Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (NEW) EXAMINATION – SUMMER 2024

Subject Code:2161902 Date:17-05-2024

Subject Name:Internal Combustion Engines

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)**	Define Mechanical Efficiency, Mean Effective Pressure and Stoichiometric air-fuel ratio.	**03**
	(b)	Compare two-stroke engine with four stroke engine.	**04**
	(c)	Explain the Methods of measuring Friction Power and explain any one of them in details.	**07**
Q.2	**(a)**	What is MPFI system?	**03**
	(b)	State functions of lubrication. Also write desirable properties of lubrication oil.	**04**
	(c)	A 4-cylinder 4-stroke petrol engine develops 30 kW at 2500 rpm. The mean effective pressure on each cylinder piston is 8 bar and mechanical efficiency is 80%. The stroke to bore ratio is 1.5. Determine diameter and stroke of each cylinder. Also determine fuel consumption of the engine if brake thermal efficiency is 30%. Take calorific value of fuel as 44 MJ/kg.	**07**
		OR	
	(c)	What is supercharging and Turbo charging? Discuss the effects of supercharging on engine power output and mechanical efficiency.	**07**
Q.3	**(a)**	What is firing order? Explain its importance and significance in case of I.C. Engine.	**03**
	(b)	Explain Octane and Cetane number of fuel.	**04**
	(c)	Explain the phenomenon of knock in case of S.I Engine with neat sketch.	**07**
		OR	
Q.3	**(a)**	Distinguish between physical delay and chemical delay in case of C.I. Engine.	**03**
	(b)	Explain Euro VI norms with the practical significance.	**04**
	(c)	What are major sources of air pollutants? What pollutants are emitted by Automobiles?	**07**
Q.4	**(a)**	What is variable compression ratio engine? List methods to vary the compression ratio.	**03**
	(b)	Define calorific value of fuel. How is it measured?	**04**
	(c)	Explain various stages of combustion in C.I. Engine.	**07**

OR

Q.4	**(a)**	What are the knock limiting parameters in S.I.engine?	**03**
	(b)	Write brief note of nozzles used in C.I. Engine.	**04**
	(c)	Explain Ignition Requirement. Also Give Types of Ignition Systems and explain in detail any one of them.	**07**
Q.5	**(a)**	What do you understand by zero emission vehicle?	**03**
	(b)	Compare wet sump and dry sump lubrication systems.	**04**
	(c)	What do you understand by the heat balance sheet of an I.C.Engine? Represent the generalized heat balance sheet it in the table.	**07**

OR

Q.5	**(a)**	What is Dissociation? What are its effects	**03**
	(b)	What is catalytic convertor? List various types used in the I.C engine.	**04**
	(c)	What are the methods used for governing of I.C. engine? Explain any one with neat sketch.	**07**

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