| 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: 80030**

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – JAN. / FEB. 2025
Second Semester
Electrical and Electronics Engineering
U23EE202 - ELECTRIC CIRCUIT THEORY
(Regulation 2023)

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

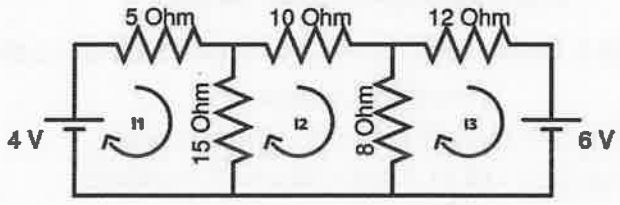
(10 x 2 = 20 Marks)

| Q.No. | Questions | Marks | KL | CO |
|---|---|---|---|---|
| 1. | State Kirchoff's laws. | 2 | K1 | CO1 |
| 2. | Compare series and parallel circuit. | 2 | K1 | CO1 |
| 3. | What is the condition for maximum power transfer? | 2 | K2 | CO2 |
| 4. | Give the expression for star to delta transformation. | 2 | K1 | CO2 |
| 5. | Define Resonance. | 2 | K2 | CO3 |
| 6. | Define coefficient of coupling. | 2 | K1 | CO3 |
| 7. | State the relationship between line and phase quantities of a 3 phase delta connected system | 2 | K2 | CO4 |
| 8. | What are the advantages of 3 phase circuits over single phase circuits? | 2 | K2 | CO4 |
| 9. | Define transient time. | 2 | K1 | CO5 |
| 10. | Differentiate transient and steady state response. | 2 | K2 | CO5 |

## PART – B

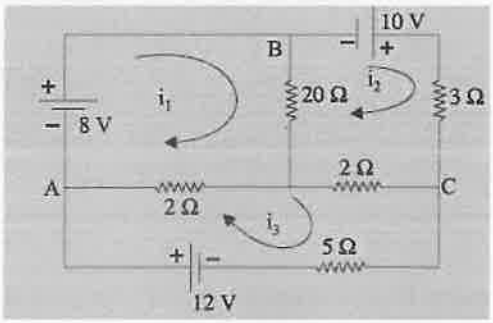
(5 x 13 = 65 Marks)

| Q.No. | | Questions | Marks | KL | CO |
|---|---|---|---|---|---|
| 11. | a) | Find the currentin10ohm resistor by using KVL method. | 13 | K3 | CO1 |

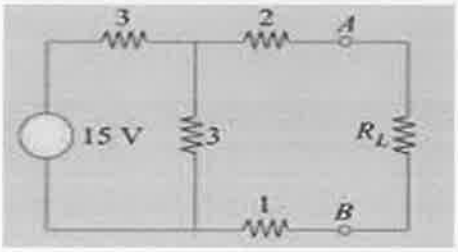



(OR)

| | | | | | |
|---|---|---|---|---|---|
| | b) | Determine current in 5ohm resistor by mesh analysis method. | 13 | K3 | CO1 |

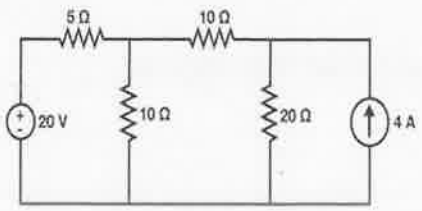



| | | | | | |
|---|---|---|---|---|---|
| 12. | a) | Find the value of R such that maximum possible power will be transferred to $R_L$. Find also the value of the maximum power. | 13 | K3 | CO2 |

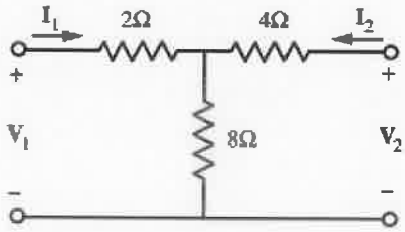



(OR)

| | | | | | |
|---|---|---|---|---|---|
| | b) | Find the current flowing through 20 Ω resistor using the superposition theorem. | 13 | K2 | CO2 |



| | | | | | |
|---|---|---|---|---|---|
| 13. | a) | A series L–R–C circuit has a sinusoidal input voltage of maximum value 20 V. If inductance, L = 0.03H, resistance, R = 5 Ω, and capacitance, C = 100 μF. Determine<br>i. Resonant frequency and half power frequency (7)<br>ii. Bandwidth and Quality factor. (6) | 13 | K3 | CO3 |
| | | (OR) | | | |
| | b) | Derive the expression for mutual inductance of a coupled coils. | 13 | K2 | CO3 |
| 14. | a) | A balanced three phase star connected load draws power from 440V supply. Two wattmeters indicates $W_1$=4.2kW and $W_2$=0.8kW. Calculate<br>i. Total power and power factor (8)<br>ii. Current in the circuit (5) | 13 | K2 | CO4 |
| | | (OR) | | | |
| | b) | Explain about Star and Delta connected three phase balanced circuits. | 13 | K2 | CO4 |
| 15. | a) | Derive the expression for a transient response of a RC circuit for step input signal. | 13 | K2 | CO5 |
| | | (OR) | | | |
| | b) | Find the hybrid parameters for the two-port network shown. | 13 | K2 | CO5 |




## PART – C

(1 x 15 = 15Marks)

| Q.No. | | Questions | Marks | KL | CO |
|---|---|---|---|---|---|
| 16. | a) | Explain in detail about the dot convention in coupled circuits. | 15 | K2 | CO3 |
| | | (OR) | | | |
| | b) | The Q factor of a series resonant circuit at 50Hz is 1.5. If this circuit is supplied with a constant voltage and variable frequency, find frequency at which capacitor voltage is maximum. | 15 | K3 | CO3 |