

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) Idling 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 cm³

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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