Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII (NEW) EXAMINATION – WINTER 2022

Subject Code:3170923 Date:16-01-2023

Subject Name:Electrical and Hybrid Vehicle

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)**	Explain the importance of Electric Vehicles.	**03**
	(b)	Give the Different types of EV used in current Automobile market.	**04**
	(c)	Explain the different types of forces acting on vehicle in static & dynamic conditions with necessary calculations.	**07**
Q.2	**(a)**	Explain the role of rotating and stationary axis transformation in vehicle movement calculations.	**03**
	(b)	List the Economic and Environment impact of electric & hybrid vehicles.	**04**
	(c)	Explain the operation of Drive Train mechanism in Hybrid Electric Vehicle.	**07**
		OR	
	(c)	Compare series hybrid and parallel hybrid system with their merits and Demerits.	**07**
Q.3	**(a)**	Explain the different types of drive trains topologies used in EV.	**03**
	(b)	Give the operation and controlling of DC motor drive.	**04**
	(c)	Explain the difference between ultracapacitor and battery as an energy Storage device for EV.	**07**
		OR	
Q.3	**(a)**	Explain the concept of electrical components controlling in EV& Hybrid EV applications.	**03**
	(b)	Explain the steady state modelling of permanent magnet machines.	**04**
	(c)	Draw and Explain typical CAN network for HEVs.	**07**
Q.4	**(a)**	Write a Short Note on use of FC in EV applications.	**03**
	(b)	Explain Operation Configuration and controlling of SRM drives in EV.	**04**
	(c)	Give the Comparison of Lithium Ion and Lead Acid Battery Configurations in EV.	**07**
		OR	
Q.4	**(a)**	Define the term hybridness.	**03**
	(b)	Explain the steps used to find the battery capacity in EV use.	**04**
	(c)	Explain the Super Capacitor and Flywheel based energy storage system for EV and HEV applications.	**07**

Q.5	**(a)**	Give the Differences Between BEV, HEV and FCEV.	**03**
	(b)	List the optimization based strategies in Hybrid Electrical Vehicles.	**04**
	(c)	Explain Electronically controlled regenerative braking system functioning as an ABS.	**07**

OR

Q.5	**(a)**	Explain the Energy Management concept for HEV.	**03**
	(b)	List the Different methods of Energy Management used in EV applications.	**04**
	(c)	Define the terms charge capacity, specific energy, energy density, Specific power, charge efficiency, energy efficiency, C rate for Batteries.	**07**

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