Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

B. E. - SEMESTER – VI • EXAMINATION – WINTER 2012

Subject code: 161902 **Date: 03/01/2013**

Subject Name: Internal Combustion Engines

Time: 02.30 pm - 05.00 pm **Total Marks: 70**

Instructions:

1. **Attempt any five questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 **(a)** Discuss the difference between theoretical and actual valve timing diagrams of four stroke petrol engine. **05**

(b) Explain "air standard analysis" which has been adopted for IC engine cycles. State assumptions made for air standard cycles. **05**

(c) Enlist the assumptions which are made for fuel-air cycle analysis. **04**

Q.2 **(a)** What is the function of carburetor in an SI engine? Briefly explain with a neat sketch the operation of simple float type carburetor. **07**

(b) Describe with suitable sketches the following systems of carburetor. **07**

(i) Main metering system
(ii) Ideling system
(iii) Acceleration pump system

OR

(b) Discuss the suitability of the following fuels in diesel engines. **07**

(i) Alcohols
(ii) Vegetable oils
(iii) Biogas

Q.3 **(a)** Describe with the help of suitable sketches: **07**

(i) Jerk pump system
(ii) Common rail system
(iii) Distributor system

(b) Describe different types of injection nozzles and discuss their relative advantages and disadvantages. **07**

OR

Q.3 **(a)** Describe a high tension magneto ignition system and compare its advantages and disadvantages with a coil ignition system. **07**

(b) Explain with suitable sketches the following scavenging systems. **07**

(i) Uniflow scavenging
(ii) Cross-flow scavenging
(iii) Loop scavenging

Q.4 **(a)** Describe with sketches the different methods of supercharging. **07**

(b) 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-cylinders were successively short-circuited without change of speed. The power measurements were as follows: **07**

With all cylinder working=16.25 kw
With No.1st –cylinder cut-off=11.55 kw

With No.2nd –cylinder cut-off =11.65 kw (BP)
With No.3rd –cylinder cut-off =11.70 kw (BP)
With No.4th –cylinder cut-off =11.50 kw (BP)
Find (a) The IP of engine (b) Mechanical efficiency (c) Indicated thermal efficiency if CV of fuel used is 42000 kj/kg and (d) Find the relative efficiency on IP bases assuming clearance vol. =60 cm^3

OR

Q.4	**(a)**	What are the basic types of Diesel smoke? What are the ways of controlling Diesel smoke?	**07**
	(b)	Explain the Methods of obtaining friction power and explain any one of them in detail.	**07**
Q.5	**(a)**	What is ignition lag? Discuss the effect of engine variables on ignition lag in case of SI engines.	**07**
	(b)	What are the basic requirements of a good SI engine combustion chamber?	**07**

OR

Q.5	**(a)**	Explain the phenomenon of diesel knock. Compare it with the phenomenon of detonation in SI engine.	**07**
	(b)	What is meant by combustion induced swirl? Show with sketches two important designs of CI combustion chamber using this method of swirl.	**07**

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