Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII EXAMINATION – SUMMER 2025

Subject Code:3171923 Date:27-05-2025

Subject Name:Internal Combustion 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)**	Compare S.I. and C.I. engine.	**03**
	(b)	Explain the emission of S.I. and C.I. engine.	**04**
	(c)	Compare properties of alternate fuels with Conventional I.C. engine fuel.	**07**
Q.2	**(a)**	Define Stoichiometric, Rich and Lean mixture.	**03**
	(b)	With neat sketch describe the simple carburetor.	**04**
	(c)	Explain the working of M.P.F.I. system. State its advantages over carburetor.	**07**
		OR	
	(c)	Derive air fuel ratio through approximate analysis of simple carburetor.	**07**
Q.3	**(a)**	How to control knocking tendency in S.I. engine?	**03**
	(b)	Explain knocking in S. I. engine.	**04**
	(c)	Explain stages of combustion in S. I. engine.	**07**
		OR	
Q.3	**(a)**	How to control knocking tendency in C.I. engine?	**03**
	(b)	Explain Knocking in C. I. engine.	**04**
	(c)	Explain stages of combustion in C.I. engine.	**07**
Q.4	**(a)**	Explain supercharger.	**03**
	(b)	Compare air cooling system with water cooling system.	**04**
	(c)	With neat sketch explain working of full pressure lubrication system.	**07**
		OR	
Q.4	**(a)**	Explain turbocharger.	**03**
	(b)	Compare wet sump lubrication with dry sump lubrication system	**04**
	(c)	With neat sketch explain working of pressurized water cooling system.	**07**
Q.5	**(a)**	Explain air box method to calculate the air consumption in I.C. Engine	**03**
	(b)	What are the requirements of a good fuel injection system for C.I. Engine?	**04**
	(c)	In a test of 4 cylinder 4 stroke petrol engine having 80 mm bore and 110 mm stroke. The following results were obtained at full throttle at a constant speed and with a fixed setting of the fuel supply of 0.09 kg/min. B. P. with all cylinder working = 16.5 kW B. P. with cylinder 1 cut off = 11. 35 kW B. P. with cylinder 2 cut off = 10. 95 kW B. P. with cylinder 3 cut off = 11. 45 kW B. P. with cylinder 4 cut off = 11. 65 kW	**07**

Calculate the indicated power, mechanical efficiency, Indicated thermal efficiency and air standard efficiency of the engine. Take calorific value of fuel is 44 MJ/kg. The clearance volume of engine is 120 cc.

OR

Q.5 **(a)** Explain Willan's line method to find friction power of the engine. **03**

(b) Explain C.R.D.I. system. **04**

(c) The following observations were recorded in a test of 1 hour duration on a single cylinder petrol engine working on four stroke cycle. **07**

Bore: 300 mm
Stroke: 450 mm
Fuel used: 8.8 kg
C.V. of fuel: 41800 kJ/Kg
Speed: 200 rpm
M.E.P. : 5.8 bar
Brake friction load: 1860 N
Quantity of cooling water: 650 kg
Temperature rise of cooling water: 22^{o} C
Cp of water:4.18 kJ/KgK
Diameter of the brake drum: 1.22 m
Calculate: (i) Mechanical efficiency (ii) Brake thermal efficiency and (iii) Heat balance on Minute and Percentage basis.

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