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R13

Code No: 113BW

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, November - 2015
ELECTRICAL CIRCUITS
(Common to EEE, ECE, ETM)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART- A **(25 Marks)**

1.a) A voltage of 10 V is required to cause a current of 1A in a resistor of resistance 10Ω. Find the voltage that is required to make the same current flow if the resistance was 30Ω. [2M]

b) Two parallel connected bulbs which consumes 50W and 60W respectively when connected across a 50V DC supply. Determine the total supply current. [3M]

c) The Phasor diagram of a load is given in figure 1, Comment on the type of load. [2M]

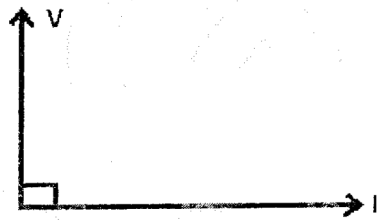

Figure: 1

d) Determine the RMS value of the function below $v(t) = 1 + 2.698\cos(5t + 45^0)$. [3M]

e) Define Mutual Inductance. [2M]

f) Write short notes on dot convention. [3M]

g) Define tree. [2M]

h) What are the properties of the planar networks? [3M]

i) State the Superposition theorem. [2M]

j) Draw the Norton's equivalent circuit and explain the procedure to find the Norton's current and Norton's resistance. [3M]

PART-B **(50 Marks)**

2.a) Define super mesh.

b) In the circuit shown in figure 2, determine the equivalent resistance between A and B.

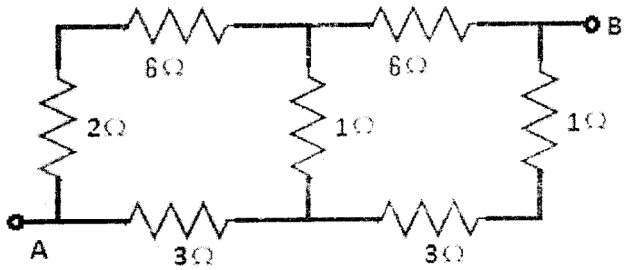

Figure: 2

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c) In the circuit shown in figure 3, determine the voltage 'V' across the current source of 2A. [2+4+4]

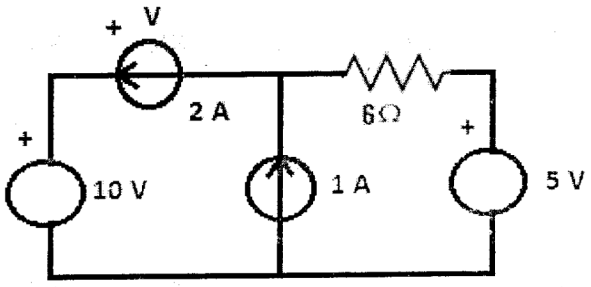

Figure: 3

OR

3.a) Define KVL.

b) Determine the voltage 'v' in the circuit shown in figure 4.

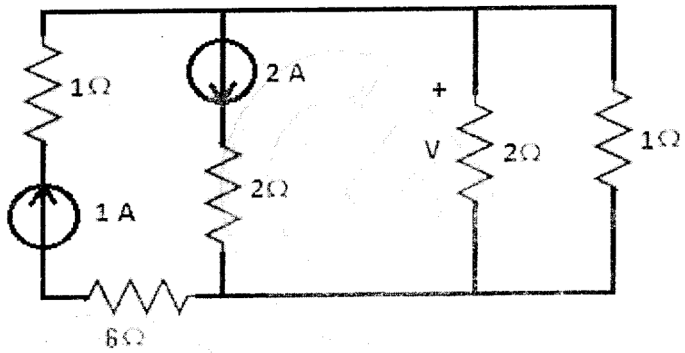

Figure: 4

c) In the circuit shown in figure 5, determine the power associated with both voltage and current sources. [2+4+4]

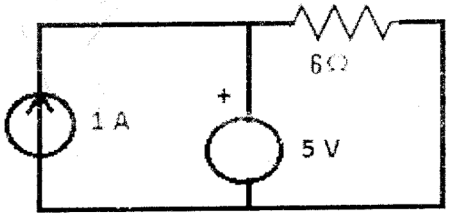

Figure: 5

4.a) Define reactive power.

b) In the circuit as shown in figure 6, determine the effective value of current 'I'.

