

Code No.: R22EE204ES

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H.T.No.

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CMR ENGINEERING COLLEGE: : HYDERABAD

UGC AUTONOMOUS

I-B.TECH-II-Semester End Examinations Regular - June- 2025

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

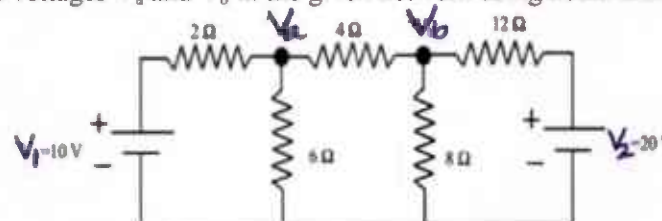
(10 Marks)

1. a) Two resistors 15Ω and 25Ω connected in series to a DC voltage source. What is the total equivalent resistance? [1M]
- b) Which fundamental law relates voltage, current, and resistance in a simple DC circuit? [1M]
- c) An AC voltage source produces a peak voltage of 311V. If this voltage is applied across a purely resistive load. What is RMS voltage measured across the load? [1M]
- d) In a three-phase balanced star-connected system, if the line voltage is 400V. what is the magnitude of the phase voltage? [1M]
- e) In the equivalent circuit of a practical transformer, which component is typically used to represent the core losses? [1M]
- f) An ideal single-phase transformer has a $N_1 = 200$ turns and $N_2 = 50$ turns. If the primary voltage is 400V, what is the secondary voltage? [1M]
- g) Why DC series motor is suitable for starting heavy loads? [1M]
- h) What is the primary function of the commutator in a DC generator? [1M]
- i) What is a rotating magnetic field in the stator of a three-phase AC machine? [1M]
- j) Name the two main parts of a three-phase induction motor. [1M]

PART-B

(50 Marks)

2. Find the node voltages V_a and V_b in the given network using nodal analysis.

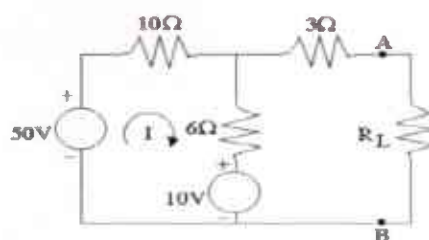


[10M]

OR

3. Obtain the Thevenin's equivalent of the network shown in figure below.

[10M]



4. Define the terms Average value, RMS value, form factor peak factor and derive them for full sine wave ($i = I_m \sin \omega t$). [10M]

OR

5. The coil has resistance of 40ohm and the inductance 2H are connected to the single phase 50Hz and 230V supply. Calculate the impedance, current, total Power and power factor. [10M]
6. 100 kVA, 11000/400 V, single-phase transformer has core losses of 1.2 kW and full-load copper losses of 1.5 kW. Calculate the efficiency of the transformer at: i) Full load, 0.8 lagging power factor. ii) Half load, unity power factor. [10M]

OR

7. Explain the principle of operation of an auto-transformer. Compare and contrast an auto-transformer with a two-winding transformer? [10M]
8. Classify various DC Generators with neat diagrams and necessary equations. [10M]

OR

- 9.a) What is statically and dynamically induced emf? [5M]
- b) List the various losses in a DC machine. [5M]
10. Explain the construction and working principle of three phase induction motor. [10M]

OR

- 11.a) Comparison between salient pole rotor and smooth cylindrical rotor of synchronous generator. [5M]
- b) Explain the main parts of synchronous generator. [5M]
