K. K. Wagh Institute of Engineering Education & Research, Nashik

(An Autonomous Institute From A.Y. 2022-23)

WINTER-2025	
Exam Seat No.:	
Academic Year: 2025-2026	Semester: V
Class: TY	Program: B.Tech
Branch Code: MEC	Pattern: 2023
Name of Course: Introduction to Electric Vehicles	Course Code: 2305391
Max. Marks: 60	Duration:2 Hrs 30 Minutes

Instructions: Candidates should read carefully the instructions printed on the Question Paper and on the cover page of the Answer Book, which is provided for their use.

1. This question paper contains 02 page(s).
2. Answer to each new question is to be started on a new page.
3. Assume suitable data wherever required, but justify it.
4. Draw the neat labelled diagrams, wherever necessary.
5. The last columns indicates the Course Outcome of the Question/sub-question.

		Marks	CO
Question No. 1			
1a)	List various performance parameters of Electric vehicles. Explain in detail factors affecting range of the electric vehicle.	(6)	CO1
Question No. 2			
2a)	Evaluate the role of government policies and incentives in promoting electric vehicle (EV) adoption globally. Provide examples from different regions.	(6)	CO2
Question No. 3			
3a)	Write a note on battery management system used in electric vehicles. Describe how it affects battery life.	(8)	CO3
	OR		
3b)	Compare various batteries used in electric vehicles based on benefits and Drawbacks.	(8)	CO3
3c)	The output voltage and current drawn by motor is 70 Volt and 15 Amp. Consider 5% extra current drawn during acceleration. Assuming Battery discharging efficiency = 85 %, Calculate battery pack capacity for a two-wheeler with range of 160 km and Gross weight of 250 kg running at a speed of 50 Km/hr.	(8)	CO3
	OR		
3d)	A 3000 kg electric two-wheeler vehicle for a speed of 60 Km/hr on a flat road with rolling resistance coefficient of 0.004 and coefficient of drag of 0.88. Assume density of air =1.2 kg/m^3 and frontal area = 3 m^2. Take Motor efficiency =80 % and Battery discharging efficiency= 85 %. Calculate battery pack capacity required to propel the vehicle.	(8)	CO3
Question No. 4			
4a)	How does integrating green energy generation with EV charging improve sustainability? Discuss the challenges and strategies for combining solar, wind, and energy storage with EV infrastructure.	(8)	CO3
	OR		

4b)	Discuss how large-scale electric vehicle charging affects grid infrastructure. What are smart charging solutions, and how does vehicle-to-grid (V2G) technology help mitigate these impacts?	(8)	CO3
4c)	Explain the role of energy storage systems (ESS) in supporting EV charging networks. How does integrating batteries with charging stations improve grid stability and service reliability?	(8)	CO3

OR

4d)	What are the major challenges faced in deploying public EV charging stations? Suggest strategies to overcome these challenges for faster infrastructure growth.	(8)	CO3

Question No. 5

5a)	What role do autonomous electric vehicles (AEVs) play in the future automotive market? Discuss their advantages, challenges, and expected impact on urban mobility.	(8)	CO4

OR

5b)	How can battery recycling and second-life applications support the sustainability of electric vehicle ecosystems? Explain with examples.	(8)	CO4
5c)	Explain how connected electric vehicles (V2X communication) enhance transportation networks in smart cities. Mention benefits and challenges.	(8)	CO4

OR

5d)	Discuss the role of wireless charging technologies for electric vehicles. What are their advantages, limitations, and future prospects in urban transportation systems?	(8)	CO4

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