PVP 23

Code: 23EE3201

I B.Tech - II Semester – Supplementary Examinations
DECEMBER 2024

ELECTRICAL CIRCUIT ANALYSIS-I
(ELECTRICAL & ELECTRONICS ENGINEERING)

Duration: 3 hours Max. Marks: 70

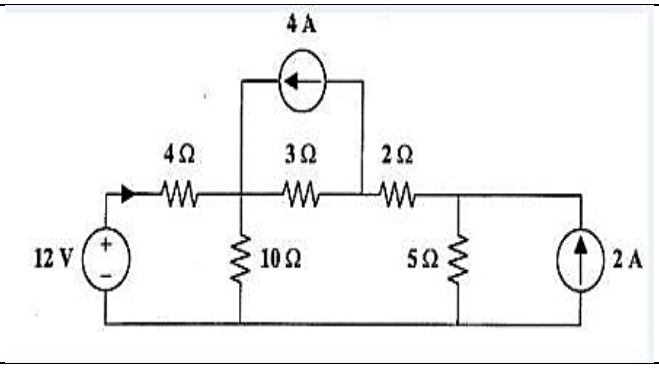
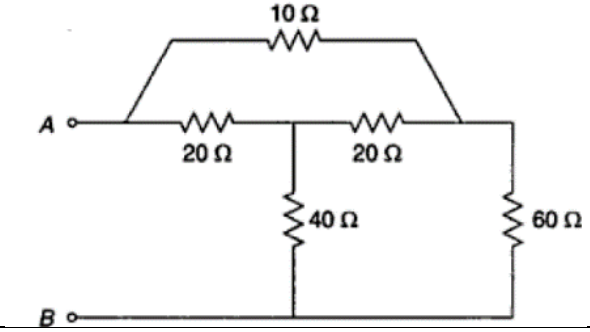
Note: 1. This question paper contains two Parts A and B.
2. Part-A contains 10 short answer questions. Each Question carries 2 Marks.
3. Part-B contains 5 essay questions with an internal choice from each unit. Each Question carries 10 marks.
4. All parts of Question paper must be answered in one place.

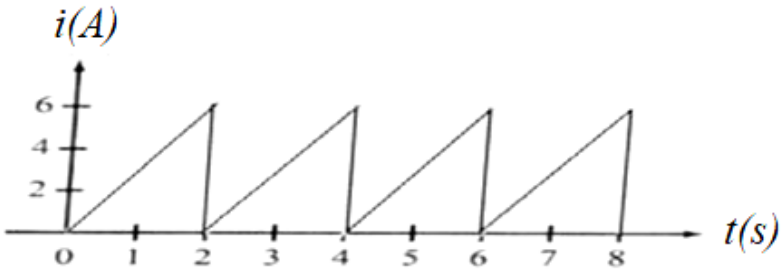
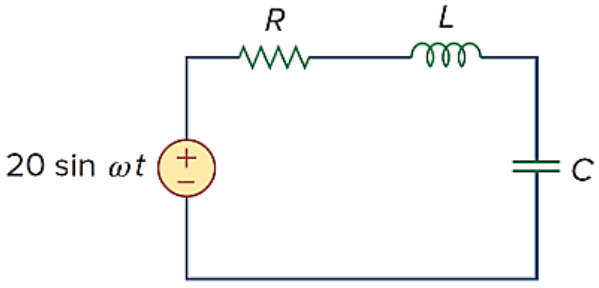
PART – A

