Course Code: 23EE2T01

BONAM VENKATA CHALAMAYYA INSTITUTE OF TECHNOLOGY & SCIENCE

(AUTONOMOUS)

I - B. Tech II-Semester Supplementary Examinations (BR23), Sep/Oct - 2024

ELECTRICAL CIRCUIT ANALYSIS-I(EEE)

Time: 3 hours | Max. Marks: 70

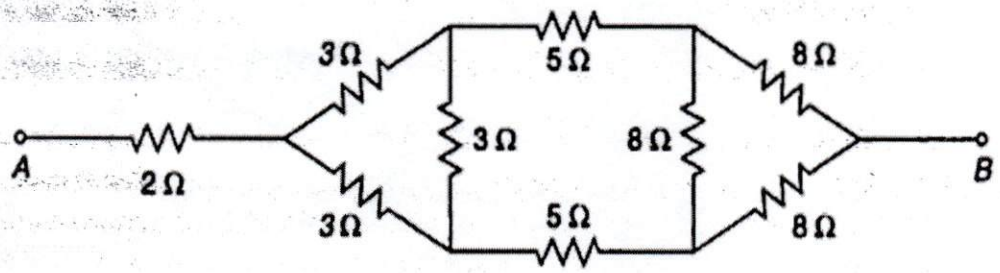
Question Paper consists of Part-A and Part-B
*Answer **ALL** the question in **Part-A and Part-B***

PART–A (10X2 = 20M)

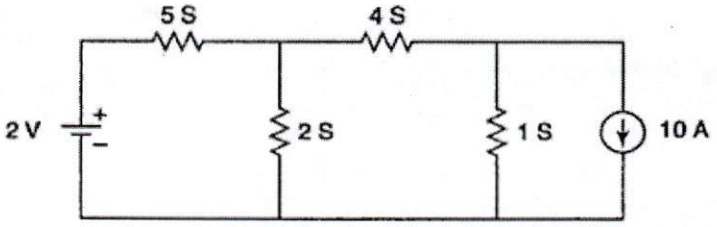
		Marks	CO	BL
1. a)	Classify electrical circuit elements.	(2M)	CO1	BL2
b)	What are the independent sources.	(2M)	CO1	BL1
c)	Define MMF, permeance	(2M)	CO2	BL1
d)	Define mutual inductance.	(2M)	CO2	BL1
e)	Define RMS value of a sinusoidal quantity.	(2M)	CO3	BL2
f)	What is the significance of power factor.	(2M)	CO3	BL3
g)	Define resonant frequency.	(2M)	CO4	BL1
h)	Write a short conditions for series resonance.	(2M)	CO4	BL2
i)	What are the limitations of maximum power transfer theorem?	(2M)	CO5	BL4
j)	State Milliman's theorem.	(2M)	CO5	BL2

PART–B (5X10 = 50M)

2.a) Find the total resistance between the terminals AB for the given circuit — 10(M) CO1 BL3



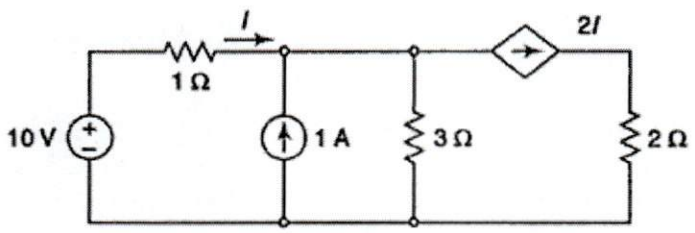
Determine the current in the conductor of 2 siemens of the network using node voltage analysis.



