PYQs

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Q.1(a) Determine (i) the current I (ii) voltage across 5Ω resistor (iii) the power loss in 18 Ω resistor in the circuit shown in Fig-1. [5]

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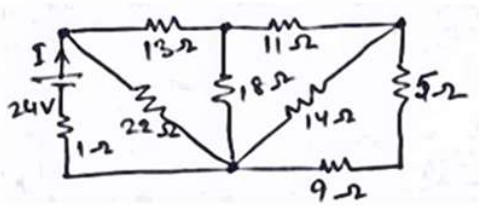

FIG.1

Q.1(b) A magnetic core, in the form of a closed ring, has a mean length of 25cm and a cross-section of 1cm^2. The relative permeability of iron is 2200. What direct current will be needed in a coil of 2000 turns uniformly wound round the ring to create a flux of 0.2mWb in the iron? [5]
If an airgap of 1mm is cut through the core perpendicular to the direction of this flux, what current will now be needed to maintain the small flux in this gap? What fraction of total ampere-turns is required to maintain the same flux in the airgap? Also draw the electrical equivalent of the magnetic circuit.

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Q1. (a) Define (i) active and passive elements (ii) linear and nonlinear elements [2]

Q1. (b) Use Node voltage method to find the current through and voltage across each resistor for the circuit shown in Fig. 1. [3]

Q2. (a) Explain with the aid of B-H curve the meaning of following terms: [2]
Remanence, Coercivity.

Q2. (b) An iron ring has a mean length of 1.0m and a cross sectional area of 10cm^2. It has a radial air gap of 2mm. a flux of 1.0 mWb is required in the air gap. The leakage factor is 1.2 and iron is such that when flux density is 1.2 Wb/m^2, the relative permeability is 400. Calculate the number of ampere turns required. [3]

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Q1 (a) Define (i)unilateral and bilateral elements with example; Draw (ii) the q-v characteristic of a linear and nonlinear capacitor. [2]

(b) A 50 μF capacitor is charged from a 200V supply. After being disconnected it is immediately connected in parallel with a 30 μF capacitor which is initially uncharged. Find: [3]
a) the potential difference across the combination
b) the electrostatic energies before and after the capacitors are connected in parallel.

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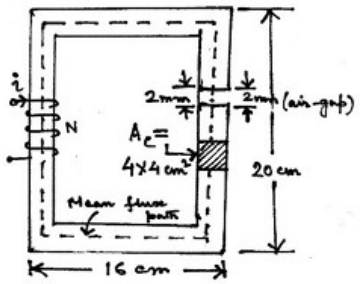
Q.1(a) Identify an ideal and a real source with characteristic diagram. Defend when is source conversion possible? Mention and label the symbol of the four types of dependent sources. [5]

Q.1(b) The figure shows a rectangular magnetic core with an air-gap. Estimate the exciting current i, needed to cause a flux density of B_g=1.2T in the air gap. Given N=400 turns and μ_r(iron)=4000. [5]

Q.1(b) The figure shows a rectangular magnetic core with an air-gap. Estimate the exciting current i, needed to cause a flux density of B_g=1.2T in the air gap. Given N=400 turns and μ_r(iron)=4000. [5]



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Q1 (a) State KVL and KCL and also give one example for each. [2]

Q1 (b) with the current as marked in Fig. 1, (i) write KCL at the four nodes; (ii) write KVL in meshes ABDA, BCDB and ADCMA. [3]

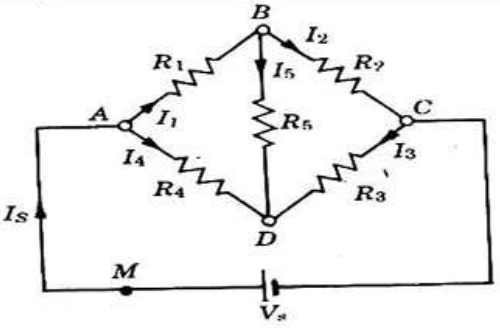

Fig. 1

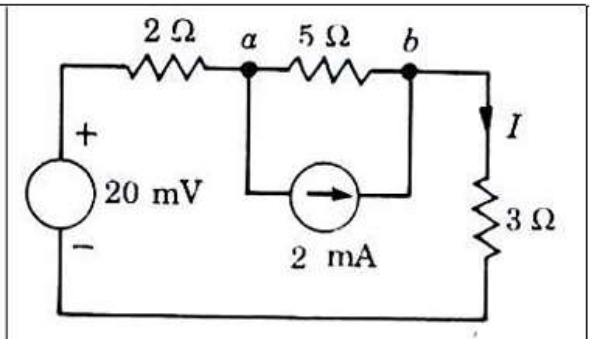

Fig. 2

Q2 (a) Use source transformation to find current *I* in Fig. 2. [2]

