

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VII (NEW) EXAMINATION – WINTER 2023****Subject Code:3170216****Date:19-12-2023****Subject Name: Electric, Hybrid and Fuel Cell Vehicles****Time: 10:30 AM TO 01:00 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) History of electric, hybrid and fuel cell vehicles.	03
	(b) Basic concept of Hybrid traction.	04
	(c) What is the Battery parameters and also explain any one battery measurement with neat sketch.	07
Q.2	(a) Explain Energy Storage Requirements in Hybrid and Electric Vehicles.	03
	(b) Basic concept of Electric traction.	04
	(c) Explain Configuration and control of BLDC Motor drives.	07
OR		
	(c) Explain power flow control in electric drive-train topologies with neat sketch.	07
Q.3	(a) Describe the control of permanent magnet motor.	03
	(b) Explain Sizing the propulsion motor.	04
	(c) Enlist types of batteries and explain Lead-acid battery with neat sketch.	07
OR		
Q.3	(a) Enlist types of fuel cells.	03
	(b) Purpose of electric motors and power electronics used in electric propulsion.	04
	(c) Explain Battery based energy storage and its analysis.	07
Q.4	(a) Explain power steering units.	03
	(b) Comparison of different energy management strategies.	04
	(c) Explain Energy Management Strategies used in hybrid and electric vehicles.	07
OR		
Q.4	(a) Explain Configuration of DC Motor drives	03
	(b) Classification of different energy management strategies.	04
	(c) Explain regenerative braking system with neat sketch.	07
Q.5	(a) Describe the fuel cell characteristics.	03
	(b) Types of battery chargers and explain any one.	04
	(c) Explain phosphoric acid fuel cell and direct methanol fuel cell with neat sketch.	07
OR		
Q.5	(a) Explain Battery characteristics.	03
	(b) Describe Hydrogen storage system.	04
	(c) Explain alkaline fuel cell and proton exchange membrane fuel cell with neat sketch.	07
