

Code No.: EE401ES

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H.T.No.

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CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS

II-B.TECH-II-Semester End Examinations (Regular) - August- 2023
BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
(MECH)

[Time: 3 Hours]

[Max. Marks: 70]

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 20 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART-A

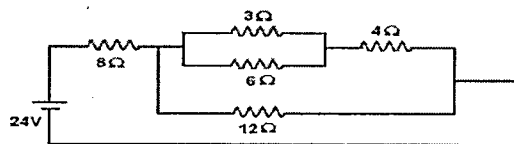
(20 Marks)

1. a) Compare ideal and practical voltage source. [2M]
- b) Solve for total current and power if the circuit has two loops with 16V source and two $2\ \Omega$ resistors connected in first loop and two $4\ \Omega$ resistors are connected in second loop using loop current analysis. [2M]
- c) Identify the main differences between MCB and MCCB. [2M]
- d) Determine active and reactive energy consumed by 200 watts iron box in 2 hours. [2M]
- e) Derive Slip equation and frequency of rotor currents for 3-phase induction motor. [2M]
- f) Develop equations for transformer efficiency in terms of its losses. [2M]
- g) Define Ripple factor and derive its equation for full-wave rectifier. [2M]
- h) Show the ideal and practical circuit for P-N Junction Diode. [2M]
- i) Discover the importance of arrow mark symbol in PNP and NPN transistors. [2M]
- j) What are the main differences between BJT and FET? [2M]

PART-B

(50 Marks)

- 2.a) Define and explain Kirchoff's laws. [4M]
- b) Solve the total current and total power consumed for the given circuit shown in Figure. [6M]



Figure

OR

3. a) What are the Voltage and current relations in Y-Y and Delta-Y connections? [4M]
- b) Calculate [6M]
 - i. The total current
 - ii. The power factor
 - iii. The active and reactive power at the circuit for a RL parallel circuit consists of a resistance of $10\ \Omega$ and an inductance of $0.04\ \text{H}$ connected across a $120\ \text{V}$, $50\ \text{Hz}$ source.

- 4.a) Define earthing. [2M]
- b) Explain the important characteristics of batteries. [8M]

OR

- 5.a) Define power factor. [2M]
- b) Utilize ELCB circuit to explain its operation in protecting electrical network. [8M]

- 6.a) Develop the emf equation of a transformer. [4M]
b) Determine generated emf of the machine for a 4-pole shunt generator supplies a load of 100 A at a terminal voltage of 400 V with armature resistance of 0.02Ω , and the shunt field resistance is 160Ω . Neglect the armature reaction. [6M]

OR

- 7.a) Explain the working of synchronous generator. [4M]
b) The stator of a 3-phase, 4-pole induction motor is connected to a 50 Hz supply. The rotor runs at 1455 rev/min at full load. Determine (i) the synchronous speed and (ii) the slip at full load. [6M]

- 8.a) Explain the V-I characteristics of PN junction diode. [5M]
b) Derive the average output voltage equation for Half-wave rectifier. [5M]

OR

- 9.a) Summarize the applications of Zener Diode. [4M]
b) Analyze Inductive and Pi-section filters. [6M]

- 10.a) Classify CC and CB configurations in detail. [8M]
b) Define Biasing in Transistors. [2M]

OR

- 11.a) Draw CE Configuration and then analyse Q-point and stability factors. [5M]
b) Identify the various portions of FET V-I characteristics. [5M]