Q2 (b) Using mesh current methord, determine current I_x in Fig.3. [3]

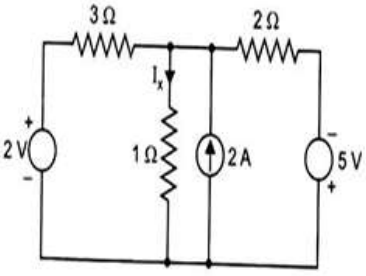

Fig. 3

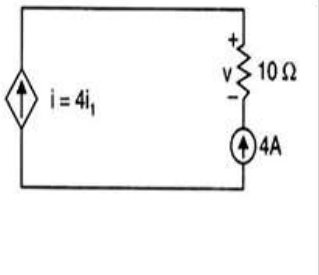

Fig. 4

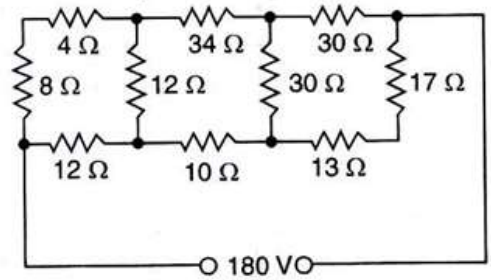

Fig. 5

Q3 (a) Find the voltage *v* across the 10 Ω resistor in Fig. 4, if the control current I_1 in the dependent current source is (i) 2A and (ii) -1A. [2]

Q3 (b) Find the current in 10 Ω resistor in Fig. 5 by star-delta transformation. Draw each conversion network. [3]

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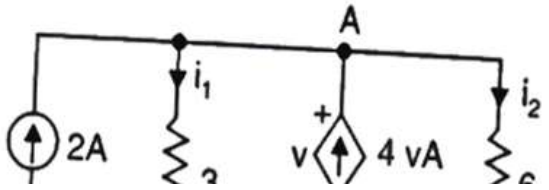
Q.1(a) Find the value of *v*, i_1 and i_2 in the circuit, resistance values are in ohm. [5]



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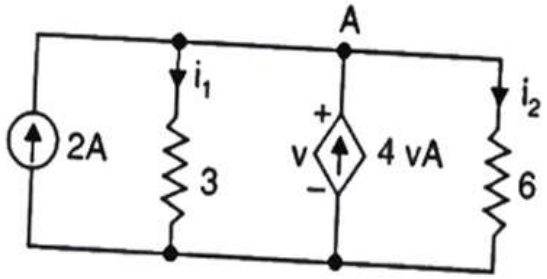

Q.1(b) A circular iron ring has a mean circumference of 1.5 m and a cross-sectional area of 0.01m^2. A saw-cut of 4 mm wide is made in the ring. Calculate the magnetizing current required to produce a flux of 0.8 mWb in the air gap if the ring is wound with a coil of 175 turns. Assume relative permeability of iron as 400 and leakage factor of 1.25. [5]

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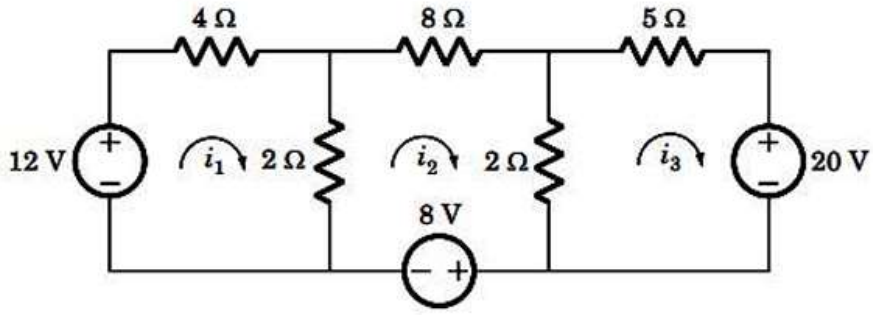
				CO	BL
Q1	(a)	Define i) Potential difference ii) Mesh density iii) Flux intensity iv) Flux	[2]	co1	1
Q1	(b)	Find the current i1, i2 and i3 with help of Mesh analysis technique.	[3]	co1, co2	1,2,3



