

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER– VII EXAMINATION – SUMMER 2026

Subject Code:3170216

Date:08-06-2026

Subject Name:Electric, Hybrid and Fuel Cell Vehicles

Time:02:30 PM TO 05:00 PM

Total Marks:70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

		MARKS
Q.1	(a) What is the working principle of electric, hybrid and fuel cell vehicles?	03
	(b) Explain electric traction in Electric Drive-trains.	04
	(c) Explain various hybrid drive-train topologies.	07
Q.2	(a) Why energy storage requirements in hybrid and electric vehicles? Explain in brief.	03
	(b) Explain auxiliary power supplies and temperature control units.	04
	(c) Types of different energy storage devices and explain any one in details.	07
	OR	
	(c) Explain matching the electric machine and the internal combustion engine(ICE).	07
Q.3	(a) What is the purpose of electric motors and power electronics used in electric propulsion.	03
	(b) Difference between battery and fuel cell based energy storage.	04
	(c) Explain configuration and control of DC motor drives.	07
	OR	
Q.3	(a) Describe working of ultra capacitor in energy storage system.	03
	(b) Describe the control of switched reluctance motor.	04
	(c) What is the battery parameters and also explain any one battery measurement with neat sketch	07
Q.4	(a) Describe hydrogen storage system.	03
	(b) Comparison of different energy management strategies.	04
	(c) Classification of different types of fuel cell and explain any one with neat sketch.	07
	OR	
Q.4	(a) Explain power steering units.	03
	(b) Explain fuel Efficiency analysis in hybrid electric drive trains.	04
	(c) Explain battery characteristics and give different types of battery chargers, explain any one.	07
Q.5	(a) What is latest vehicle communication technique used in today's vehicle?	03
	(b) Difference between lead-acid battery and nickel-based batteries.	04
	(c) Explain various fuel cell drive-train topologies.	07
	OR	
Q.5	(a) How to work in vehicles networks – CAN.	03
	(b) Explain basic concept of fuel cell vehicles.	04
	(c) Classification of different energy management strategies and explain any one in details.	07