Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S3 (Minor) Examination November 2025 (2024 Admn)

Course Code: MNMUT309

Course Name: FUNDAMENTALS OF ELECTRIC AND HYBRID VEHICLES

Max. Marks: 60 Duration: 2 hours 30 minutes

PART A

(Answer all questions. Each question carries 3 marks)

		CO	Marks
1	List out different EV/HEV classifications.	1	(3)
2	State the advantages and disadvantages of Mild and Full Hybrid Vehicles.	1	(3)
3	Explain how tractive effort influences the acceleration of Electric vehicles and Hybrid electric vehicles.	2	(3)
4	How does aerodynamic forces influence the vehicle stability?	2	(3)
5	Differentiate electric traction and hybrid traction?	3	(3)
6	Explain the control strategies used in hybrid drive-train topologies.	3	(3)
7	State any three limitations of current autonomous systems	4	(3)
8	State the applications of AI in Autonomous Vehicles.	4	(3)

PART B

(Answer any one full question from each module, each question carries 9 marks)

Module -1

			CO	Marks
9	a)	Compare EVs and HEVs in detail in terms of construction, performance, and efficiency.	1	(6)

	b)	Discuss the history and evolution of electric and hybrid vehicles.	1	(3)
10		Draw the general layout of an electric vehicle and explain its components.	1	(9)

Module -2

11		Compare the Indian, American Urban, and New European Drive Cycles.	2	(9)
12		Explain the effects of rolling, grade, and aerodynamic resistance on vehicle performance.	2	(9)

Module -3

13		Explain the switching techniques used in hybrid electric power trains.	3	(9)
14		With block diagrams, compare series, parallel, and series-parallel hybrid systems.	3	(9)

Module -4

15		Describe the role of AI in autonomous electric vehicles.	4	(9)
16		Explain the SAE levels (0–5) of vehicle autonomy in detail.	4	(9)

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