International Islamic University Chittagong (IIUC)
Department of Electronic and Telecommunication Engineering
Semester End Examination

Program: **B.sc (Engg.)**
Course Code: **EEE–1121**
Total Marks: **50**

Semester: **Autumn 2023**
Course Title: **Electrical Circuit I DC**
Time: **2 Hours 30 Minutes**

(i) Answer all the questions. The figures in the right-hand margin indicate full marks.
(ii) Course Outcomes (COs) and Bloom's Levels are mentioned in additional Columns.

Course Outcomes (COs) of the Questions	
CLO1	Understand the concepts of basic Circuit element, basic circuit, and basic circuit Laws and magnetic circuit laws.
CLO2	Analyze Electric Circuits and Components using suitable engineering analytical techniques.

Bloom's Levels of the Questions						
Letter Symbols	**R**	**U**	**Ap**	**An**	**E**	**C**
Meaning	Remember	Understand	Apply	Analyze	Evaluate	Create

PART A

Q1.	**a)**	Obtain the node voltages in the circuit of Fig. 1	**CLO2**	**Ap**	**5**

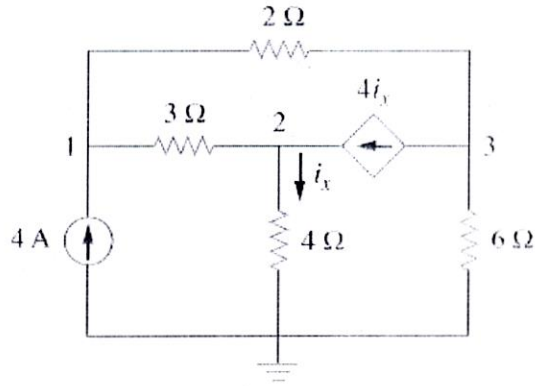


Fig. 1

OR

	a)	Use Nodal Analysis to determine I_o in Fig. 2	**CLO2**	**Ap**	**5**

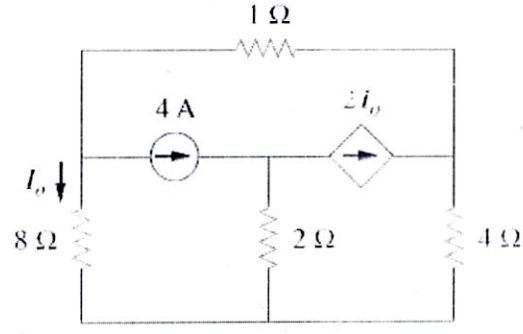
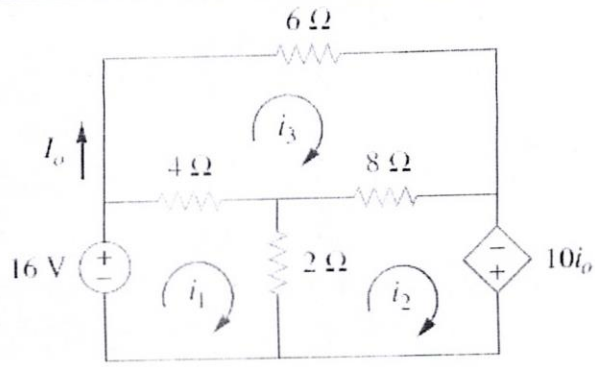
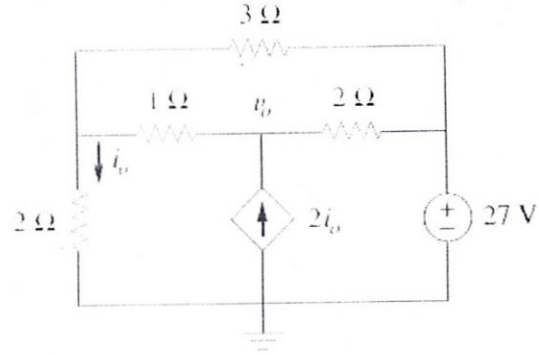
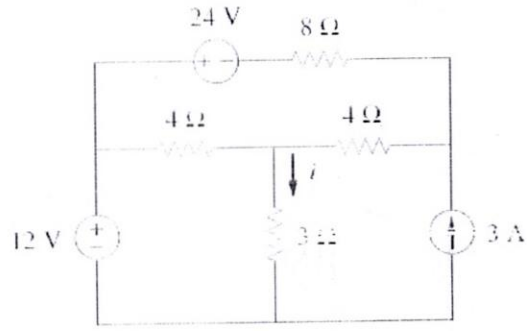
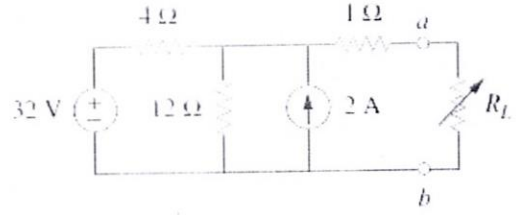


