Reg.No.: | | | | | | | | |

VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]
Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 8033

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – AUG. / SEP. 2023
Second Semester
Electrical and Electronics Engineering
U19EE202 – ELECTRIC CIRCUIT THEORY
(Regulation 2019)

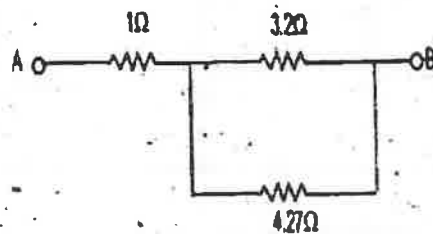Time: Three Hours   Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Two resistors 4Ω and 6Ω are connected in parallel. If the total current is 20A, find the current across each resistor.	2	K1	CO1
2.	Determine the power factor of a RLC series circuit with $R=5\Omega$, $X_L=8\ \Omega$ and $X_C=12\Omega$.	2	K2	CO1
3.	In the figure determine the equivalent resistance by using star delta transformation.	2	K1	CO2

| 4. | Find the value of R_L for the maximum power transfer. | 2 | K1 | CO2 |

1

|				
5.	An RLC circuit consists of a resistance of 1000 W, an inductance of 100 mH and a capacitance of 10 μF. What is the Q factor of the circuit?	2	K1	CO3
6.	Two coupled coils have a self inductances 37.5 mH and 193 mH, with the mutual inductance of 63.75 mH. Find the co efficient of coupling.	2	K1	CO3
7.	Three loads, each of resistance 30Ω, are connected in star to a 415 V, 3-phase supply. Determine the phase current and the line current.	2	K1	CO4
8.	Two wattmeters connected to a 3-phase motor indicate the total power input to be 12 kW. The power factor is 0.6. Determine the readings of each wattmeter.	2	K1	CO4
9.	Construct a circuit that realizes the following Z parameters. $$Z = \begin{bmatrix} 12 & 4 \\ 4 & 8 \end{bmatrix}.$$	2	K2	CO5
10.	An alternating current i= 414 Sin (2π x 50 x t) A is passed through a series circuit of a resistance of 100 ohm and an inductance of 0.31831 H. Find the expression for the instantaneous values of voltage across the resistance.	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.   Questions   Marks   KL   CO

11. a) Use nodal analysis to determine i_0 and V_R.   13   K2   CO1
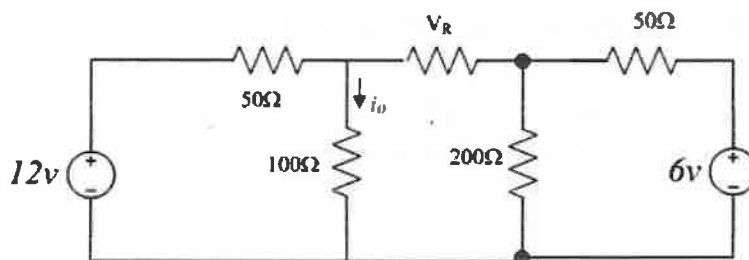
(OR)

b) In the circuit shown in Figure determine the current I_x.   13   K2   CO1

2
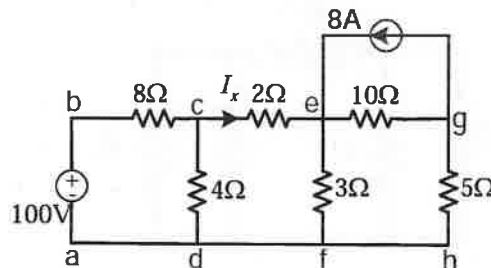
12. a) Find the current flowing through 20 Ω using the superposition theorem.　　13　K1　CO2
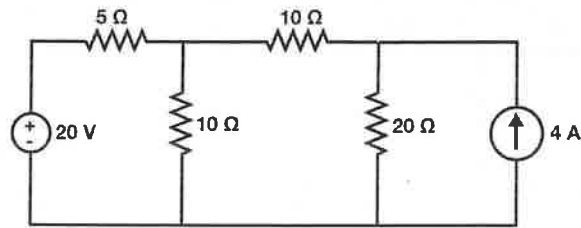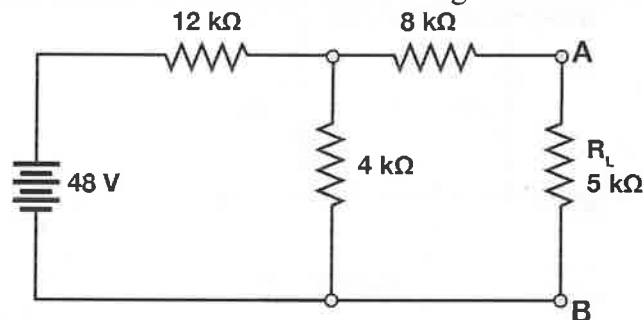

