Code No.: R22EE204ES | R22 | H.T.No. | | | 8 | R | | | | | | |

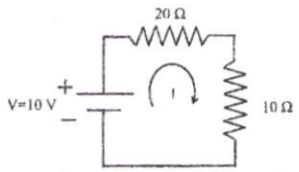
CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS
I–B.TECH–II–Semester End Examinations (Regular) - September- 2023
BASIC ELECTRICAL ENGINEERING
(Common for ECE, CSE, IT)

[Time: 3 Hours] **[Max. Marks: 60]**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 10 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 **(10 Marks)**

1. a) State Kirchhoff's voltage and current law. [1M]
   b) Find the current I in the given network. [1M]

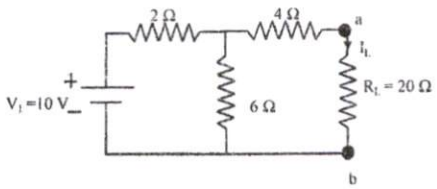


   c) Define capacitive reactance and write down the formula for it. [1M]
   d) Find the impedance of RL circuit with AC excitation. [1M]
   e) What are the losses in transformer? [1M]
   f) Write the EMF equation of a Single Phase Transformer. [1M]
   g) What is the function of Commutator in a dc generator? [1M]
   h) What is the difference between Motor & Generator? [1M]
   i) Discuss the applications of Single Phase Induction Motor. [1M]
   j) What is necessity of rotating magnetic field in an induction motor? [1M]

PART-B **(50 Marks)**

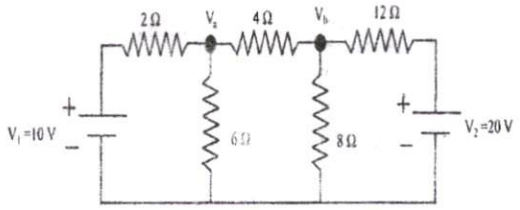
2.a) Obtain the volt-ampere relationship for R, L and C. [5M]

   b) State and explain Norton's theorem. Find the load current I_L using Norton's theorem. [5M]



OR

3. Find the node voltages, V_a and V_b in the given network using nodal analysis and find current flowing through each branch. [10M]



4. a) Define Alternating quantity, Instantaneous value, Frequency, Time period and Cycle for a sine wave. [5M]

b) Derive the relationship among phase and line voltages and currents for a Delta [5M]

OR

5. a) Find the impedance of RC circuit with AC excitation. [5M]

b) Derive the Average value, Root mean square value, Form factor and Peak factor for Sine waveform. [5M]

6. a) Explain the working principle of 1- phase Transformer. [5M]

b) A 500 KVA, single phase transformer has 500 turns on the primary and 200 turns on the secondary. The primary is connected to 2000 V, 50 Hz supply. Determine the Secondary voltage and the maximum value of flux. [5M]

OR

7.a) Draw and explain Equivalent Circuit of 1-phase Transformer referred to primary. [5M]

b) Explain the auto transformer with a 2 winding transformer. [5M]

8. a) Classify various DC generators with neat diagrams and necessary equations. [5M]

b) A 4-pole wave wound dc generator has 200 armature conductors and flux per pole is 0.5 weber. The generator runs at 900 rpm. Find the generated emf. [5M]

OR

9.a) Explain the construction of DC machine with neat sketch. [5M]

b) Derive the emf equation of dc generator. [5M]

10.a) Explain the principle of operation of 3-Phase induction Motor. [5M]

b) A 10-pole, 3-phase induction motor runs at a speed of 485 rpm at 50 Hz supply. Determine i. Synchronous speed and ii. Slip. [5M]

OR

11. Explain the principle of production of rotating magnetic field in a 3-phase induction Motor. [10M]

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