

**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. Explain Valve timing diagram for 4-stroke diesel engine. **07**
- Q.2 (a)** Derive expressions for the efficiency and mean effective pressure of an Otto cycle. Comment on the effect of compression ratio on the efficiency. **07**
- (b)** In a SI engine working on the ideal Otto cycle, the compression ratio is 5.5. The 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. **07**
- OR**
- (b)** What is the basic difference between an Otto cycle and Diesel cycle? Derive an expression for the efficiency and mean effective pressure of the Diesel cycle. **07**
- Q.3 (a)** Define pre-ignition with respect to SI engines and delay period with respect to a CI engines **07**
- (b)** What is meant by abnormal combustion? Explain the phenomena of knock in SI engine. **07**
- OR**
- Q.3 (a)** How LPG can be used as an alternate fuel in a SI engine? Briefly explain the important details about the conversion kit, which is used to convert an existing petrol car in to a gas car running in LPG **07**
- (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<sub>x</sub>, 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**

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