Fig. 2

	b)	Use Mesh Analysis to determine I_o in the circuit of Fig. 3	**CLO2**	**Ap**	**5**

		 Fig. 3			
		OR			
	b)	Determine v_o and i_o in the circuit of Fig. 4 using mesh analysis.  Fig. 4	**CLO2**	**Ap**	**5**
Q2	**a)**	Use Superposition to determing i in the circuit of Fig. 5  Fig.5	**CLO2**	**Ap**	**5**
	b)	Determine the Thevenin Equivalent Circuit of the Circuit shown in Fig. 6 to the left of the terminal a-b. Then Find the current through R_L = 6Ω and R_L = 36Ω.  Fig. 6	**CLO2**	**Ap**	**5**
		PART B			

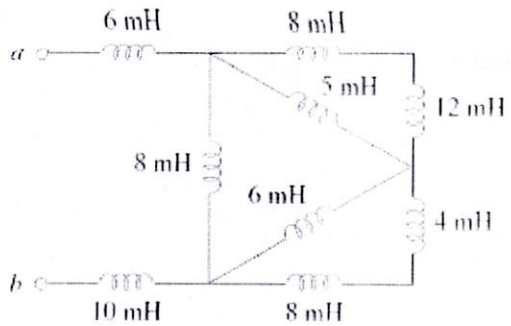
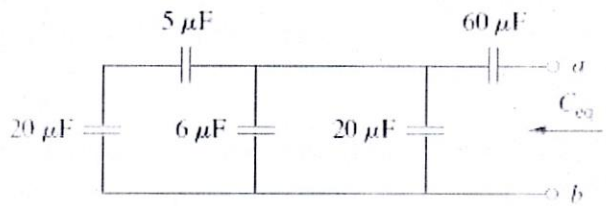
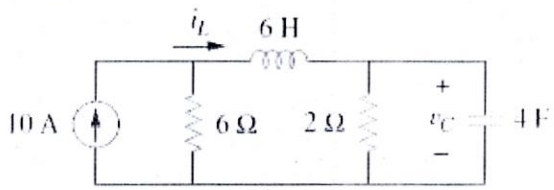
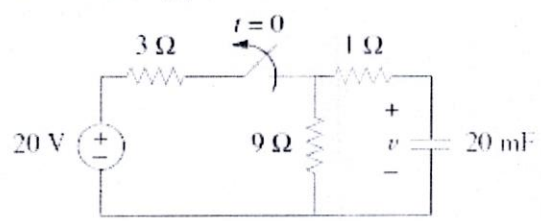
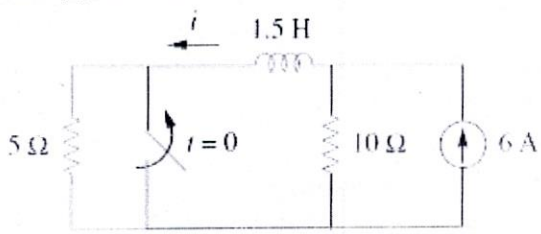
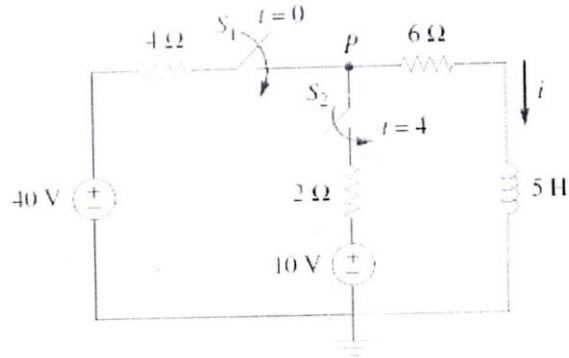
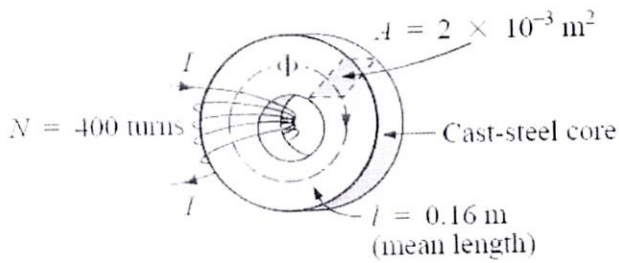
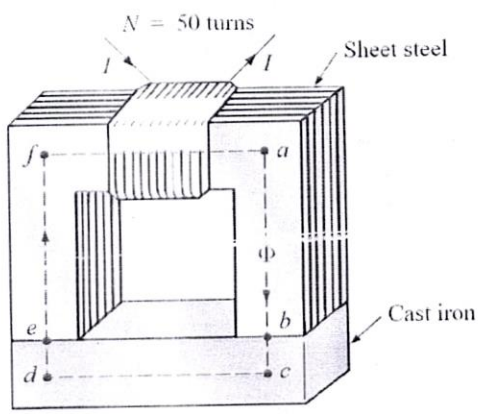
Q3.	**a)**	Explain the Statement: "Inductor acts like a short circuit to DC"	**CLO1**	**U**	**3**
	b)	Determine the equivalent inductance of the inductive network in Fig. 7  Fig. 7	**CLO2**	**Ap**	**3**
		OR			
	b)	Determine the equivalent capacitance of the circuit in Fig. 8  Fig. 8	**CLO2**	**Ap**	**3**
