VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD
Accredited by NAAC with A++ Grade
B.E. (E.E.E.) II-Semester Backlog Examinations, August-2023
## Circuit Theory

Time: **3 hours**

Max. Marks: **60**

Note: Answer all questions from Part-A and any FIVE from Part-B

Part-A (10 × 2 = 20 Marks)

Q. No.	Stem of the question	M	L	CO	PO
1.	What are the differences between dependent and independent sources?	2	1	1	1,2
2.	State the source Transformation principle.	2	1	1	1,2
3.	Define phase angle and phase difference.	2	1	2	1,2
4.	Define peak factor of an alternating quantity.	2	1	2	1,2
5.	The resistance of a coil is 140 Ω and its inductance is 0.85 H. Find the current, the power factor and the circuit impedance when the coil is connected to 120 V, 60 Hz supply.	2	3	3	1,2,3
6.	Draw the impedance triangle of series R-L and R-C circuits.	2	1	3	1,2
7.	State the maximum power transfer theorem.	2	1	4	1,2
8.	What is the condition for the maximum power to be transferred in AC circuit?	2	1	4	1,2
9.	A three-phase, three-wire balanced delta -connected load yields wattmeter readings of 1154 W and 557 W. Find the power factor of the load.	2	4	5	1,2,3
10.	What do you understand by a balanced load of a three phase circuit?	2	1	5	1,2

Part-B (5 × 8 = 40 Marks)

		M	L	CO	PO
11. a)	Using source transformation, calculate power dissipated in 10Ω resistor in the circuit shown in figure:	4	4	1	1,2,3

|		M	L	CO	PO
b)	State and explain Kirchhoff's current law and voltage law with examples.	4	2	1	1,2

		Marks			
12. a)	Use the nodal analysis to determine voltage at node 1 and the power supplied by the dependent current source in the network shown in figure:	4	4	2	1,2,3
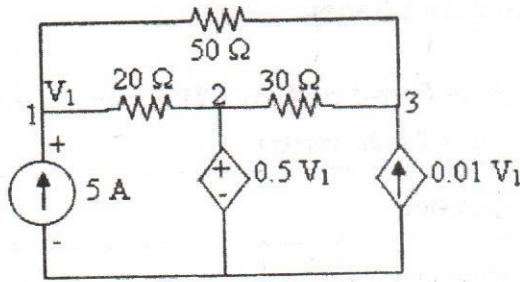
b)	Find the rms value, average value and form factor of the voltage wave shown in figure:	4	2	2	1,2
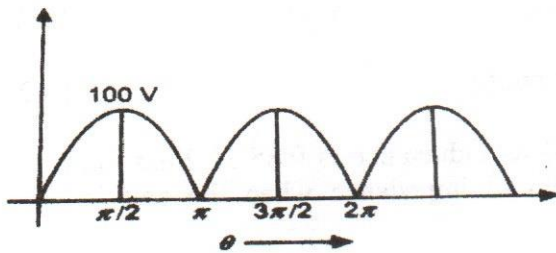
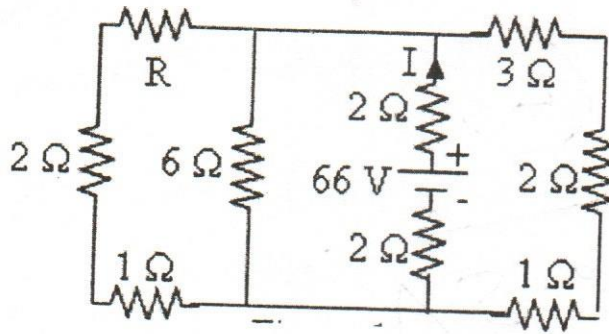|					
13. a)	In the circuit shown in below figure, Calculate the average power absorbed by the resistor and inductor. Find the average power supplied by the voltage source.	4	3	3	1,2,3
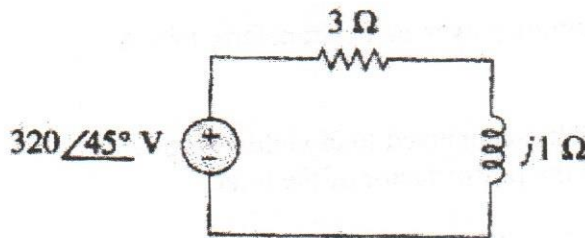
b)	With a neat circuit diagram and phasor diagram, derive the expression for steady state current of a series RC circuit.	4	2	3	1,2
14. a)	Explain the procedure to find thevenin's resistance of a circuit with DC excitation for both without dependent sources and with dependent sources.	4	2	4	1,2
b)	State and explain Norton's theorem.	4	2	4	1,2
15. a)	Derive the expression for average three power in a three phase circuit.	4	2	5	1,2
b)	Three identical coils, each of resistance 10ohm and inductance 42mH are connected (a) in star and (b) in delta to a 415V,50 Hz, 3-phase supply. Determine the total power dissipated in each case	4	4	5	1,2,3

16. a)	Find the value of resistance R, if the current is I=11 A and source voltage is 66 V as shown in figure:	4	3	1	1,2,3

b)	A series circuit consisting of a 10 ohm resistor, 100 µF capacitance and a 10 mH inductance is driven by a 50 Hz AC voltage source of maximum value 100 volts. Calculate the equivalent impedance, current in the circuit, the power factor and power dissipated in the circuit.	4	3	2	1,2,3

17. Answer any *two* of the following:

a)	Two coils A and B are connected in series across a 240 V, 50 Hz supply. The resistance of coil A is 5 ohms and inductance of coil B is 0.015 H. If input from the supply is 3 kW and 2 kVAr, find the resistance of coil B and inductance of coil A. Also calculate voltage across each coil.	4	3	3	1,2,3
b)	State and explain Superposition theorem with an example.	4	2	4	1,2,3
c)	With a neat circuit diagram and phasor diagram, explain the measurement of three phase power using two wattmeters in a three phase circuit.	4	2	5	1,2,3

M : Marks;   L: Bloom's Taxonomy Level;   CO; Course Outcome;   PO: Programme Outcome

i)	Blooms Taxonomy Level – 1	20%
ii)	Blooms Taxonomy Level – 2	40%
iii)	Blooms Taxonomy Level – 3 & 4	40%

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