Q2	(a)	What are the advantages of ac supply over DC supply?	[2]	co1, co2	1,2
Q2	(b)	Explain the star delta conversion.	[3]	co1, co4	1,2,3

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Q.1(a) Distinguish between an ideal independent voltage source and a practical voltage source. What are the types of dependent sources? Explain with a diagram. [5]

Q.1(b) Find the current i0 in the circuit in Fig. 1. [5]

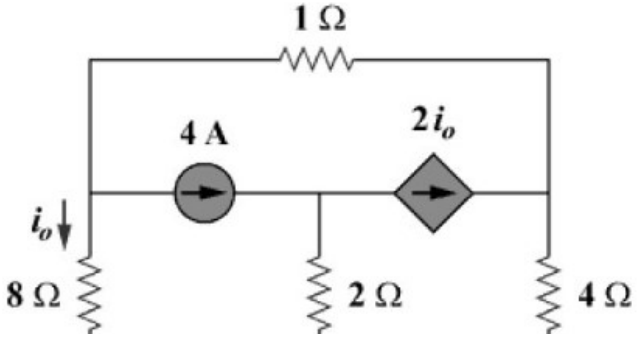
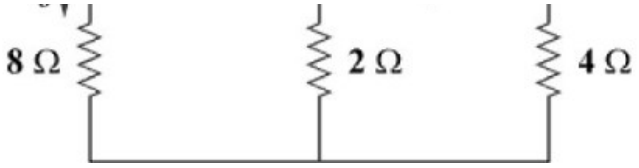


Fig. 1.



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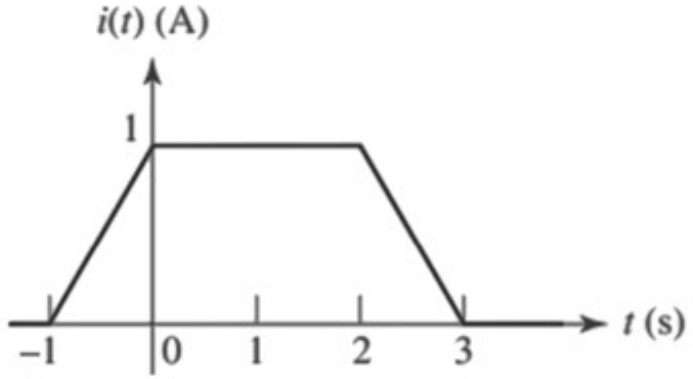
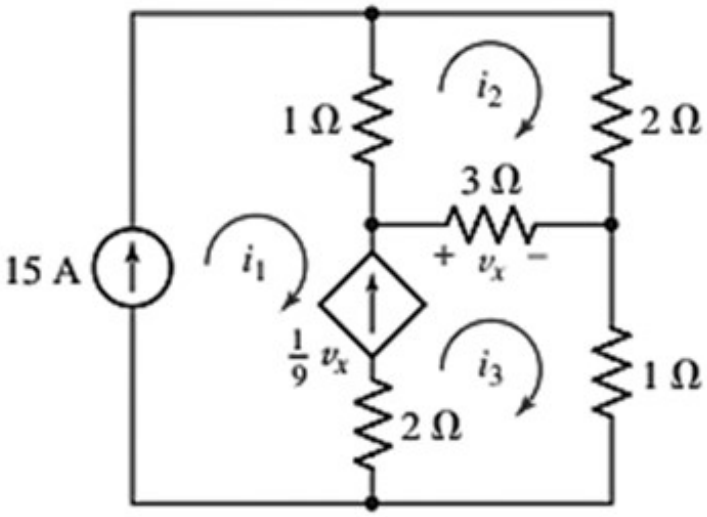
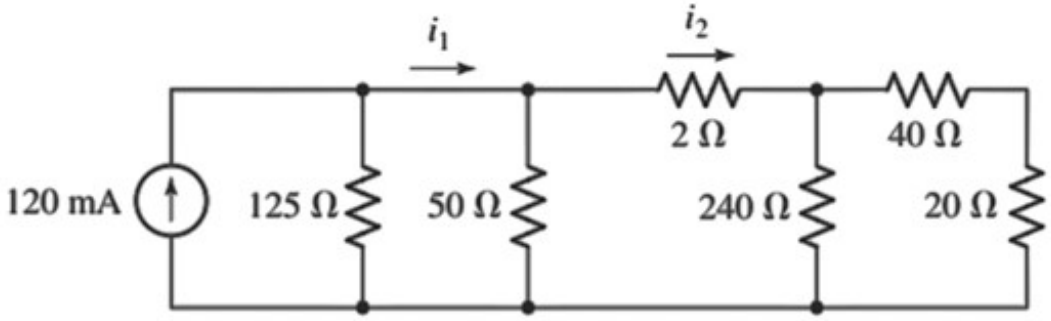
			CO	BL
Q.1(a)	Determine and sketch the voltage in a 3 H inductor if the current waveform is as below:	[2]	CO1	BL3



