Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code:3150210 Date:13/06/2022

Subject Name:Automobile Engines

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 assumptions made for fuel-air cycles?	**03**
	(b)	Give the comparison between wet sump and dry sump lubrication system.	**04**
	(c)	Explain MPFI system for S.I. engine.	**07**
Q.2	**(a)**	Explain the following terms: (i) Rich Mixture (ii) Ignition limit (iii) Stochiometric mixture	**03**
	(b)	What is meant by supercharging? What is its effect on engine performance?	**04**
	(c)	Derive an equation for the variation in air standard efficiency of otto cycle on account of variation in C_v.	**07**
		OR	
	(c)	A single cylinder 4 – stroke cycle oil engine works on diesel cycle. The following readings were recorded during trial on full load: Area of indicator = 3 cm^2, Length of the diagram = 4 cm, Spring constant = 10 bar/cm^2-cm, Speed of the engine = 400 rpm, Load on the brake = 380 N, Spring reading = 50 N, Diameter of the brake drum = 120 cm, Fuel consumption = 2.8 kg/hr, Calorific value of fuel = 42000 kJ/kg, Diameter of the cylinder = 16 cm, Stroke of the piston = 20 cm. Find:- (i) F.P. of the engine, (ii) Mechanical efficiency, (iii) Brake thermal efficiency, (iv) Brake mean effective pressure.	**07**
Q.3	**(a)**	What are the different parameters considered to control the knock?	**03**
	(b)	Describe the Pintle and Pintaux nozzle with neat sketch and discuss their relative merits and demerits.	**04**
	(c)	Draw and explain valve timing diagram of 4-storke petrol engine	**07**
		OR	
Q.3	**(a)**	State the factors on which delay period depends in C.I. engine	**03**
	(b)	Explain the effect of fuel-air ratio on fuel air cycle analyses.	**04**
	(c)	State the different methods used for I. C. Engine cooling and Explain thermo-syphon cooling system.	**07**
Q.4	**(a)**	What are the limitations of simple carburettor?	**03**
	(b)	With a line diagram, explain the working of pneumatic governor.	**04**
	(c)	What is turbocharging? State the types of turbocharging and explain any one with neat sketch.	**07**
		OR	

Q.4 **(a)** What are the different factors that affect the ignition lag S.I. engine combustion? **03**

(b) Explain the function of following parts in simple carburettor: **04**

(i) Chock valve, (ii) Throttle valve, (iii) Float and float chamber, (iv) Nozzle tip

(c) With a line diagram explain the working of common rail fuel injection system used in C. I. Engine. **07**

Q.5 **(a)** Why rich mixture required for starting and during idling of an engine? **03**

(b) Describe the different phases of Spray formation with neat sketch **04**

(c) A 4- cylinder, 4 – stroke petrol engine 6 cm bore and 9 cm stroke was tested at constant speed. The fuel supply was fixed to 0.13 kg/min and plugs of 4-cylinder were successively short-circuited without change of speed. **07**

The power measurement were as follows:
With all cylinder working = 16.25 kW,
With No. of 1^{st} cylinder cut-off=11.55 kW,
With No. of 2^{nd} cylinder cut-off=11.65 kW (B.P.),
With No. of 3^{rd} cylinder cut-off=11.70 kW (B.P.),
With No. of 4^{th} cylinder cut-off=11.50 kW (B.P.).
Find:- (i) I.P. of engine,
(ii) Mechanical efficiency,
(iii) Indicated thermal efficiency, if C.V. of fuel used is 42000kJ/kg,
(iv) Relative efficiency on I.P. basis assuming clearance volume 65 cm^3.

OR

Q.5 **(a)** State the function of lubrication system in I. C. engine **03**

(b) Explain detonation or Knocking in S.I. engine **04**

(c) Explain construction and working of bosch fuel pump **07**

****