PVP 23

Code: 23EE3201

I B.Tech - II Semester – Regular Examinations - JULY 2024

ELECTRICAL CIRCUIT ANALYSIS-I
(ELECTRICAL & ELECTRONICS ENGINEERING)

Duration: 3 hours Max. Marks: 70

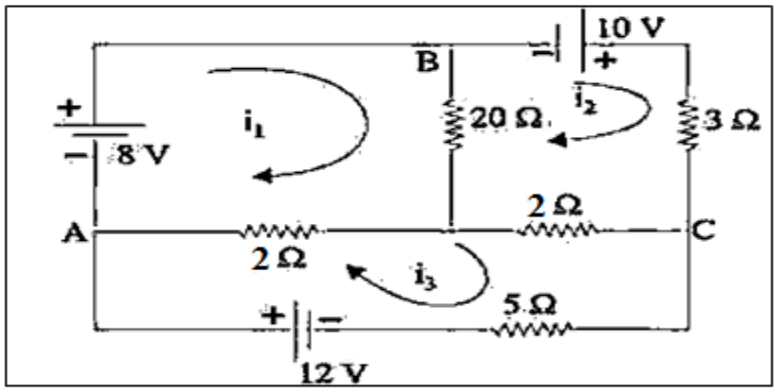
Note: 1. This question paper contains two Parts A and B.
2. Part-A contains 10 short answer questions. Each Question carries 2 Marks.
3. Part-B contains 5 essay questions with an internal choice from each unit. Each Question carries 10 marks.
4. All parts of Question paper must be answered in one place.

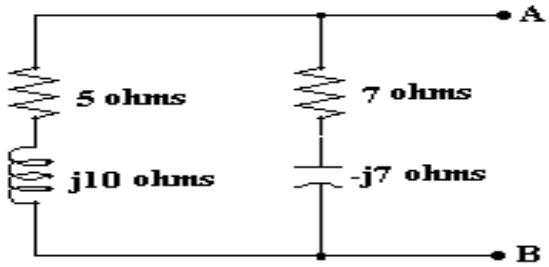
BL – Blooms Level CO – Course Outcome

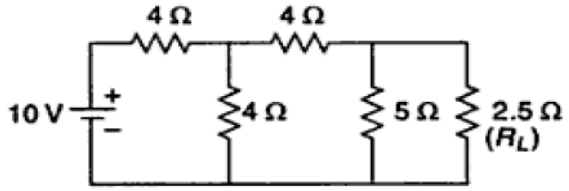
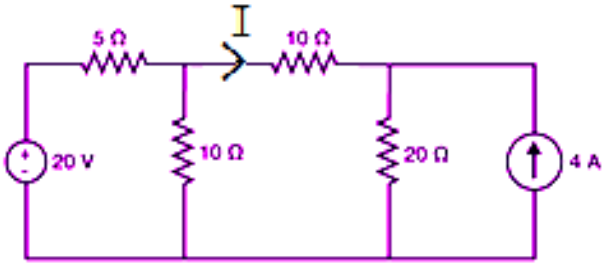
PART – A

		BL	CO
1.a)	Define passive elements.	L1	CO1
1.b)	Draw and explain Voltage to current transformation method.	L2	CO1
1.c)	Define Reluctance.	L1	CO2
1.d)	Define Faraday's second law.	L2	CO2
1.e)	Draw the phasor diagram for RLC Series circuit.	L2	CO3
1.f)	Explain the concept of periodic function.	L2	CO3
1.g)	Define Q Factor.	L2	CO4
1.h)	Write bandwidth expressed in a series resonant circuit.	L1	CO4
1.i)	Define Reciprocity theorem.	L2	CO5
1.j)	Draw the Norton's equivalent circuit.	L1	CO5

PART – B

			BL	CO	Max. Marks
UNIT-I					
2		Determine current in 3ohm resistor by using mesh analysis. 	L3	CO1	10 M
OR					
3	a)	Derive the expressions for Star-Delta transformations.	L2	CO1	5 M
	b)	State and explain Kirchhoff's voltage law with suitable examples.	L2	CO1	5 M
UNIT-II					
4	a)	Explain the analogy between electrical and magnetic circuit.	L2	CO2	6 M
	b)	Explain the concept of self and mutual inductance with neat diagram.	L2	CO2	4 M
OR					
5		Two magnetically coupled coils have self-inductances of 60 mH and 9.6 mH, respectively. The mutual inductance between the coils is 22.8 mH. Calculate the coefficient of coupling. Calculate the inductance when two coils are connected in series and parallel(both aiding and opposing cases).	L3	CO2	10 M

UNIT-III					
6	a)	Define the following with respect to sinusoidal quantity: i) RMS Value ii) Average Value iii) Form factor iv) Peak factor	L2	CO3	4 M
	b)	Find the equivalent impedance (Z_{AB}) and phase angle of the parallel circuit given. 	L3	CO3	6 M
OR					
7	a)	Consider a series RC circuit with R = 10Ω and C = 20 micro farads. The applied voltage is given by v = 50cos(10000t). Calculate impedance of the circuit, current, voltage across resistance and capacitor.	L3	CO3	6 M
	b)	Derive the Average current for output waveform of half wave rectifier.	L2	CO3	4 M
UNIT-IV					
8		A RLC series circuit with a resistance of 10Ω, inductance of 0.2H and a capacitance of 40μF is supplied with a 100V supply at variable frequency. Find the following w.r.t to series resonant circuit. i) Frequency at which resonance takes place. ii) Current at resonance. iii) Power and power factor at resonance.	L3	CO4	10 M

		iv) Half power frequencies. v) Quality factor. vi) Bandwidth. vii) Voltage across R,L,C at resonance.			
		OR			
9	a)	Explain the behavior of an RLC circuit in a locus diagram when resistance, inductance and capacitance are variables.	L2	CO4	5 M
	b)	Define parallel resonance and explain its relationship with the Q-factor.	L2	CO4	5 M
		UNIT-V			
10	a)	Derive the condition for maximum power transfer from source to load in maximum power transfer theorem. Obtain the equation for maximum power.	L2	CO5	5 M
	b)	Find the current through R_L in figure using Norton's theorem. 	L3	CO5	5 M
		OR			
11	a)	State and explain Thevenin's theorem with an example.	L3	CO5	5 M
	b)	Find the current I in 10 ohms using superposition theorem. 	L3	CO5	5 M