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Code No. : 12423 N/O

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD

Accredited by NAAC with A++ Grade

B.E. (E.C.E.) II-Semester Main & Backlog Examinations, August-2023

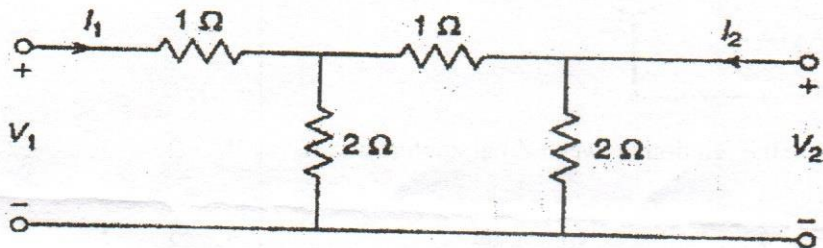
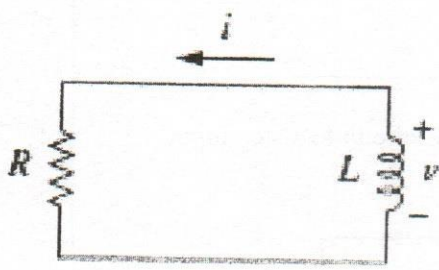
Basic Circuit Analysis

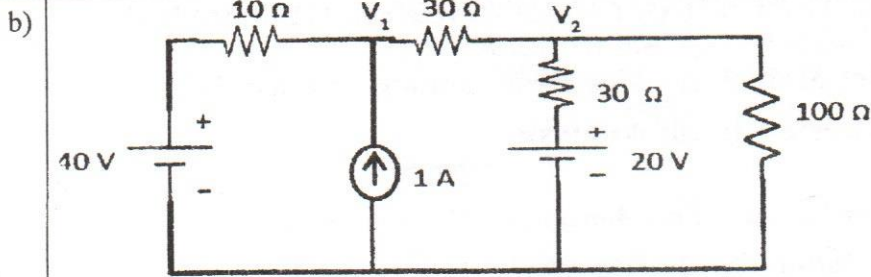
Time: 3 hours

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	PSO
1.	Define an ideal current and voltage sources. Draw corresponding characteristics.	2	1	1	1	1
2.	State Kirchoff's voltage and current laws.	2	1	1	1	1
3.	State and explain maximum power transfer theorem.	2	1	2	1	1
4.	State and explain reciprocity theorem.	2	1	2	1	1
5.	Obtain Z_{11} in terms of h parameters.	2	1	3	2	1
6.	 <p>Find z_{11} of the network shown.</p>	2	2	3	2	1
7.	<p>Find the value of L and R for the circuit shown in figure below where $v = 100$ V and $i = 25$ A.</p> 	2	2	4	2	1
8.	Explain the difference between transient and steady state response using an RC circuit.	2	1	4	1	1
9.	Explain any four classifications of passive filters with their characteristics.	2	1	5	1,2	1
10.	Define selectivity in the context of RLC resonant circuit.	2	1	5	1	1
Part-B (5 × 8 = 40 Marks)						
11. a)	Explain mesh analysis network reduction technique for any given network.	4	2	1	1,2	1



Calculate the current through 10 ohms resistor using nodal analysis.

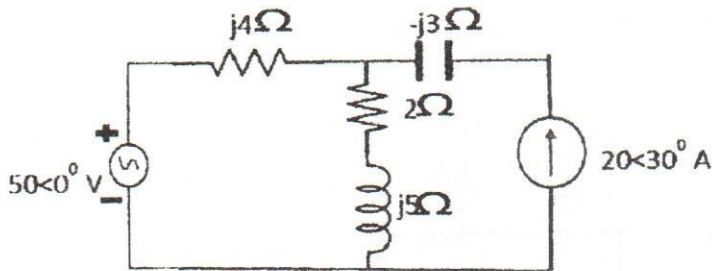
4 2 1 2 1

12. a) State super position theorem using an example.

2 2 2 1 1

b) Using superposition theorem, find the current across $(2+j5)$ branch for the circuit shown below:

6 2 2 3 1

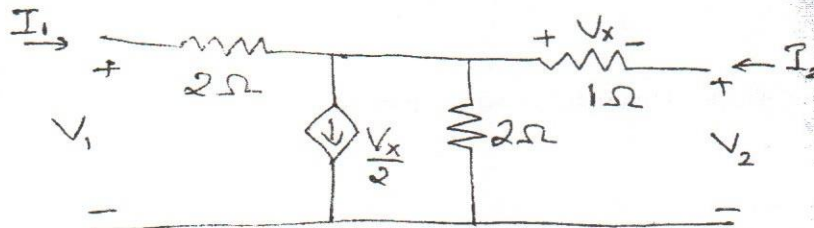


13. a) Explain ABCD parameters. Derive the relation between Z parameters and ABCD parameters

4 2 3 1,2 1

b) Calculate the y_{11} and y_{22} for the given circuit.

