Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV (New) EXAMINATION – WINTER 2015

Subject Code:2140203 **Date:28/12/2015**

Subject Name: AUTOMOBILE ENGINES

Time: 2:30pm to 5:00pm **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)**	Explain working of 4-srtoke diesel engine using P-V diagram with neat sketch.	**07**
	(b)	Explain Octane number in details.	**07**
Q.2	**(a)**	Explain the stages of combustion in C.I engines using P-θ diagram. Where θ = crank angle.	**07**
	(b)	Explain Lanova air-cell combustion chamber with neat sketch.	**07**
		OR	
	(b)	Explain the various factors affecting the delay period in S.I engine in details.	**07**
Q.3	**(a)**	Differentiate two-stroke and four stroke engine. Also explain the phenomenon of scavenging.	**07**
	(b)	Explain MPFI system with neat sketch.	**07**
		OR	
Q.3	**(a)**	Classify the cooling system. Also explain thermosyphon system with neat sketch.	**07**
	(b)	Explain the functions of lubrication system. Also differentiate Wet and Dry sump lubrication system.	**07**
Q.4	**(a)**	Classify fuel injection system in C.I engine. Also explain CRDI system in details.	**07**
	(b)	Define carburetion. Explain the working of starting jet with neat sketch.	**07**
		OR	
Q.4	**(a)**	Explain various types of injection nozzles with neat sketch.	**07**
	(b)	Differentiate supercharging and turbo charging.	**07**
Q.5	**(a)**	Enlist various methods used to measure the brake power of I.C engine. Explain the working of Hydraulic dynamometer in details.	**07**
	(b)	A 2-stroke single cylinder petrol engine has bore of 160 mm, stroke of 190 mm and clearance volume of 700 cm^3. The indicated mean effective pressure is 5 bar, engine speed equals to 1000 rpm and indicated thermal efficiency of 32%. If mechanical efficiency is 85% calculate indicated power, BP, FP and relative efficiency.	**07**
		OR	
Q.5	**(a)**	Explain the various methods to improve engine performance in details.	**07**
	(b)	A test is conducted on a two-stroke diesel engine whose bore is 20 cm and stroke 30 cm running at 400 RPM at full load and the following data is recorded: P_{mi}=3.2 bar , Net brake load= 65 kg_f, fuel used = 0.07 kg/min. Jacket cooling water 8.4 kg/min with rise in temperature = 20 ^{0}C. A: F ratio = 30:1. Brake wheel diameter = 1 m Temperature of exhaust gases = 400 ^{0}C and room temperature = 20 ^{0}C, C.V of fuel used = 40 MJ/kg. The fuel contains 85% C and 15 % H_2. Take C_{pg}= 1 KJ/kg ^{0}C and C_{ps} (steam) = 2.1 KJ/kg ^{0}C, h_{fg} (steam) = 2250 KJ/kg. Find I.P., B.P. and draw the heat balance sheet on minute basis.	**07**

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