Code No: 153AP

R18

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations,August/September - 2022
ELECTRICAL CIRCUIT ANALYSIS
(Electrical and Electronics Engineering)

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

Answer any five questions
All questions carry equal marks
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1.a) State and explain reciprocity theorem.
b) Find the current 'i' in the circuit below figure 1 using nodal analysis. [7+8]

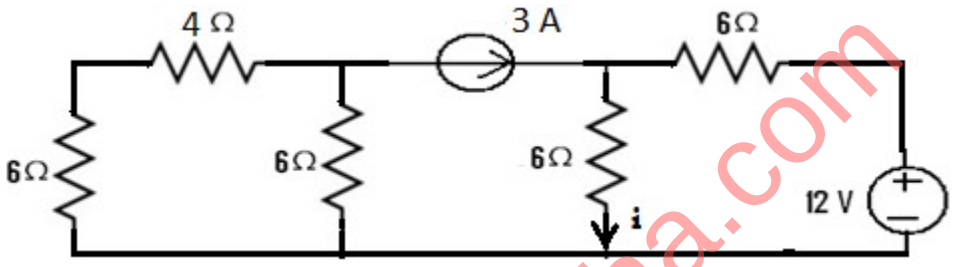

Figure 1

2.a) State and explain Maximum Power Transfer theorem.
b) Find the voltage 'V' in the circuit below figure 2 using Thevenin's theorem. [7+8]

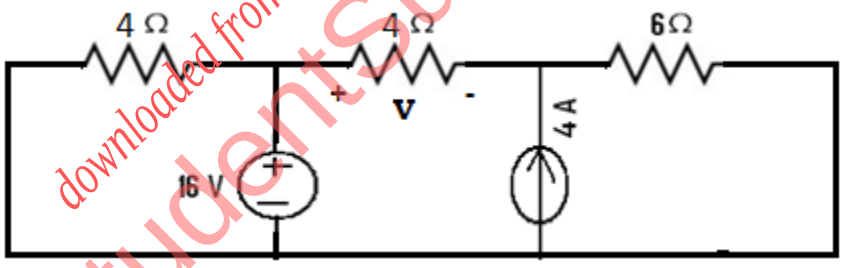

Figure 2

3.a) Derive the expression for the current for t > 0 in series RL circuit excited by a DC voltage source at t = 0.
b) For the circuit shown below figure 3, determine the voltage across the capacitor for t>0. Given v(0) = 6 V. [7+8]

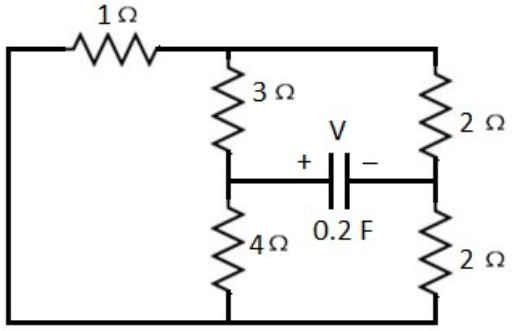

Figure 3

4.a) Derive the expression for the voltage for t > 0 across capacitor in series RC circuit excited by a sinusoidal voltage source at t = 0.

b) In the circuit below figure 4, derive the expression for the voltage 'V' across the inductor. [7+8]

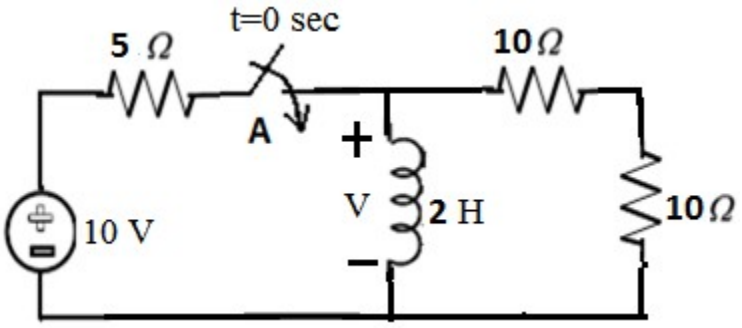

Figure 4

5.a) How to represent a sine function as a rotating phasor? Explain.

b) Two coils connected in series aiding fashion have a total inductance of 100 mH. When connected in a series opposing configuration, the coils have a total inductance of 60 mH. If the inductance of one coil is double the other, find self, mutual inductances and coefficient of coupling. [7+8]

6.a) Explain the properties of an ideal transformer.

b) A relay coil is connected to a 230V, 50 Hz supply. If it has a resistance of 15Ω and an inductance of 0.75 H, calculate the apparent power and power factor. [7+8]

7.a) What is convolution integral? Explain with an example.

b) Derive an expression for resonant frequency of a series RLC circuited excited by sinusoidal voltage. [7+8]

8.a) Discuss in detail about the parallel connection of two port networks.

b) Determine impedance parameters for the two port network below figure 5. [7+ 8]

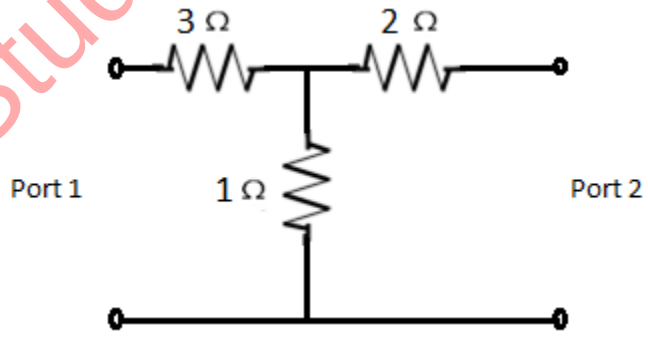

Figure 5

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