Code No.: EE104ES | R20 | H.T.No. | | | 8 | R | | | | | |

CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS
I–B.TECH–I–Semester End Examinations (Supply) - December- 2025
BASIC ELECTRICAL ENGINEERING
(Common for CSC, CSD, CSE, IT)

[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)**

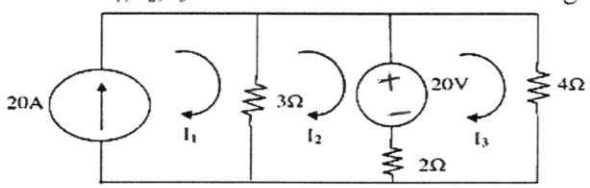
1. a) State ohms Law. [2M]
   b) State Kirchoff's current law. [2M]
   c) Define power factor. [2M]
   d) Show the sinusoidal waveform and label the peak value. [2M]
   e) Determine the efficiency of transformer when output is 450 W and total losses are 50 W. [2M]
   f) Compare ideal and practical transformer. [2M]
   g) Write the torque equation of DC motor. [2M]
   h) Give the function of commutator in DC generator. [2M]
   i) Define slip. [2M]
   j) Name the parts of an alternator. [2M]

PART-B **(50 Marks)**

2. Derive the time domain analysis of RL circuit with DC excitation. [10M]

OR

3. Determine the loop currents I_1, I_2, I_3 in the circuit shown below using KVL. [10M]



4. Derive the expression for RMS value and average value of an alternating voltage wave $v = V_m \sin \omega t$. [10M]

OR

5. An inductive coil consisting of a resistance of 3.1 Ω and an inductance of 0.04 H is connected in parallel with a non inductive resistor of 15 Ω across 240 V, 50 Hz supply. Solve for the i) Current in each branch, ii) Power absorbed by the inductive coil, iii) Total current drawn from the supply and iv) overall Power factor of the circuit. [10M]

6. In a 25 kVA, 2000/200 V, single-phase transformer, the iron and full-load copper losses are 350 and 400 W respectively. Determine the efficiency on [10M]
   (i) half full-load at UPF
   (ii) full load at 0.8 pf lagging.

OR

7. Explain the three phase transformer connections with neat sketch. [10M]

8. Explain about the construction and working of DC machine with neat diagrams. [10M]

OR

9. Discuss the different types of DC generators with suitable diagrams. [10M]

10. Explain the importance of torque – slip characteristics of a 3-phase induction motor with a neat sketch. [10M]

OR

11. Explain the working of an alternator with neat sketch. [10M]

****