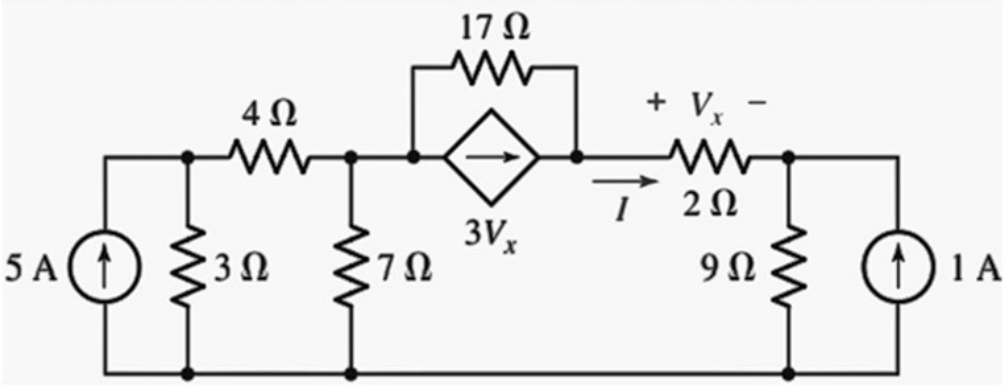
Q.1(b)	Evaluate the mesh currents.	[3]	CO1	BL3



Q.2(a)	Apply current division and resistance combination methods to find i_1 and i_2.	[2]	CO1	BL3

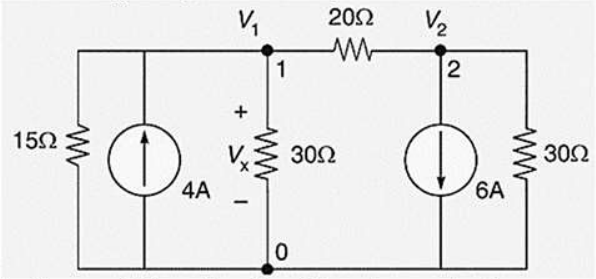


Q.2(b) Examine the current through the 2Ω resistor by using source transformations. [3] CO1 BL4

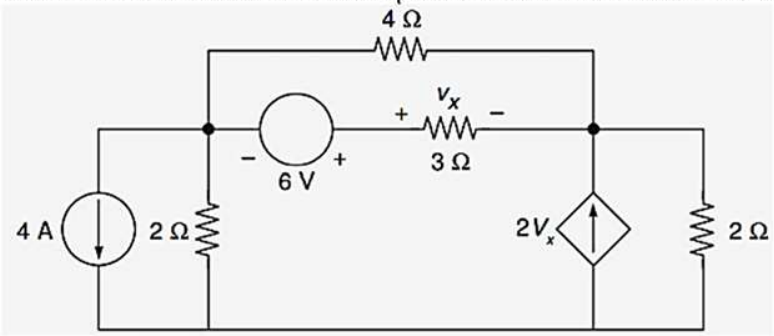


END-SEM MO-22

			CO	BL
Q.1(a)	Predict V_x using nodal analysis.	[5]	1,2	3

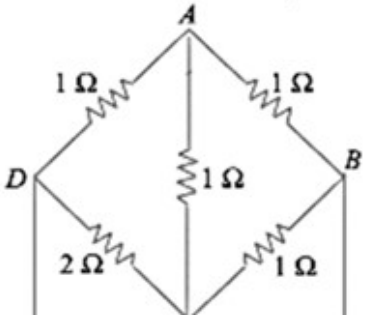


Q.1(b)	In the resistive circuit with a dependent source estimate the value of V_x.	[5]	1,2	3



MID-SEM MO-23

			CO	BL
1.(a)	A bridge network ABCD is shown as in Fig. 1. Evaluate by star/delta transformation, the network resistance as viewed from the battery terminals.	2.5	CO1	BL3



