Code No: **R204124I** **R20** **Set No. 1**

IV B.Tech I Semester Regular Examinations, January – 2024

ELECTRIC VEHICLES AND HYBRID TECHNOLOGY

(Automobile Engineering)

Time: 3 hours **Max. Marks: 70**

Answer any FIVE Questions
ONE Question from Each unit
All Questions Carry Equal Marks
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UNIT - I

1 a) Discuss the environmental and economic factors driving the need for hybrid and electric vehicles in the automotive industry. [7]

b) Describe the main components of any one hybrid vehicle layout with neat sketch. [7]

(OR)

2 a) Discuss the key components and working principles of electric vehicles. [7]

b) Compare electric vehicles and IC engine vehicles. [7]

UNIT - II

3 a) Discuss the critical design requirements for electric vehicles, such as range, velocity, acceleration, power etc. [7]

b) Enumerate and explain the different resistances rolling resistance, aerodynamic resistance, gravitational resistance, etc. encountered by electric vehicles. [7]

(OR)

4 a) How does the reduction of resistances and improvement in transmission efficiency contribute to enhancing efficiency and range of electric vehicles? [7]

b) How do advancements in battery technology and charging systems contribute to reducing charging times and improving the convenience of EVs? [7]

UNIT - III

5 a) Explain the key parameters used to evaluate batteries, such as capacity, voltage, current, energy and power. [7]

b) Explain the functionality and benefits of quick charging devices for batteries. [7]

(OR)

6 a) Define the role and importance of a Battery Management System (BMS). [7]

b) How does the arrangement of cells in series and parallel affect the voltage, current and power output of Polymer Exchange Membrane Fuel Cells. [7]

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UNIT - IV

7	a)	Compare and contrast the characteristics of DC motors with brushes and brushless DC motors.	[7]
	b)	Discuss the features and advantages of Permanent Magnet (PM) motors.	[7]
		(OR)	
8	a)	Differentiate open-loop and closed-loop control systems.	[7]
	b)	How Regenerative braking systems works?	[7]

UNIT - V

9	a)	Explain the function and significance of power split devices.	[7]
	b)	Discuss the advantages and limitations of different power split devices.	[7]
		(OR)	
10	a)	Describe Parallel mode hybrid vehicle.	[7]
	b)	What factors are used in tire selection?	[7]