K. J. Somaiya Institute of Technology, Sion, Mumbai-22
(Autonomous College Affiliated to University of Mumbai)

May 2024-25
(B. Tech / M. Tech.) Program: B.Tech. Scheme II
Regular/Supplementary Examination: LY Semester: VIII
Course Code: AIDLC8032 and Course Name: Intelligent Vehicle Technology
Date of Exam: 23/05/2025 Duration: 02.5 Hours Max. Marks: 60

Instructions:
(1)All questions are compulsory.
(2)Draw neat diagrams wherever applicable.
(3)Assume suitable data, if necessary.

Q. No.	Question	Max. Marks	CO	BT level
Q 1	**Solve any two questions out of three: (05 marks each)**	10		
a)	Explain the basic working principle of a Hybrid Electric Vehicle (HEV)		CO2	U
b)	How do the powertrain configurations of HEVs affect their fuel efficiency and emissions?		CO3	U
c)	What forces are involved in the vehicle's motion, and how do they affect its speed and acceleration?		CO1	U
Q 2	**Solve any two questions out of three: (05 marks each)**	10		
a)	Explain the configuration of a series hybrid electric vehicle and its advantages		CO2	U
b)	Explain the concept of propulsion power in a vehicle and its significance.		CO1	U
c)	What factors influence the tractive effort required during normal driving conditions?		CO3	U
Q.3	**Solve any two questions out of three. (10 marks each).**	20		
a)	What are the different types of Electric Vehicles (EVs) based on their power source?		CO3	U
b)	i. Compare the Look Ahead Method with traditional traffic-based strategies in terms of their ability to predict and optimize energy usage in Electric Vehicles. ii. Which approach offers better efficiency during long trips?		CO6	U
c)	Given an electric vehicle (EV) with a lithium-ion battery (energy density: 150 Wh/kg) that consumes 15 kWh per 100 km and needs a 300 km range, calculate the required battery weight. Discuss how energy density, range,		CO5	Ap

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	and consumption influence battery size and how this calculation helps optimize the vehicle's design for efficiency and performance.			
Q.4	**Solve any two questions out of three. (10 marks each)**	20		
a)	Explain which hybrid drive train configuration is more suitable for achieving higher fuel efficiency during low-speed driving conditions. Justify your choice with reasons and supporting examples.		CO2	U
b)	i. Compare and contrast traditional control systems and optimization-based control with examples from electric vehicle applications. ii. Explain their pros and cons.		CO6	U
c)	Compare the torque-speed characteristics of a DC Motor and an Induction Motor in the context of Electric Vehicle (EV) applications. Discuss the advantages and disadvantages of each motor type based on their performance		CO4	Ap

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