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Question Paper Code: 53403

B.E./B.Tech. DEGREE EXAMINATION, MAY 2018

Third Semester

Electronics and Communication Engineering

15UEC303-CIRCUIT THEORY

(Regulation 2015)

Duration: Three hours

Maximum: 100 Marks

PART A - (5x 1 = 5 Marks)

Answer All Questions

1. If R_1 and R_2 are connected in parallel then the current through R_1 is CO1- R
(a) $I_2 * [R_2 / (R_1 + R_2)]$ (b) $I * [R_1 / (R_1 + R_2)]$
(c) $I * [R_2 / (R_1 + R_2)]$ (d) $I * [(R_1 + R_2) / R_2]$
2. The number of branches in a tree is _____ the number of CO2-R
branches in a graph
(a) less than (b) more than (c) equal to (d) double
3. In parallel RLC circuit under resonance condition the value of current is CO3- R
(a) Maximum (b) Minimum (c) Zero (d) None of the above
4. What would be the value of power factor for series RLC circuit under the CO4- R
resonance phenomenon?
(a) 0 (b) 0.5 (c) 1 (d) infinity
5. In a star connected circuit the value of power is given by CO5- R
(a) $\sqrt{3} V_{ph} * I_{ph} * \cos\phi$ (b) $\sqrt{3} V_L * I_L * \cos\phi$
(c) $3 V_L * I_L * \cos\phi$ (d) $\sqrt{3} V_L * I_L * \sin\phi$

PART – B (5 x 3= 15Marks)

6. What are the classifications of Circuit elements? CO1-U
7. Explain the Norton's theorem. CO2- U
8. Examine the variation of X_L and X_C with respect to frequency. CO3- U
9. Compare the phasor diagram of R_L , R_C and R_{LC} series circuit. CO4- Ana
10. Define Mutual induction. CO5- U

PART – C (5 x 16= 80Marks)

11. (a) Calculate the current through $6\ \Omega$ resistance of the given network by application of Kirchhoff's law show in figure 2. CO1-App (16)

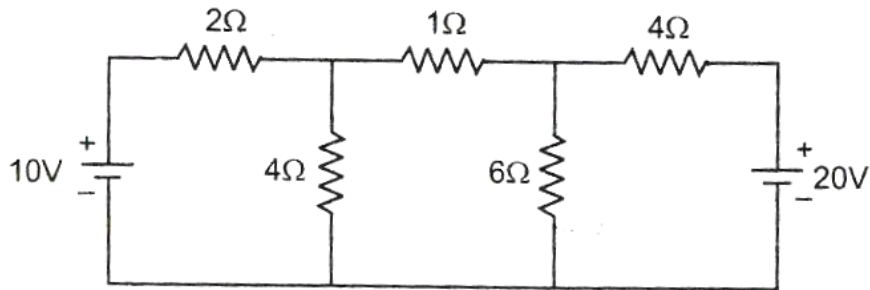


Figure 2

Or

- (b) (i) Explain source transformation technique. CO1 -U (8)
- (ii) Find the value of resistor R if the power dissipated in $2\ \Omega$ resistor is $6\ \text{W}$, in the network shown in figure 4. CO1 -Ana (8)

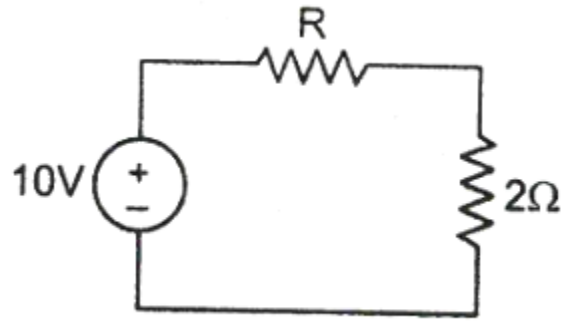
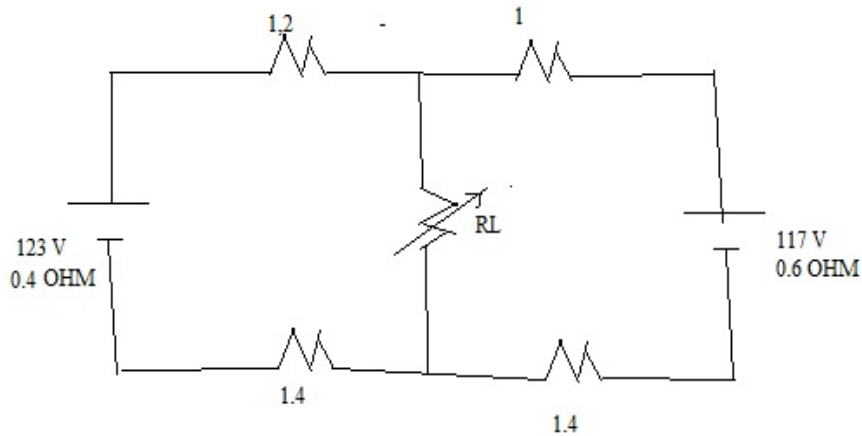


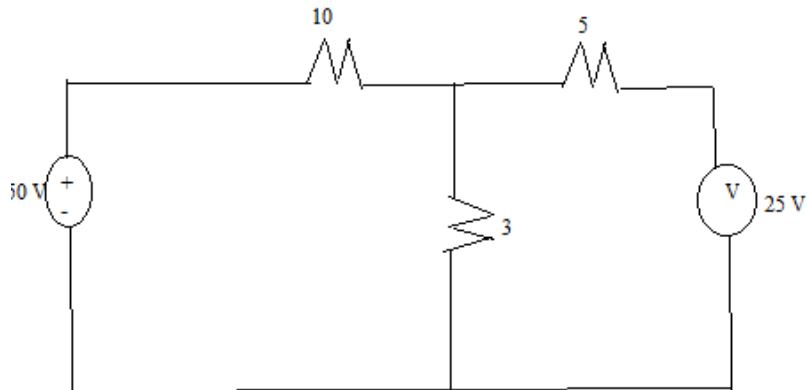
Figure 4

12. (a) Determine the ohmic value of $R_{L\text{ in}}$ in the following circuit when its power is maximum and also find the maximum load power. CO2 -App (16)



Or

- (b) (i) State and explain the super position theorem. CO2 -U (4)
- (ii) Find the current in each resistor using super position theorem for the below circuit. CO2 -App (12)



13. (a) A series circuit with $R=10\Omega$, $L=0.1H$ and $C=50\mu F$ has an applied voltage $V=50\angle 0^\circ$ with a variable frequency. Find the resonant frequency, the value of frequency at which maximum voltage occurs across the inductor and the value of frequency at which maximum voltage occurs across the capacitor. CO3- App (16)

Or

- (b) Explain the current, voltage and frequency in a series resonant circuit with phasor diagram of RL, RC and RLC circuit. CO3- U (16)
14. (a) Derive the DC response of RL and RC series circuit. CO4-App (16)

Or

- (b) Define the following CO4 -U (16)
- (i) Transient state
 - (ii) Transient Time and Transient response
 - (iii) Natural response and Natural frequency
 - (iv) Damping ratio.
15. (a) Derive the expression for the coefficient of coupling in coupled circuits with neat diagram. CO5- U (16)

Or

- (b) Two wattmeters are connected to read the total power in a 3-phase circuit. Find the condition for which (a) $W_1 = W_2$
(b) $W_1 = -W_2$ (c) $W_1 = 0$. CO5-Ana (16)