A   **Reg. No. :** ☐☐☐☐☐☐☐☐☐☐

Question Paper Code: 52309

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2022

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. Resistance of a conductor increases when   CO1- U

    (a) its length increases   (b)its area decreases

    (c) both length and area increases   (d) specific resistance is kept constant

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. The purpose of a commutator in a dc generator is to_____   CO2- R

    (a) Increase output voltage   (b) Reduce sparking at brushes

    (c) Provide smoother output   (d) Convert the induced ac into dc

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

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

5. Which of the following doping will produce a p-type semiconductor   CO3- R

    (a)Germanium with phosphorus   (b) Silicon with Germanium

    (c) Germanium with Antimony   (d) Silicon with Indium

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. Convert octal 377 to binary.   CO4- R

    (a) 11101101   (b)) 01111011   (c) 10110111   (d) 11111111

8. Time constant of RC circuit? CO4- R

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

9. In amplitude modulation, frequency is_____ CO5- R

(a) constant   (b) zero   (c) variable   (d) one

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. State Ohm's law. CO1- R

12. Give the types of transformers based on their construction. CO2- R

13. List the applications of Zener diode. CO3- R

14. What is transient state? CO4-U

15. Define complex power. CO5-U

PART – C (5 x 16= 80 Marks)

16. (a) Three resistances of values $2\Omega, 3\Omega$ and 5Ω are connected in   CO1- App   (16)
    series across 20 V,D.C supply .Calculate (a) equivalent
    resistance of the circuit (b) the total current of the circuit (c) the
    voltage drop across each resistor and (d) the power dissipated in
    each resistor.

Or

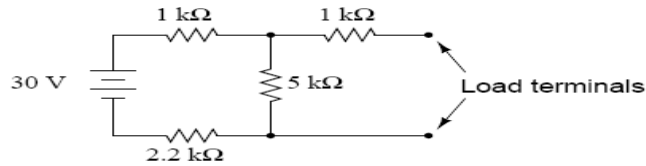   (b) Apply Kirchhoff's voltage law and find the current I_1 and I_2 and   CO1- App   (16)
    I_3 flowing in the given circuit using Cramer rule?
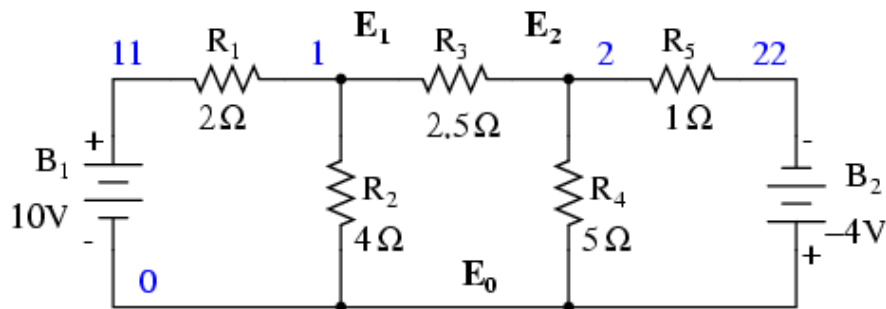
17. (a) Illustrate Maximum Power Transfer theorem with suitable   CO2- U   (16)
    example.

Or

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(b) Give a step-by-step procedure for reducing this circuit to a CO2- U (16)
Thevenin's equivalent circuit.

18. (a) The parameter of a RLC parallel circuit excited by a current CO3- Ana (16)
source are R = 40 Ohm, L = 2 mH , C = 3 Microfarad.
Determine the
(i) Resonant frequency
(ii) Quality factor
(iii) Bandwidth
(iv) Cut – off frequencies.

Or

(b) Derive the expression for maximum amplification of single CO3- Ana (16)
tuned circuits at resonance

19. (a) Illustrate the transient response analysis of first order RC circuits CO4- U (16)
for DC excitation.

Or

(b) In the series R , L circuit resistance is 50 Ohm , and Inductance CO4- U (16)
is 0.5 H and applied voltage is $e = 100\ e^{-50\,t}$.
Find the
(i) Resulting current
(ii) Initial rate of change of current

20. (a) Describe various methods used for the measurement of three CO5- U (16)
phase power in three phase circuits.

Or

(b) A balanced star connected load of (4+j3)Ω per phase is CO5- U (16)
connected to a balanced 3 phase 400V supply. The phase current
is 12A. Calculate total active power, reactive power and the
apparent power.

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