BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION)

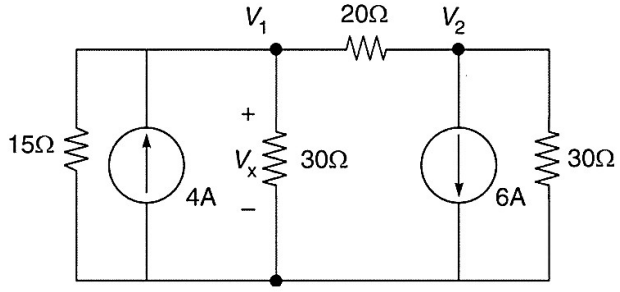
CLASS: BTECH & IPH **SEMESTER : I**
BRANCH: ME/CE/PIE/CHEM Engg./BT/FET/IMSc (Phy) **SESSION : MO/2025**

SUBJECT: EE24101 BASIC OF ELECTRICAL ENGINEERING

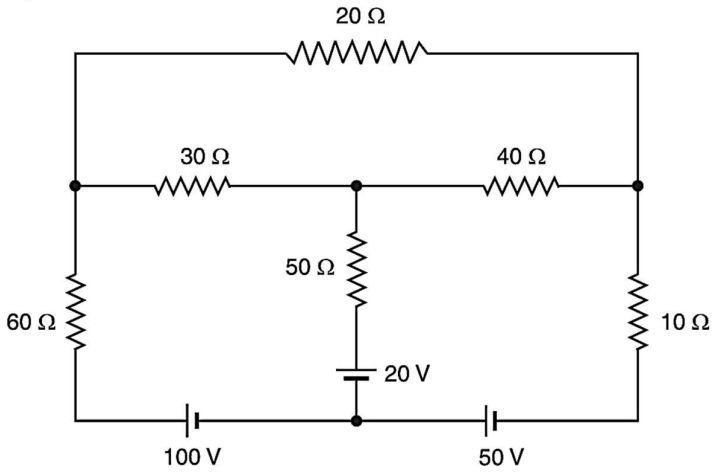
TIME: 02 Hours **FULL MARKS: 25**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 5 marks and total 25 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates**

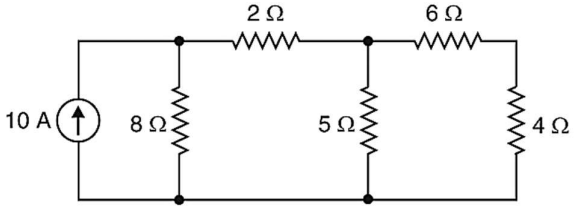
			CO	BL
Q.1(a)	In the given circuit, determine the voltages V_1, V_2, and V_x using **nodal analysis**.	[2]	CO1	III



Q.1(b)	(i) Differentiate between ideal and practical current source. (ii) In the circuit given in **Q. 1(a),** determine the number of nodes and branches. (iii) What are linear and non-linear circuits?	[3]	CO1	I
Q.2	Use **mesh analysis** to determine the current flowing through all the resistances in the following circuit:	[5]	CO1	V

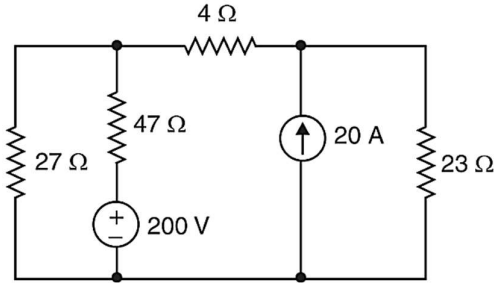


Q.3(a)	Explain Thevenin's and Norton's theorem. Draw related circuit diagrams and write related equations to explain.	**[2]**	**CO2**	II
Q.3(b)	For the given circuit with 4 Ω load, draw the Thevenin's equivalent circuit and hence, find the current through the 4 Ω load resistor.	**[3]**	**CO2**	II

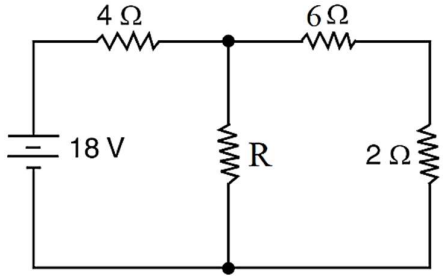


PTO

Q.4(a)	State and explain superposition theorem in electrical circuits.	[2]	CO2	I
Q.4(b)	Using **superposition theorem**, find the current in 23 Ω resistor in the given circuit.	[3]	CO2	III



Q.5(a)	In the given figure, find the value of resistor "R" so that the power delivered to it is maximum. Also calculate the power delivered by the voltage source in this condition.	[2]	CO2	III



Q.5(b)	Derive the proof of "maximum power transfer theorem". Clearly draw the related circuit diagram and write the equations.	[3]	CO2	IV

:::::17/10/2025:::::M