Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (NEW) EXAMINATION – WINTER 2017

Subject Code: 2161902 Date:08/11/2017

Subject Name:Internal Combustion Engines

Time:02:30 PM TO 05:00PM 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)**	Define the terms: (i) Mechanical efficiency (ii) indicate and brake thermal efficiency (iii) specific fuel consumption	**03**
	(b)	Explain with the help of neat sketch, the working of a 4-stroke Diesel engine.	**04**
	(c)	What is air fuel cycle? Explain the phenomenon of dissociation.	**07**
Q.2	**(a)**	Compare S.I. engines with C.I engines.	**03**
	(b)	Discuss the application of diesel plants and its advantages.	**04**
	(c)	Draw & explain valve timing diagram of 4-stroke diesel engine.	**07**
		OR	
	(c)	Explain construction and working of Junker's gas calorimeter with neat sketch.	**07**
Q.3	**(a)**	Enumerate the desirable properties of a fuel for I.C. engines.	**03**
	(b)	Explain the working of solex carburetor.	**04**
	(c)	Derive an expression for air-fuel ratio of IC engine for neglecting compressibility of air.	**07**
		OR	
Q.3	**(a)**	Define: HUCR, Octane number and Cetane number.	**03**
	(b)	Describe the working of electronic ignition system, what are the advantages of it?	**04**
	(c)	Enlist the method of governing system in IC engine. Explain with figure any one of it.	**07**
Q.4	**(a)**	What do you mean by solid injection system? Enlist the types of solid injection system.	**03**
	(b)	Explain in brief with neat sketch splash lubrication system.	**04**
	(c)	Explain the need of supercharging and with a neat sketch describe pulse converter turbocharging.	**07**
		OR	
Q.4	**(a)**	Explain briefly the phenomenon of "Diesel knock".	**03**
	(b)	Explain the factors on which delay period depends in C.I.engine.	**04**
	(c)	In a test of a 4-cylinder, 4-stroke engine 75mm bore and 100mm stroke, the following results were obtained at full throttle at a particular constant speed and with fixed setting of fuel supply of 6 kg/hr.	**07**

B.P. with all cylinder working =15.6kW
B.P. with cylinder no. 1 cut-out =11.1kW
B.P. with cylinder no. 2 cut-out =11.03kW
B.P. with cylinder no. 3 cut-out =10.88kW
B.P. with cylinder no. 4 cut-out =10.66kW

If the calorific value of the fuel is 83600kJ/kg and clearance volume is $0.0001m^3$, calculate: (i) Mechanical efficiency (ii) Indicated thermal efficiency (iii) Air standard

efficiency.

Q.5 **(a)** What are the different factors that affect the ignition lag in S.I. engine combustion? **03**

(b) Explain with neat sketch thermo siphon cooling system. **04**

(c) Explain with help of P-Ɵ diagram the combustion in S.I. engine. Discuss how the detonation and pre-ignition affect the combustion in S.I. engine. **07**

OR

Q.5 **(a)** Write brief notes on EURO norms. **03**

(b) Describe with neat sketch the ELCD to control evaporative emission from SI engine. **04**

(c) A simple carburetor under a certain condition delivers 5.45 kg/h of petrol with an air fuel ratio of 15. The fuel jet area is $2mm^2$ with coefficient of discharge of 0.75. If the tip of the fuel jet is 0.635cm above the level of petrol in the float chamber and the venturi throat coefficient of discharge of 0.80. calculate: **07**

(i) The venturi depression in cm of H_2O necessary to cause air and fuel flow at the desired rate.

(ii) The venturi throat diameter.

(iii) The velocity of air across the venturi throat.

You make take density of air = 1.29 kg/m^3 and specific gravity of petrol =0.72

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