	c)	In the Circuit of Fig. 9, Determine v_o, i_L, energy stored in capacitor and inductor under DC condition.  Fig. 9	**CLO2**	**Ap**	**4**
Q4.	**a)**	The switch in the circuit of Fig. 10 is closed for a long time. At t = 0 the switch is opened. Calculate w(t) for t>0.  Fig. 10	**CLO2**	**Ap**	**5**
	b)	The switch in Fig. 11 has been closedfor a long time. At t = 0, the switch is opened. Determine i*(t)* for t>o. 	**CLO2**	**Ap**	**5**

Fig. 11

OR

	b)	At t = 0, switch 1 in Fig. 12 is closed and switch 2 is closed 4s later. Determine *i(t)* for t>0. Calculater *i* for t = 2s and t = 5s.  Fig. 12	**CLO2**	**Ap**	**5**
Q5.	**a)**	Define: I. Magnteic Flux Density II. Magnetizing Force	**CLO1**	**U**	**3**
	b)	For the series magnetic circuit of Fig 13,Find the value of *I* required to develop a magnetic flux of 4×10^{-4} Wb.  Fig. 13	**CLO2**	**Ap**	**3**
	c)	For the electromagnet of Fig. 14, Determine the current I required to establish the indicated flux in the core.  $l_{ab} = l_{cd} = l_{ef} = l_{fa} = 4$ in. $l_{bc} = l_{de} = 0.5$ in. Area (throughout) = 1 in.² $\Phi = 3.5 \times 10^{-4}$ Wb Fig. 14	**CLO2**	**Ap**	**4**

APPENDIX

B-H Curve of 3 Materials