

GUJARAT TECHNOLOGICAL UNIVERSITY**PDDC - SEMESTER-V • EXAMINATION – SUMMER 2013****Subject Code: X 51904****Date: 20-05-2013****Subject Name: Internal Combustion Engines****Time: 02.30 pm - 05.00 pm****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) i) Discuss the various applications of I C Engine. **04**
ii) Draw and explain port timing diagram of two stroke S I Engine. **03**
- (b) What is the importance of scavenging? Draw and explain different scavenging method of two stroke I C Engine. **07**
- Q.2** (a) Explain the objective of supercharging. Compare natural aspired, supercharge and Turbo charge Engine. **07**
- (b) Draw and write salient features of i) Zenith carburetor ii) MPFI system for modern automobile engine. **07**
- OR**
- (b) Derive the relation for air fuel ratio for Simple Carburettor assuming air is incompressible. **07**
- Q.3** (a) What are the different types of nozzles and its spray patterns for C I engine? **07**
- (b) Draw and explain the working of magneto ignition system. **07**
- OR**
- Q.3** (a) What is the need of governing system in an I C Engine? **07**
Compare different types of governing system.
- (b) Explain working of (with figure) Variable Compression Ratio engine. **07**
- Q.4** (a) Explain different methods of measuring pollutant from engine. **07**
- (b) Compare different properties of CNG, LPG, Biodiesel and Hydrogen used for I C Engine. **07**
- OR**
- Q.4** (a) Draw the Otto and diesel cycle on P-V diagram and show the modification if specific heat changes with respect to the temperature. **07**
- (b) Differentiate between Air cycle and fuel air cycle. **07**
Explain the phenomena of dissociation.
- Q.5** (a) Explain with neat sketch Combustion stages in C I engine. Discuss the different factors effecting delay period. **07**
- (b) A six cylinder, four stroke S I Engine delivers 400 kW at 2200 rpm. Determine the bore, stroke and BSFC from the following data: **07**

Compression ratio = 7.6
Stroke / Bore ratio = 1.25
IMEP = 100 N / cm²
Mechanical efficiency = 75%
C.V. of fuel = 44000 kJ/kg
Break thermal efficiency = 28%

OR

Q.5 (a) Explain with neat sketch Detonation in S I Engine. Also mention the factors affecting the detonation. **07**

(b) The following data is given for a single cylinder 4-stroke oil engine: **07**

Cylinder diameter = 18 cm, stroke = 36 cm, Speed of engine = 286 RPM, Brake Torque = 375 Nm, IMEP = 7 bar, Fuel consumption = 3.88 liters/hr, Specific gravity of fuel = 0.8, CV of Fuel used = 44500 kJ/kg, A:F ratio= 25:1., Ambient air temperature = 21°C, C_p (gases) = 1.2 kJ/kg °C, Exhaust gas temperature = 415°C, Cooling water circulated = 4.2 kg/min, Rise in temperature of cooling water = 28.5°C.

Find brake and indicated thermal efficiency and draw heat balance sheet on percentage basis.
