Reg. No. ☐☐☐☐☐☐☐☐☐☐☐☐

| Question Paper Code | 12528 |

B.E. / B.Tech - DEGREE EXAMINATIONS, NOV / DEC 2023
Second Semester
Electrical and Electronics Engineering
(Common 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. Estimate the resultant resistance produced by the parallel connection of two resistors of 10Ω and 30Ω.   *2,K2,CO1*

2. How the series circuit is distinguished with parallel circuits?   *2,K2,CO1*

3. State maximum power transfer theorem for DC circuits.   *2,K1,CO2*

4. State Reciprocity theorem.   *2,K1,CO2*

5. A series RC circuit consists of a resistor 10Ω and capacitor of 0.1F. Find the time constant τ.   *2,K2,CO3*

6. What is meant by transient time?   *2,K1,CO3*

7. Express the term tuned circuits. Mention the different of tuned circuits.   *2,K1,CO4*

8. Write the expression for resonant frequency for Parallel RLC Circuit.   *2,K1,CO4*

9. Compare star and delta connected system.   *2,K2,CO5*

10. Define power factor in terms of impedance and power components.   *2,K1,CO5*
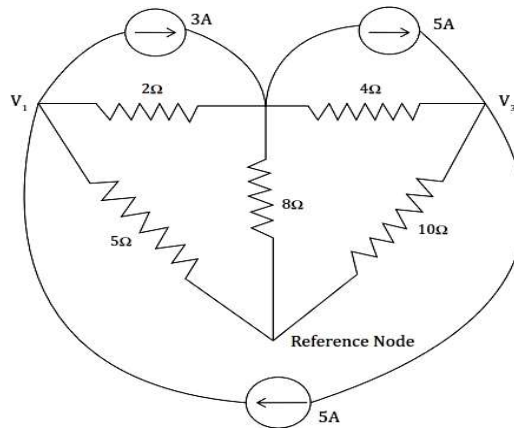
PART - B (5 × 13 = 65 Marks)
Answer ALL Questions

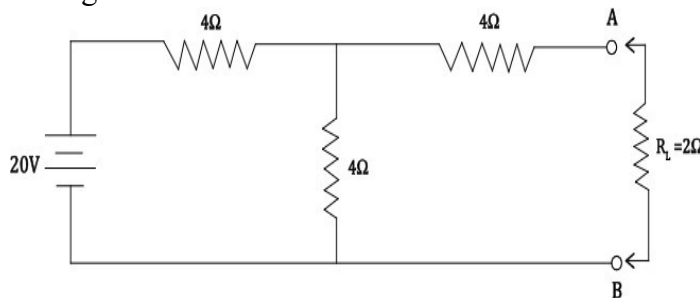11. a) Illustrate the Loop currents I_1, I_2 and I_3 by Mesh loop analysis as shown in Fig.   *13,K3,CO1*

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create   **12528**
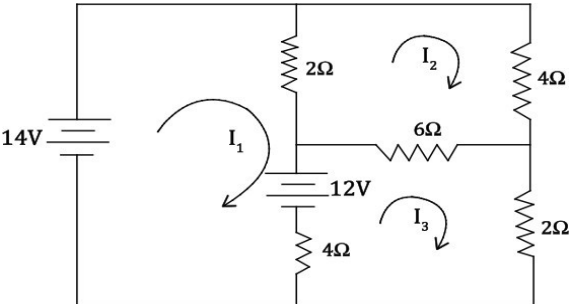
OR

b) Calculate the value of Nodal Voltages V_1, V_2 and V_3 by nodal analysis method as shown in Fig. *13,K3,CO1*
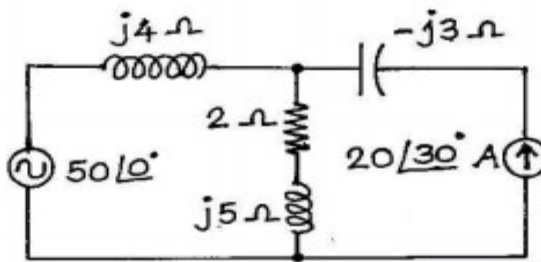

12. a) Prove Thevenin's theorem and Norton's theorem for the given problem as shown in Fig. *13,K3,CO2*

OR

b) For the circuit shown below, determine the voltage across $(2+j5)\Omega$ impedance by using the superposition theorem. *13,K3,CO2*


13. a) Derive the transient response of series R-L circuit, with DC input, using Laplace transform and also sketch the transient response curve. *13,K2,CO3*

OR

b) A Series RLC circuit with R=20 Ω, L =0.05 H and C = 20 microfarad has a constant voltage V= 100 V applied at t=0. Determine the current transient. *13,K3,CO3*

14. a) Analyze the value of L at which the circuit resonates at a frequency of 1000 rad/s in the circuit shown in Fig. *13,K3,CO4*
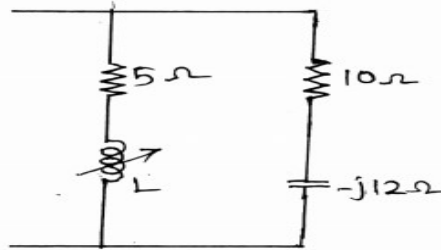
OR

b) Explain the phenomenon of resonance. Derive the formula for the resonance frequency of the series resonance circuits. And also obtain the Capacitance and resonance curve. *13,K2,CO4*

15. a) A 400V, three phase supply feeds an un balanced, Delta connected load. The branch impedances of the load are $Z_R=(4+j8)\Omega$; $Z_Y=(3+j4)\Omega$ and $Z_B=(15+j20)\Omega$. Find the line currents and Power across each phase. Assume RYB phase sequence. *13,K3,CO5*

OR

b) Explain three phase power measurement by 2 wattmeter method for star connected load and determine the power equation and draw the phasor diagram. *13,K2,CO5*

PART - C (1 × 15 = 15 Marks)

16. a) (i) A three phase balanced delta-connected load of $4+j8\Omega$/Phase is connected across a 400V, 3Ø balanced supply. Determine the phase currents and Power (Phase sequence in RYB). *10,K3,CO5*

(ii) Explain in detail in the Concept of co-efficient coupling. *5,K2,CO4*

OR

b) (i) A balanced Star connected load of (4+j3) Ohm / Phase is connected to a 3-Phase, 230V, 50Hz Supply. Evaluate (i) Line Current (ii) Power Factor (iii) Power. *10,K3,CO5*

(ii) Two coupled coils of self inductance L1 = 2H and L2 = 4 H are coupled in (i) series aiding (ii) series opposing (iii) parallel aiding (iv) parallel opposing. If the mutual inductance is 0.5H. Find the equivalent inductance in each case. *5,K2,CO4*