Reg. No.														

Question Paper Code	12653

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2024
Second Semester
Mechanical Engineering
(Common to Mechanical and Automation Engineering)
20ESEE201 - ELECTRICAL TECHNOLOGY WITH LABORATORY
Regulations - 2020

Duration: 3 Hours   Max. Marks: 100

PART - A (10 × 2 = 20 Marks)
Answer ALL Questions

		Marks	K-Level	CO
1.	Define the term node and junction.	2	K1	CO1
2.	Define active and passive elements.	2	K1	CO1
3.	A 100 V lamp has a hot resistance of 250 Ω. Find the current taken by the lamp and its power rating in watts. Calculate also the energy it will consume in 24 hours.	2	K2	CO2
4.	List some applications of maximum power transfer theorem.	2	K1	CO2
5.	What is back EMF or counter EMF?	2	K1	CO3
6.	What is self and separately excited DC generator?	2	K1	CO3
7.	List the applications of 3-phase induction motor.	2	K1	CO4
8.	What are the advantages of salient pole type construction used for synchronous machines?	2	K1	CO4
9.	What is the necessity of a starter?	2	K1	CO5
10.	List the different types of braking.	2	K1	CO5

PART - B (5 × 13 = 65 Marks)
Answer ALL Questions

11. a) Make use of source conversion technique, find the load current IL in the circuit shown in Fig.   13   K3   CO1
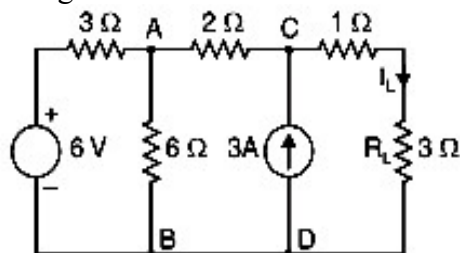
OR

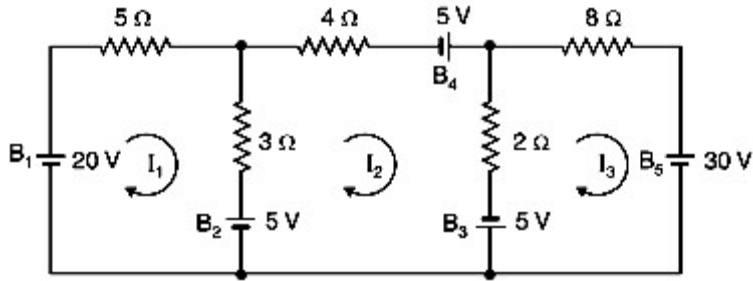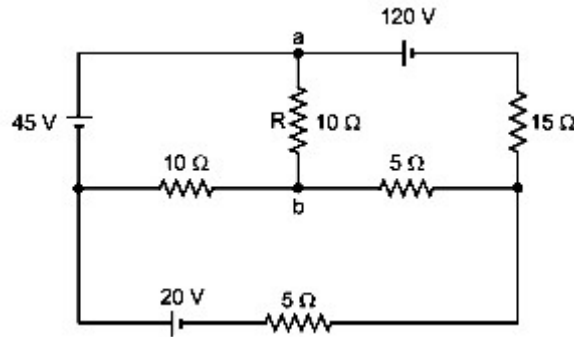   b) Identify to determine the current flow through the individual loops using Mesh Analysis.   13   K3   CO1

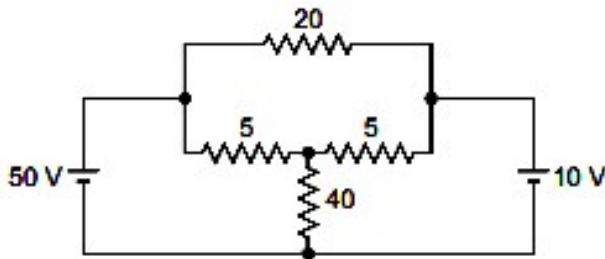*K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create*   **12653**

12. a) Identify to find the current through the resistance R connected between   *13 K3 CO2*
        a and **b** using Thevenin's theorem.

OR

   b) Apply the superposition theorem to find the current in the 40 ohm   *13 K3 CO2*
       resistor. All resistances are in ohms.

13. a) Explain the construction and working of a single-phase transformer.   *13 K2 CO3*

OR

   b) i) Develop the torque equation of DC machine which is used in steel   *7 K3 CO3*
          mills.
      ii) Classify the different types of DC generator in details.   *6 K2 CO3*

14. a) Explain the construction and principle of operation of synchronous   *13 K2 CO4*
        machine with a neat sketch.

OR

   b) Develop the expression for torque, slip and draw speed torque   *13 K3 CO4*
       characteristics in Induction Motor.

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create   **12653**

15. a) A 10 pole DC shunt generator with 800 wave connected conductors and running at 600 rpm supplies a load of 15 Ω resistance at a terminal voltage of 240V. The armature resistance is 0.28 Ω and field resistance is 240 Ω. Determine the armature current, the induced emf and flux per pole. *13 K3 CO5*

<div align="center">**OR**</div>

b) Illustrate about different types of electric drives and its applications to industry. *13 K2 CO5*

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PART - C (1 × 15 = 15 Marks)

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16. a) i) Explain the three-point starter for DC motor. *8 K2 CO6*

   ii) Classify the various starting methods of induction motors. *7 K2 CO6*

<div align="center">**OR**</div>

b) Infer how an induction motor is brought to stop by (i) Plugging and (ii) dynamic braking *15 K2 CO6*