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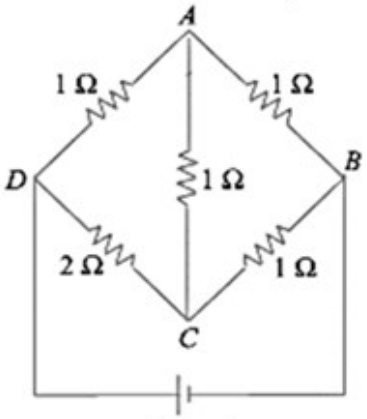

Fig. 1

1.(b)	Evaluate the current *i* and also the power and voltage of the dependent source in Fig. 2. All resistances are in ohms.	2.5	CO1	BL3

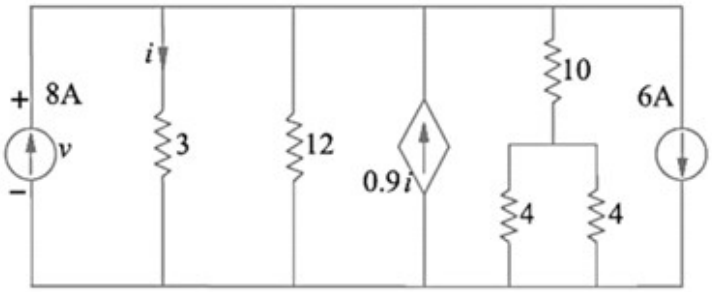

Fig. 2

2.	Evaluate the current *I*, by altering the two voltage sources to equivalent current sources and then apply Nodal Analysis for the Fig. 3	5	CO1	BL3

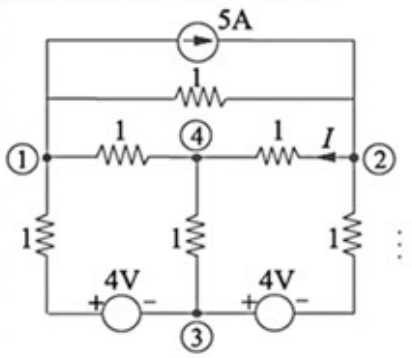

Fig. 3

3.	Analyze the three mesh currents as in Fig. 4 using Super-Mesh Principle.	5	CO1	BL4

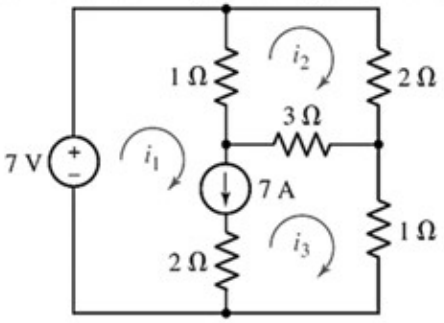

Fig. 4

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			CO	BL
Q.1(a)	The dependent current source I_d is related to the voltage V_{ab} in Fig. 1 through the relation $I_d = 0.4\ V_{ab}$. Evaluate the current through the 8 Ohm resistor by nodal analysis.	[5]	CO1	3

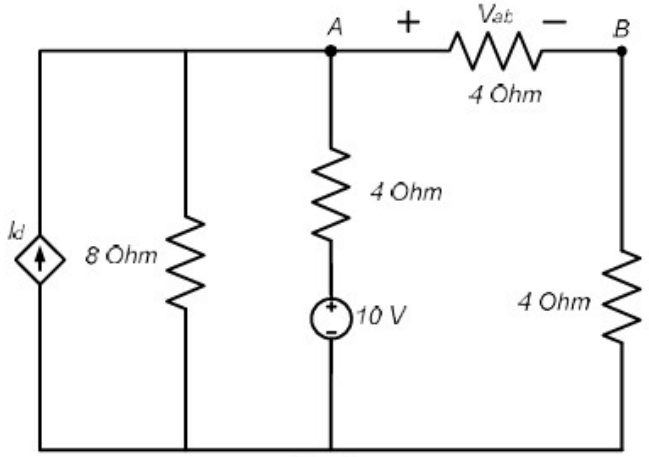

Fig. 1

Q.1(b)	A steel ring 25 cm diameter and of circular section with thickness of 3cm in diameter has an air gap of 1.5 mm. If it is wound uniformly with 750 turns of conductor carrying current of 2.1 A, then Evaluate : (i) mmf, (ii) magnetic flux, (iii) magnetic flux density in air gap, (iv) relative permeability of steel ring . Assume that the steel section takes 35% of the total mmf.	[5]	CO1	5