

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VI • EXAMINATION – SUMMER 2013

Subject Code: 161902

Date: 27-05-2013

Subject Name: Internal Combustion Engines

Time: 10.30 am - 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.
4. Usual notations are used

- Q.1 (a)** What do you mean by I.C. Engine? How are they classified? **07**
(b) Define Bore, stroke, compression Ratio, clearance ratio and mean effective pressure. **07**
Explain Valve timing diagram for 4-stroke diesel engine.

- Q.2 (a)** Derive expressions for the efficiency and mean effective pressure of an Otto cycle. **07**
Comment on the effect of compression ratio on the efficiency.
(b) In a SI engine working on the ideal Otto cycle, the compression ratio is 5.5. The **07**
pressure and temperature at the beginning of compression are 1 bar and 27° C
respectively. The peak pressure is 30 bar.
Determine the pressure and temperatures at the salient points, the air-standard
efficiency and the mean effective pressure. Assume ratio of specific heats to be 1.4 for
air.

OR

- (b)** What is the basic difference between an Otto cycle and Diesel cycle? Derive an **07**
expression for the efficiency and mean effective pressure of the Diesel cycle.
Q.3 (a) Define pre-ignition with respect to SI engines and delay period with respect to a CI **07**
engines
(b) What is meant by abnormal combustion? Explain the phenomena of knock in SI **07**
engine.

OR

- Q.3 (a)** How LPG can be used as an alternate fuel in a SI engine? Briefly explain the **07**
important details about the conversion kit, which is used to convert an existing petrol
car in to a gas car running in LPG
(b) What are the advantages of using alcohols as fuels in SI engines? **07**

- Q.4 (a)** What are the factors affecting carburetion? **07**
(b) Differentiate between multipoint injection and direct injection. **07**

OR

- Q.4 (a)** What is Scavenging system? Gives its importance and enlist the types of it. **07**
Q.4 (b) Explain the types of nozzles used in CI engines. **07**

- Q.5 (a)** Write down Bharat Stages of emission norms in brief for cars and two wheelers. **07**
(b) What are the international accepted methods for measuring the NO_x, CO and HC? **07**

OR

- Q.5 (a)** What is supercharger? Explain turbo-supercharger. **07**
(b) Explain the working principles of Stirling and Wankle engines in detail. **07**