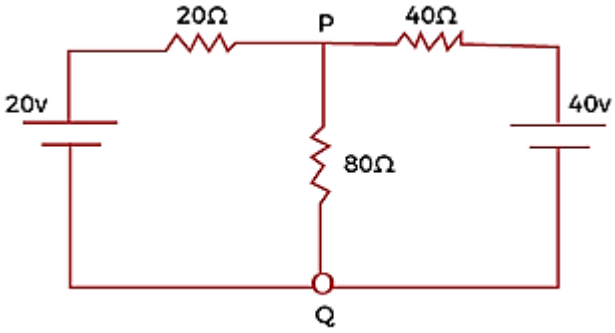
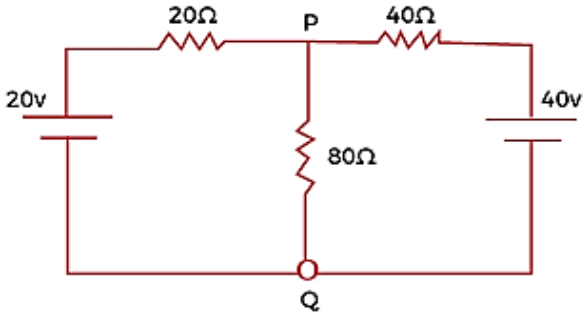
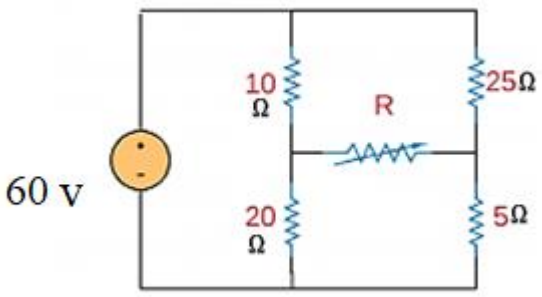
1.a)	Define junction.
1.b)	Differentiate between mesh and loop.
1.c)	What role does the coefficient of coupling play in mutual inductance?
1.d)	Define co-efficient of Coupling.
1.e)	Define form factor.
1.f)	Define R.M.S value.
1.g)	Define Q-Factor of a coil.
1.h)	Draw the locus diagram for series RL circuit.
1.i)	Draw the Norton’s equivalent circuit.
1.j)	Write the application of Thevenin's theorem.

PART – B

					Max. Marks
UNIT-I					
2	a)	State Kirchhoff’s Laws.			3 M
	b)	Using Mesh analysis, find the mesh currents in the circuit.			7 M

			
OR			
3	a)	Draw and explain source transformation methods.	5 M
	b)	Using star - delta transformation, find the equivalent resistance between the terminal's 'A' and 'B' in the network shown in figure below. 	5 M
UNIT-II			
4	a)	The essential component of a toaster is an electrical element (a resistor) that converts electrical energy to heat energy. How much current is drawn by a toaster with resistance 12Ω at 110 V?	3 M
	b)	Compare and contrast the behavior of series and parallel magnetic circuits.	7 M
OR			
5	a)	Two identical coils each have self-inductance 0.03H, if coefficient of coupling k is 0.8, 0.9 and 1 determine the value of mutual inductance (M) between the coils respectively.	5 M
	b)	Derive the expression for equivalent inductance of two coupled coils connected in parallel aiding.	5 M
UNIT-III			
6	a)	Derive the expressions for Average value and RMS value of a sinusoidal wave.	5 M

	b)	A capacitor of capacitance 79·5 μF is connected in series with a non-inductive resistance of 30 Ω across 100 V, 50 Hz supply. Find (i) impedance (ii) current (iii) phase angle and (iv) equation for the instantaneous value of current.	5 M
		OR	
7	a)	Find the average and RMS value for the following periodic waveform with amplitude.  	5 M
	b)	Explain about RLC series circuit with neat diagram.	5 M
		UNIT-IV	
8	a)	Explain how the locus diagram differs in RC circuits with variable resistance and capacitance with neat diagram.	5 M
	b)	Explain different types of resonance circuits, and write applications of resonance circuits.	5 M
		OR	
9		In the circuit below, R = 2 Ω, L = 1 mH, and C = 0.4 μF. (i) Find the resonant frequency ω_r and the half-power frequencies ω_1 and ω_2. (ii) Calculate the quality factor and bandwidth. (iii) Determine the amplitude of the current at ω_r, ω_1 and ω_2.  	10 M

		UNIT-V	
10	a)	Determine current flow in 80 ohms resistance using Thevenin's Theorem 	5 M
	b)	Explain Superposition theorem with neat diagram.	5 M
		OR	
11	a)	Determine current flow in 80 ohms resistance using superposition Theorem. 	5 M
	b)	Apply Maximum Power Transfer theorem to find the maximum power in R. 	5 M