Enrolment No /Seat No.: _____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME - SEMESTER– 1 (OLD) • EXAMINATION – WINTER - 2024

Subject Code:3711110 **Date: 16 Jan 2025**

Subject Name:Alternate Fuels and Energy

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.**

Q.1	**(a)**	What is alternate fuel? Why it is called the urgency of today and for future energy security – Justify your answer in Indian context.	**07**
	(b)	Use of Hydrogen as fuel is more suitable for SI engine than CI engine – Justify the statement with reference to Hydrogen property as a fuel.	**07**
Q.2	**(a)**	With neat sketch explain trans-esterification process for biodiesel production as per ASTM standard. What is the purpose of biodiesel purification?	**07**
	(b)	Discuss NOx control methodology used in CI engine with Biodiesel blend.	**07**
		OR	
	(b)	Explain performance and emissions of Methanol-Gasoline different established blends in SI Engines.	**07**
Q.3	**(a)**	What modifications in SI engine are required to use ethanol as blend from 10% to 100% with gasoline? –justify your answer with reasons.	**07**
	(b)	Discuss performance and emission characteristic of Biodiesel as fuel as a blend with diesel specifying the any two important % blend.	**07**
		OR	
Q.3	**(a)**	Explain modifications required in SI Engine to use CNG as fuel with neat sketch.	**07**
	(b)	What is emulsification of alcohol with diesel? Describe performance and emission Improvement by blending of alcohol with diesel.	**07**
Q.4	**(a)**	Explain layout and major components of solar powered car with neat sketch.	**07**
	(b)	Compare the battery characteristics of Hybrid EV and EV.	**07**
		OR	
Q.4	**(a)**	Differentiate between series Hybrid and parallel Hybrid vehicles and explain With neat sketch.	**07**
	(b)	Compare performance of different High energy and power density batteries.	**07**
Q.5	**(a)**	Explain steam reforming process for the production of hydrogen with its merits and demerits.	**07**
	(b)	Describe in short, the metal hydride hydrogen storage methods for Automobile.	**07**
		OR	
Q.5	**(a)**	Briefly discuss the Hydrogen production from water electrolysis. Also mention its advantages and disadvantages.	**07**
	(b)	Describe challenges in cryogenics hydrogen storage and transport system.	**07**

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