(OR)

b) Find V_{TH}, R_{TH} and the load current I_L flowing through and load voltage　13　K1　CO2
across the load resistor in the circuit below using Thevenin's Theorem.

13. a) A series L–R–C circuit has a sinusoidal input voltage of maximum value　13　K2　CO3
12 V. If inductance, L = 20 mH, resistance, R = 80 Ω, and capacitance,
C = 400 nF, determine (a) the resonant frequency, (b) the value of the
p.d. across the capacitor at the resonant frequency, (c) the frequency at
which the p.d. across the capacitor is a maximum, and (d) the value of
the maximum voltage across the capacitor.

(OR)

b) A pure inductance of 150 mH is connected in parallel with a 40 μF
capacitor across a 50 V, variable frequency supply. Determine
　　a. Resonant frequency of the circuit　　　　　　　　　　　　　　　7　K2　CO3
　　b. Current circulating in the capacitor and inductance at resonance　　6

14. a) A 415 V, 3-phase ac motor has a power output of 12.75 KW and operates
at a power factor of 0.77 lagging with an efficiency of 85%. If the motor
is delta-connected, Determine
　　a. Power input　　　　　　　　　　　　　　　　　　　　　　　　5　K2　CO4
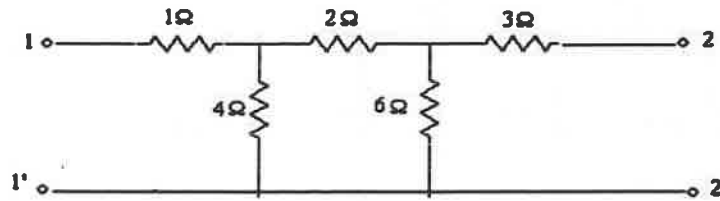　　b. Line current and phase current　　　　　　　　　　　　　　　　8

(OR)

b) A balanced star-connected load absorbs a total power of 5 KW at a　　13　K1　CO4
leading power factor of 0.6 when connected to a line voltage of 240 V.
Find the impedance of each phase and total complex power of load.

3

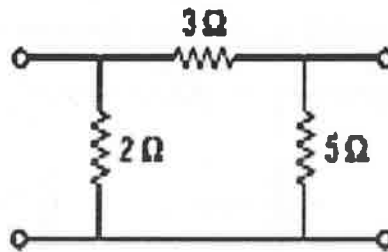15. a) Obtain 'Y' – parameters for the given network shown in below figure.   13   K2   CO5

(OR)

b) Determine the h parameters for the circuit shown in below figure.   13   K2   CO5

PART – C

<div align="right">(1 x 15 = 15 Marks)</div>

Q.No.	Questions	Marks	KL	CO
16. a)	Derive the expression for the voltage across the inductor and capacitor in a series RLC circuit (R = 5Ω, L = 5mH, C = 5μF) excited by a sinusoidal voltage of 100V, 50 Hz if the supply is connected at t = 0. Assume zero initial conditions.	15	K3	CO5

<div align="center">(OR)</div>

b)	A parallel RL circuit is connected to an A.C voltage v = 100sin (500t+300) at t = 0. If R = 5 ohms and L = 0.01H, find the equation for the current.	15	K3	CO5

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