shown in figure below is 2.5 kW at 0.71 lagging power factor (pf). The input voltage is 230 V, 50 Hz. Find the value of the capacitor C, such that the resultant power factor of the input current is 0.866 lagging.



OR

5 (a) Derive RMS value of alternating quantity from fundamentals

(b) A 50 Hz sinusoidal voltage applied to a single phase circuit has its RMS value of 200 V, its value at t = 0 is 28.3 volts positive. The current drawn by the circuit is 5 A r.m.s and lags behind the voltage by one sixth of a cycle. Write the expressions for instantaneous values of voltage and current.

UNIT – III

6 (a) Derive the expressions of quality factor using the general definition and show that greater the quality smaller the band width, using current Vs angular frequency plot for various values.

(b) Consider a series resonance circuit consisting of a 10 ohms resistance, a 2mH inductance and a 200nF capacitance. Determine the maximum energy stored, the energy dissipated per cycle of the circuit.

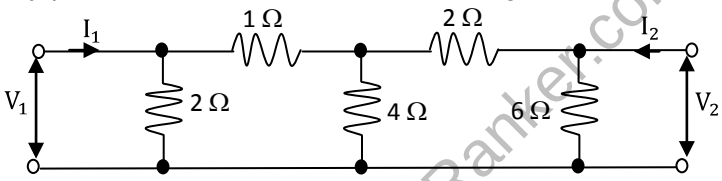
OR

7 (a) Define coefficient of magnetic coupling. Derive the expression for coefficient of magnetic coupling.

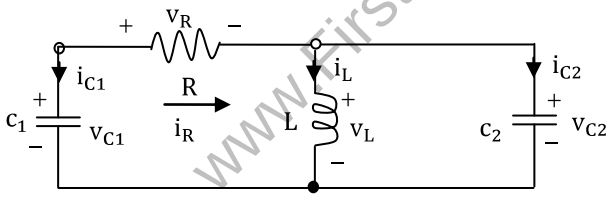
(b) Write the properties of ideal transformer and analyze ideal transformer.

UNIT – IV

8 (a) Find the y-parameters for the network shown in figure below.

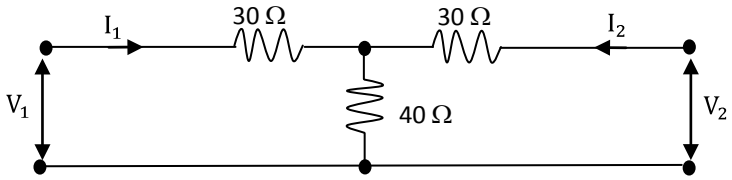


(b) Form the state matrix equation for the network shown in figure bellow.



OR

9 For the symmetrical 2-port network shown in figure below, find the z-and ABCD-parameters.



UNIT – V

10 (a) State and explain the characteristics of passive filter

(b) Design a T-section constant K-high pass filter having cut-off frequency of 10 kHz and design impedance R_0 = 600 Ω. Find its characteristic impedance and phase constant at 25 kHz.

OR

11 (a) Explain briefly about M-derived high pass filter.

(b) Design an M-derived high pass filter having a design impedance of 600 Ω, cut off frequency of 5 kHz and m = 0.35. Also determine the frequency of infinite attenuation.

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