R22 Regulation *Subject code:4O6BA*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

B. Tech VI Semester Regular/Supplementary Examinations, April 2026

FUNDAMENTALS OF ELECTRIC VEHICLES

(EEE)

Maximum Marks: 60 Date:23.04.2026 Duration: 3 hours

Note: **1.This question paper contains two parts A and B.**
2. Part A is compulsory which carries 10 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10X1M=10 Marks)		Marks	CO	Bloom Tx
1.a)	List any two EV subsystems.	1M	1	Remember
b)	What is meant by charging infrastructure?	1M	1	Understand
c)	What is a drive cycle?	1M	2	Understand
d)	Write the expression for tractive force.	1M	2	Remember
e)	Define State of Charge (SoC).	1M	3	Remember
f)	Why are Lithium-ion batteries preferred in EVs?	1M	3	Understand
g)	What is Field Oriented Control (FOC)?	1M	1	Remember
h)	What is d-q equivalent circuit?	1M	2	Remember
i)	Differentiate between slow and fast charging.	1M	3	Understand
j)	What is an on-board charger?	1M	2	Remember

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	Bloom Tx
2	Explain the overview of Electric Vehicles in India and India's EV program initiatives.	10M	1	Understand
	OR			
3	Discuss charging and swapping infrastructure in India with advantages and challenges.	10M	1	Analyze
4	Derive the expression for power and torque required for vehicle acceleration.	10M	2	Apply
	OR			
5	Discuss drive cycles and calculate energy consumption per km for a given drive cycle.	10M	2	Analyze
6	Explain the design of EV drive train with neat diagram.	10M	3	Apply
	OR			
7	Explain mechanical, thermal, and electrical design considerations in EV battery pack development.	10M	3	Apply

8	Discuss three-phase AC systems and DC-AC conversion in EV applications.	10M	2	Analyze
	OR			
9	Discuss thermal design and engineering considerations of EV motors.	10M	3	Analyze
10	Explain different types of EV chargers with suitable diagrams.	10M	1	Understand
	OR			
11	Analyze the economics of public charging stations in India.	10M	3	Evaluate