4 3 3 2 1

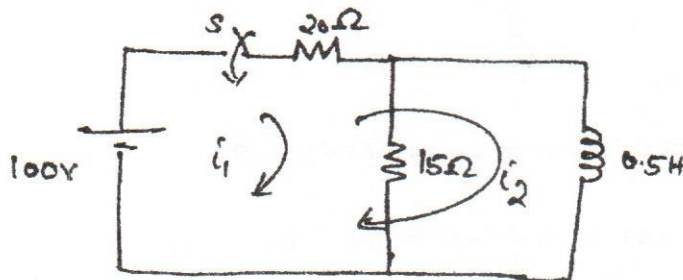


14. a) Derive the transient response of a series RC circuit to a step input.

4 3 4 1,2 1

b)

4 3 4 3 1



Determine the current equation of i_1 when the switch is closed at $t=0$.

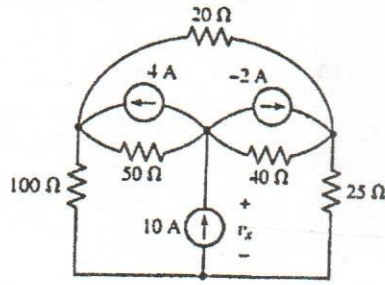
15. a) Compare series and parallel resonant circuits with respect to resonant frequency and Q-factor.

4 2 5 1 1

b) A series RLC circuit consists of a 100 ohms resistance, 0.2H inductance, 5μF capacitance with an applied voltage of 10 V. Determine the resonant frequency, Q factor and bandwidth of the circuit.

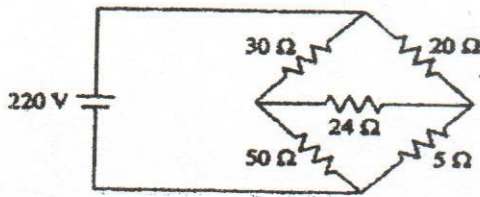
4 3 5 2 1

16. a) Find V_x in the circuit using nodal analysis.



4 3 1 3 1

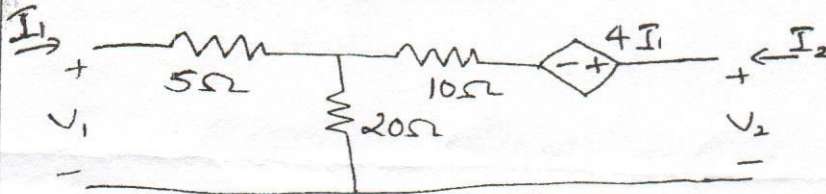
b) Using the Thevenin's theorem, find the power dissipated across 5 ohms resistor.



4 3 2 1,2 1

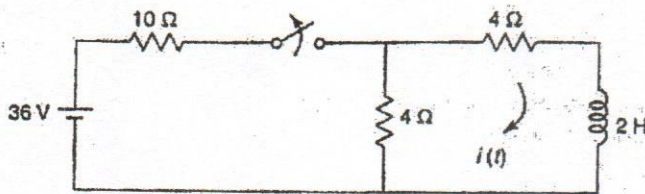
17. Answer any two of the following:

a) Calculate Z_{11} and Z_{21} for the given circuit.



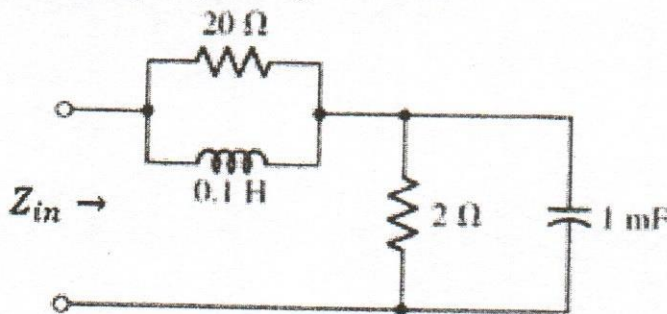
4 3 3 1,2 1

b) The circuit is in steady state when switch is closed at $t < 0$. At $t = 0$, the switch is open. Obtain $i(t)$ at $t > 0$.



4 3 4 3 1

c) Find the resonant frequency of the given circuit.



4 2 5 2 1

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%