A **Reg. No. :** | | | | | | | | | | |

Question Paper Code: 52309

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2024

Second Semester

Electrical and Electronics Engineering

15UEE209 - ELECTRIC CIRCUITS

(Regulation 2015)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. Which of the following is not a Active element? CO1- App

   (a) Voltage source (b) Current source (c) Generator (d) Vacuum cleaner

2. Which of the following condition is satisfy by the Ohm's Law? CO1- R

   (a) Constant voltage (b) Constant temperature

   (c) Constant current (d) None of the above

3. Superposition theorem is only applicable for? CO2- R

   (a) Nonlinear system (b) Linear system (c) Both (a) & (b) (d) None of the above

4. Maximum power transfer theorem is applicable for? CO2-U

   (a) Iron box (b) Grinder (c) Sound system (d) Air conditioner

5. Antiresonance is also called as ? CO3- R

   (a) Parallel resonance (b) Series resonance

   (c) Both (a) & (b) (d) None of the above

6. Mutual inductance is ? CO3- R

   (a) $K = M \sqrt{(L_1 L_2)}$ (b) $M = K \sqrt{(L^1 L^2)}$ (c) $M = C \sqrt{(L_1 L_2)}$ (d) $M = K \sqrt{(L_1 L_2)}$

7. Rising time for overdamped system is ? CO4- R

   (a) 0 % to 100 % (b) 0 % to 90 % (c) 0 % to 63.2 % (d) 0 % to 36.8 %

8. Time constant of RC circuit? CO4- R

(a) 0 % to 63.2 % (b) 0 % to 36.8 % (c) 2T (d) 4T

9. Power factor is not defined as CO5- R

(a) Angle between voltage and current

(b) Ratio between Resistance / Impedance

(c) Real power / Apparent power

(d) Coil displacement

10. Time period is? CO5- R

(a) $2\pi / \omega$ (b) F = 1 / T

(c) Time taken for half cycle (d) Time taken for half cycle

PART – B (5 x 2= 10 Marks)

11. What is current? CO1- R

12. State current division rule. CO2- R

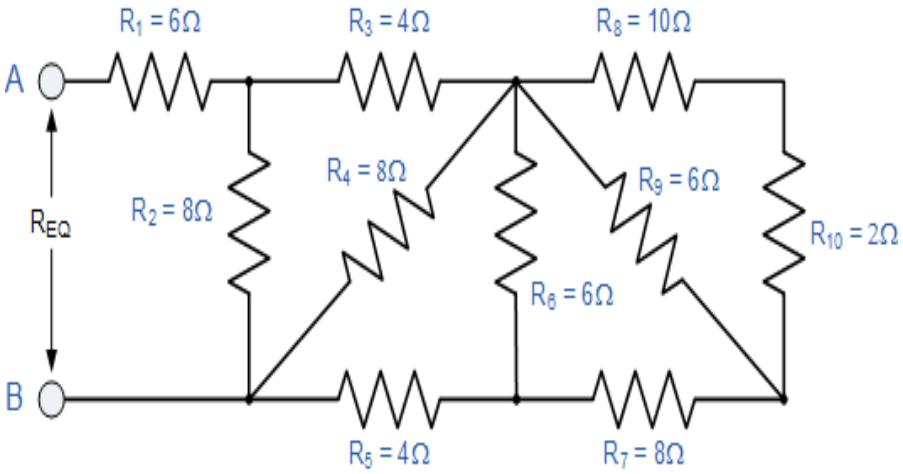
13. Define coefficient of coupling. CO3- R

14. What is transient state? CO4-App

15. Define complex power. CO5-Ana

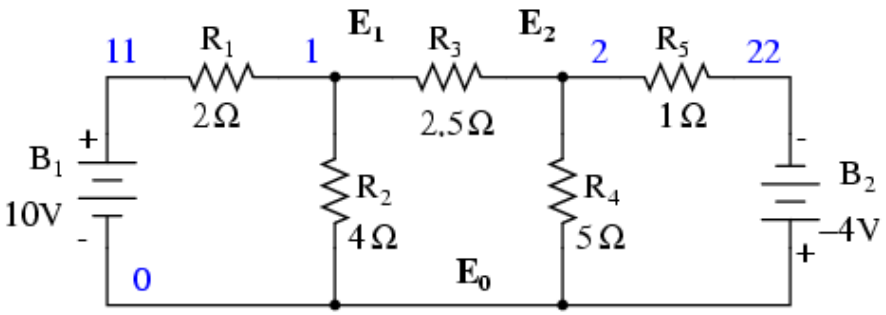
PART – C (5 x 16= 80 Marks)

16. (a) Determine the total resistance R of the given circuit? CO1- App (16)

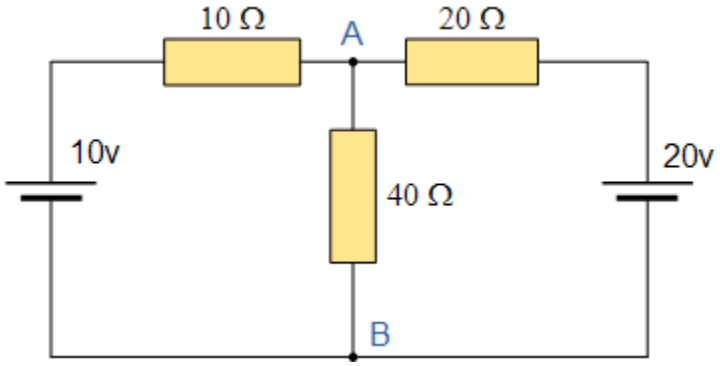


Or

(b) Apply Kirchhoff's voltage law and find the current I_1 and I_2 and I_3 flowing in the given circuit using Cramer rule? CO1- App (16)



17. (a) Using Thevenin's theorem, solve this problem and find the current flow through between Terminal A and Terminal B . CO2- U (16)



Or

(b) Explain maximum power transfer theorem and derive the expression for maximum power transfer. CO2- U (16)

18. (a) The parameter of a RLC parallel circuit excited by a current source are R = 40 Ohm, L = 2 mH , C = 3 Microfarad. Determine the CO3- Ana (16)

(i) Resonant frequency

(ii) Quality factor

(iii) Bandwidth

(iv) Cut – off frequencies.

Or

(b) Two coupled coils with L 1 = 0.02 H , L 2 = 0.01 H and K = 0.5 are connected in our different ways , series Aiding , series opposing and Parallel Aiding and Parallel Opposition of the winding sense. What are the four equivalent inductances? CO3- Ana (16)

19. (a) A sinusoidal voltage of 10 sin 100 t is connected in series with a switch and R = 10 Ohm , L = 0.1 H . If the switch is closed at t = 0 , determine the transient current i(t). CO4- U (16)

Or

(b) In the series R , L circuit resistance is 50 Ohm , and Inductance is 0.5 H and applied voltage is $e = 100\, e^{-50\, t}$. CO4- U (16)

Find the

(i) Resulting current

(ii) Initial rate of change of current

20. (a) Explain the power and power factor measurements in three phase circuits. CO5- U (16)

Or

(b) (i) Mention some advantages of three Phase system over a Single Phase system? CO5- U (8)

(ii) Compare balanced network and unbalanced network CO5- U (8)