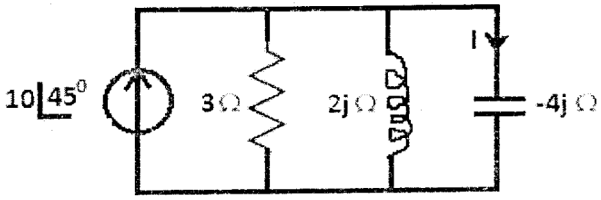

Figure: 6

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c) The voltage and current phasors of a circuit are given figure 7. Find the circuit elements and their values. [2+4+4]

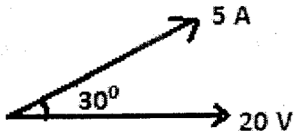

Figure: 7

OR

5.a) Define active power.

b) Derive an expression for the power in a R-L circuit when it is excited by sinusoidal source.

c) Two loads of same magnitude of impedance are connected in series, one is having power factor of 0.6 lagging and the other is having power factor of 0.8 leading. Calculate the power factor of the total combination. [2+4+4]

6.a) Draw the locus diagram of Series RL circuit and explain.

b) For the circuit shown in figure 8, determine the values of i_1 and i_2 at resonance. [5+5]

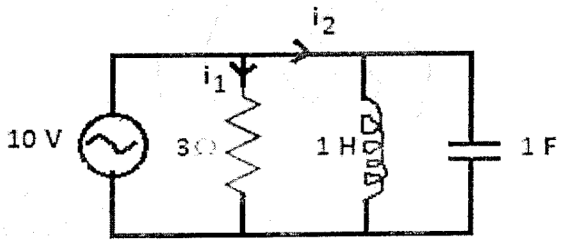

Figure: 8

OR

7.a) Draw the locus diagram of Parallel RC circuit and explain.

b) In the circuit shown in figure 9, the voltmeter reading V_1 is 200 V at resonance. Determine the readings of Voltmeters V_2 and V_3. Given the quality factor as 20. [5+5]

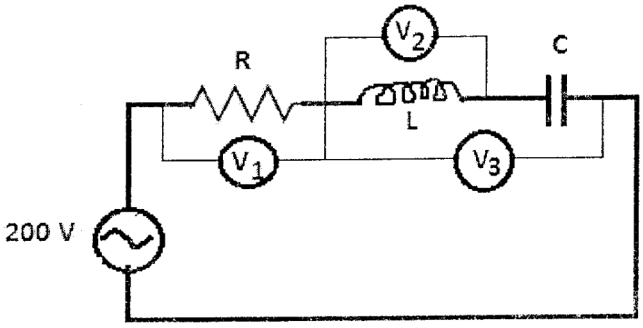

Figure: 9

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10.a) State and Explain the Maximum Power Transfer theorem.
b) In the circuit shown in figure 12, determine 'V' using Thevenin's theorem. [5+5]

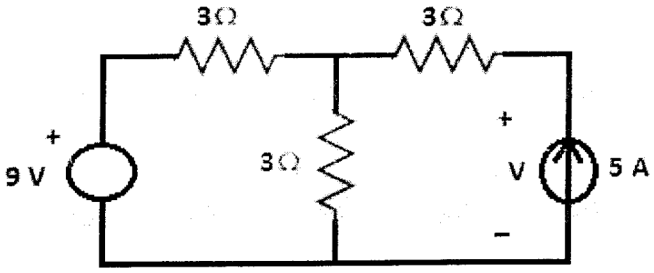

Figure: 12

OR

11.a) State and Explain the Millman's theorem.
b) In the circuit shown in figure 13, determine 'i' using superposition theorem. [5+5]

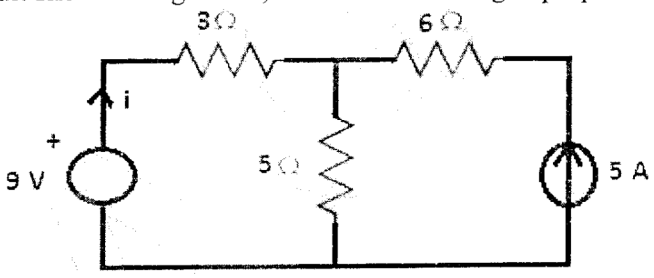

Figure: 13

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