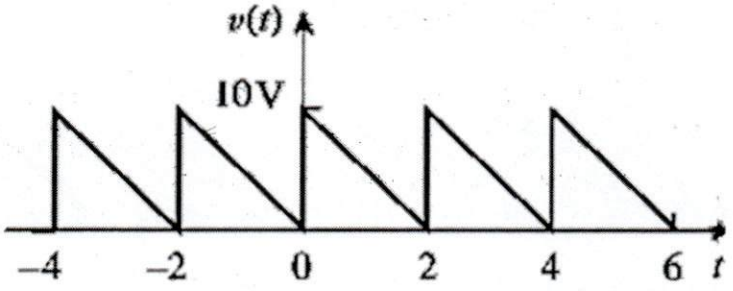
(OR)

b) Obtain the delta-star conversion equations with examples — 10(M) CO1 BL2

In the given network find the value of the dependent source using nodal analysis.



3.a)	State Faradays laws of electromagnetic induction	10(M)	CO2	BL3
	A long solenoid has 500 turns. When a current of 2 A is passed through it, the resulting magnetic flux linked with each turn of the solenoid is 4×10^{-3} Wb, find self-inductance			
	(OR)			
b)	Define coefficient of coupling. Derive its expression for two magnetically coupled coils.	10(M)	CO2	BL1
	Explain the dot convention used in magnetic circuits.			
4.a)	Derive the expression for RMS value of alternating current wave I = Im Sinωt.	10(M)	CO3	BL2
	Find the rms and average value of the wave form shown below.			



(OR)

b)	A coil of resistance 10 ohms, inductive reactance of 20 ohms is connected in series with a capacitive reactance of 25 ohms across a 230 V, 50 Hz supply. Determine the following: a) Inductance and capacitance of the circuit b) Total impedance of the circuit c) Current d) Power factor and power consumed e) Draw the phasor diagram.	10(M)	CO3	BL3

5.a) Define the following terms 10(M) CO4 BL2

i) The resonant frequency.

ii)Q factor of the circuit at resonant frequency.

iii)Band width

Given a series RLC circuit with R=10ohms, L=1mH, C=1microF is connected across a sinusoidal source of 20V with variable frequency.

find:

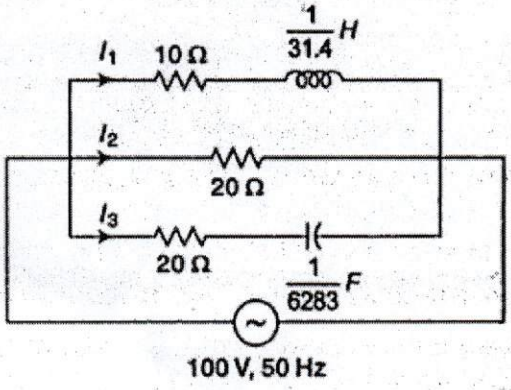
i) The resonant frequency.

ii)Q factor of the circuit at resonant frequency.

iii)Half power frequencies.

(OR)

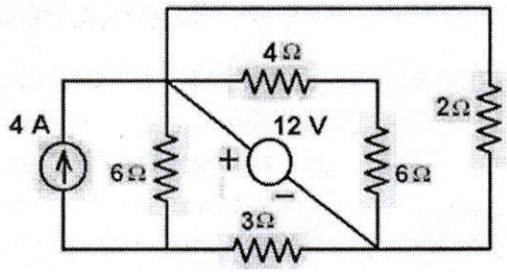
b) Find the branch currents,total current,Z amd Y ,apparent,active and reactive power and power factor in the given circuit 10(M) CO4



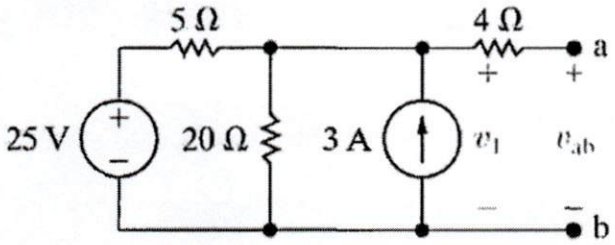
6.a) State and explain reciprocity and compensation theorems with examples 10(M) CO5

(OR)

b) List out the limitations of super position theorem and find the current in 2 Ω resistor using superposition theorem. 10(M) CO5



Find V_{ab} by using Thevenin's theorem


5 Ω
4 Ω
a
25 V
20 Ω
3 A
v_1
v_{ab}
b

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