Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code:3170215 Date:08/06/2022

Subject Name:Advance Combustion Technology of I.C. Engine

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 are the types of nozzle are used in gasoline direct injection?	**03**
	(b)	Explain Engine Knocking phenomenon.	**04**
	(c)	Write the Stages of Combustion processes in CI Engine with Proper Diagram.	**07**
Q.2	**(a)**	Write a short note on GDI Engine.	**03**
	(b)	What is charge stratification combustion?	**04**
	(c)	Define term Downsizing. Explain any one method of downsizing.	**07**
		OR	
	(c)	Explain the reasons of knocking in SI Engine. List various methods to reduce knocking.	**07**
Q.3	**(a)**	Define Ignition lag in brief.	**03**
	(b)	Write the advantages of gasoline direct injection in terms of efficiency in a real engine.	**04**
	(c)	Explain turbocharged direct injection (TDI) with schematic diagram.	**07**
		OR	
Q.3	**(a)**	Write short notes on exhaust gas treatment on fuel economy	**03**
	(b)	Explain in brief concept of lean boost combustion system.	**04**
	(c)	What are the problems associated with turbo charging the spark-ignition engine? Explain any two of the problems in detail.	**07**
Q.4	**(a)**	Mention the advantages of direct injection system	**03**
	(b)	Explain factors which increase NOx production in CI engine.	**04**
	(c)	Explain the effect of fuel injection timing on auto ignition combustion.	**07**
		OR	
Q.4	**(a)**	Differentiate turbo charging and super charging.	**03**
	(b)	What is Turbo Lag in Turbocharging?	**04**
	(c)	Enlist the problems associated with stratified charge lean-burn mixture in a DI gasoline engine.	**07**
Q.5	**(a)**	Draw the Schematic diagram of SCR treatment	**03**
	(b)	Explain EGR with the neat sketch	**04**
	(c)	Describe the fundamental principle of HCCI combustion in gasoline engines.	**07**
		OR	
Q.5	**(a)**	Compare emissions with HCCI and CI engine operation	**03**
	(b)	Enlist the limitation of HCCI combustion	**04**
	(c)	Describe how the selective catalytic reduction (SCR) NOx control as an alternative to lean NOx traps (LNT)	**07**

****