

# GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER-VII EXAMINATION – WINTER 2025

Subject Code:3170216

Date:01-12-2025

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.

- Q.1** (a) Enlist types of batteries and explain lithium ion battery with neat sketch. **07**  
(b) What is the basic concept of hybrid traction? **04**  
(c) What are the advantages of electric traction? **03**
- Q.2** (a) Explain series, parallel, strigear and power split hybrid drive train topologies. **07**  
(b) What are the topologies of fuel cell? **04**  
(c) Compare the battery used in EV and Hybrid EV. **03**
- OR**
- (c) Compare the battery used in EV and Fuel cell vehicle. **03**
- Q.3** (a) Explain in short battery characteristics like Voltage, Discharge curve, Capacity, Energy density, Specific energy density, Power density, Temperature dependence while selecting any one of the battery you like. **07**  
(b) Discuss the Merits and demerits of proton exchange membrane fuel cell (PEMFC). **04**  
(c) What are the advantages of series motor? **03**
- OR**
- Q.3** (a) Explain configuration and control of DC motor drives. **07**  
(b) Explain Sizing the propulsion motor. **04**  
(c) List the types of battery chargers and explain any one of them. **03**
- Q.4** (a) Explain Configuration and control of BLDC Motor drives. **07**  
(b) Explain the methodology to use the hydrogen in fuel cell vehicle and hydrogen in IC engine. **04**  
(c) Explain working of high-speed flywheels. **03**
- OR**
- Q.4** (a) Compare the Electric and Hybrid vehicle. **07**  
(b) Give short history of electric vehicle. **04**  
(c) Explain regenerative braking systems. **03**
- Q.5** (a) Explain energy management strategies used in electric hybrid vehicle. **07**  
(b) What is full form of CAN in any type of vehicle? What are its function? **04**  
(c) Describe in short, the compressed hydrogen storage methods for Automobile. **03**
- OR**
- Q.5** (a) Explain battery management strategies used in electric hybrid vehicle. **07**  
(b) Describe the fuel cell vehicle with its performance and safety aspects. **04**  
(c) Describe in short, the metal hydride hydrogen storage methods for Automobile. **03**

\*\*\*\*\*