Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (NEW) - EXAMINATION – SUMMER 2016

Subject Code:2161902 **Date:09/05/2016**

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.**

Q.1	**(a)**	Calculate the percentage change in efficiency of air standard Otto cycle having a compression ratio of 7 for the following cases: (1) The specific heat at constant volume increase by 2% (2) The specific heat at constant pressure increased by 2% Assuming γ to be invariant.	**07**
	(b)	A six cylinder four stroke diesel engine has a power output of 280 kW at 1500 rpm. The fuel consumption is 0.24 kg/kWh. The pressure in the cylinder at the beginning of injection is 40 bar and maximum cylinder pressure is 70 bar. The injection is expected at 200 bar and maximum pressure at the injector is set to be about 600 bar. Determine the orifice area required per injector if the injection takes place over 15^0 crank angles. Take the effective pressure difference to be the average pressure difference over the injection period. Assume the coefficient of discharge for the injector 0.8, specific gravity of fuel 0.86 and the atmospheric pressure 1.013 bar.	**07**
Q.2	**(a)**	Explain with neat sketch valve timing diagram for Diesel engine. Also explain deviation of an actual cycle from an ideal cycle.	**07**
	(b)	Explain pumping loss and rubbing friction loss as applied to I.C. Engines?	**07**
		OR	
	(b)	Explain construction and working of Junker's gas calorimeter with neat sketch.	**07**
Q.3	**(a)**	Discuss the significance of distillation curve.	**07**
	(b)	Explain construction and working of bosch fuel pump.	**07**
		OR	
Q.3	**(a)**	Derive an expression for air-fuel ratio for (1) Neglecting compressibility of air (2) Considering compressibility of air	**07**
	(b)	Describe a high tension magneto ignition system and compare its advantage and disadvantage with coil ignition system.	**07**
Q.4	**(a)**	Enlist various factor by which diesel knock can be controlled.	**07**
	(b)	Explain with neat sketch the pulse turbocharging (Buchi Type).	**07**
		OR	
Q.4	**(a)**	Describe the factors to be considered to reduce the knocking?	**07**
	(b)	Explain with neat sketch splash lubrication system.	**07**
Q.5	**(a)**	Explain with neat sketch the working of a thermostat cooling system.	**07**

(b) Discuss a “Heat balance sheet” in 350 words. **07**

OR

Q.5 **(a)** Tell Bharat Stages of emission norms in brief for cars and two wheelers. **07**

(b) State effect of supercharging on following parameters.

(1) Power output (2) Mechanical efficiency (3) Fuel consumption.

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