Reg. No.												

Question Paper Code	12652

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2024

Second Semester

Electrical and Electronics Engineering

(Common to Electronics and Instrumentation Engineering & Instrumentation and Control Engineering)

20EEPC201 - ELECTRICAL CIRCUIT ANALYSIS

Regulations - 2020

Duration: 3 Hours | Max. Marks: 100

PART - A (10 × 2 = 20 Marks)

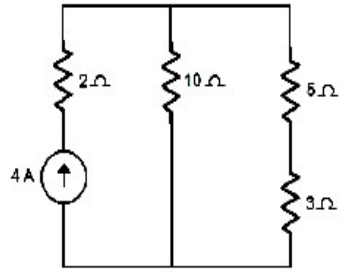
Answer ALL Questions

		Marks	K – Level	CO
1.	Define Ohm's law with its limitations.	2	K1	CO1
2.	List the importance of power factor.	2	K1	CO1
3.	Justify the condition for maximum power transfer theorem.	2	K2	CO2
4.	List out the procedure to calculate Norton's Current.	2	K2	CO2
5.	Define the time constant for RL circuit.	2	K1	CO3
6.	Compare between the steady state and the transient response of an electrical circuit.	2	K2	CO3
7.	Define quality factor of series resonance circuit.	2	K1	CO4
8.	Show the equation of coefficient of coupling.	2	K2	CO4
9.	What is real power and reactive power of AC circuits?	2	K2	CO5
10.	Show the relation between Line current and Phase current for Star and Delta Network.	2	K2	CO5

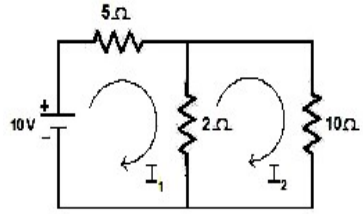
PART - B (5 × 13 = 65 Marks)

Answer ALL Questions

			Marks	K – Level	CO
11.	a) i)	Show the current through 10 Ω resistor for the following circuit.	6	K2	CO1

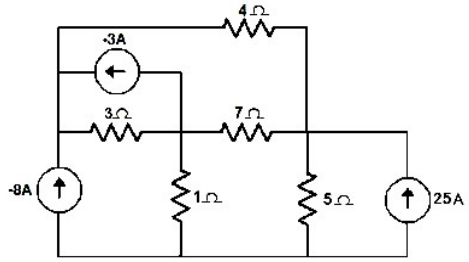


	ii)	Explain the mesh equations for the circuit shown in figure below and solve the currents.	7	K2	CO1

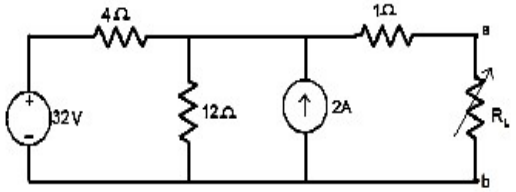


OR

b) Infer the nodal voltages for the given circuit and also obtain the power dissipation across 5Ω resistor. *13 K2 CO1*

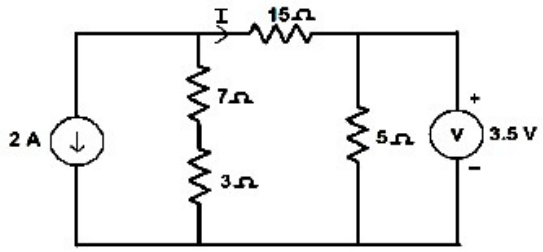


12. a) Identify the Thevenins's equivalent circuit of the circuit shown below, to left of theterminals ab. Then find the current through RL = 16 Ω and 36 Ω. *13 K3 CO2*



OR

b) Solve for the circuit shown by using superposition theorem to compute current (I). *13 K3 CO2*



13. a) A Series RLC circuits has R=50 Ω L= 0.2H, and C = 50 microfarad. Constant voltage of 100V is impressed upon the circuit at t=0. Find the expression for the transient current assuming initially relaxed conditions. *13 K2 CO3*

OR

b) A step voltage V(t) = 100 u(t) is applied to a series RLC circuit with L=10H, R=2Ω and C= 5F. The initial current in the circuit is zero but there is an initial voltage of 50V on the capacitor in a direction which opposes the applied source. Find the expression for the current in the circuit. *13 K2 CO3*

14.	a)	Derive bandwidth for a series RLC circuit as a function of resonant frequency.	*13*	*K2*	*CO4*
		OR			
	b)	A series RLC circuit consists of R=100 Ω, L = 0.02 H and C = 0.02μF. Calculate frequency of resonance. A variable frequency sinusoidal voltage of constant RMS value of 50V is applied to the circuit. Find the frequency, when the voltage across L and C is maximum. Also calculate the maximum voltage across L and C. Also calculate voltages across L and C at frequency of resonance. Find maximum current in the circuit.	*13*	*K2*	*CO4*
15.	a)	A symmetrical three phase 400V system supplies a balanced delta connected load. The current in each branch circuit is 20A and phase angle 40° (lag) calculate the line current and total power.	*13*	*K2*	*CO5*
		OR			
	b)	A balanced star connected load having an impedance 15+j20Ω per phase is connected to 3Ø, 440V, 50Hz. Find the line current and power absorbed by the load.	*13*	*K2*	*CO5*

PART - C (1× 15 = 15 Marks)

16.	a)	Outline the single tuned circuit and derive the expression for mutual inductance and current in the secondary coil.	*15*	*K2*	*CO4*
		OR			
	b)	With a neat circuit and phasor diagram explain the three-phase power measurement by two wattmeter method.	*15*	*K2*	*CO5*