

## 2.16 30269 INTERNAL COMBUSTION ENGINE

### UNIT-1 GAS POWER CYCLES:

- 1.1 Otto cycle, Diesel cycle, Dual combustion cycle, Atkinson Brayton cycle
- 1.2 Air standard efficiency
- 1.3 Effect of compression ratio on efficiency
- 1.4 Numerical Problems

### UNIT-2 PRINCIPLES OF INTERNAL COMBUSTION ENGINES:

- 2.1 Introduction and Classification of I.C Engines
- 2.2 Working principle of four stroke and two stroke cycle and their comparison
- 2.3 Working and special features of petrol and diesel engines and their comparison and applications
- 2.4 I.C. engine terms - Bore, stroke, dead centres, crank throw, compression ratio, clearance volume, piston displacement and piston speed, B.S.I. specification for I.C. engine parts
- 2.5 Valve timing diagrams, firing order and super charging of I.C. engines

### UNIT-3 PETROL ENGINES:

- 3.1 Concept of Carburation, Air fuel ratio
- 3.2 Simple carburetors and its limitations
- 3.3 Description of Solex and S.U. types carburetors
- 3.4 Multi point fuel injection system
- 3.5 Mechanical and electrical feed pump
- 3.6 Description of coil ignition system and Magneto ignition system
- 3.7 Elementary idea of combustion phenomenon, detonation, pre- ignition and octane number

### UNIT-4 Diesel Engines:

- 4.1 Description and working of Fuel feed pump
- 4.2 Injection of fuel, air and airless injection and fuel injectors
- 4.3 Elementary idea of combustion phenomenon, diesel knock, delay period and Cetane number.
- 4.4 Introduction to swirl and open combustion chambers
- 4.5 Introduction to Wankel engine

### UNIT-5 COOLING, LUBRICATION AND GOVERNING:

- 5.1 Necessity of engine cooling
- 5.2 Properties of coolants
- 5.3 Methods of cooling and their merits and demerits
- 5.4 Function of Lubrication, lubrication systems of I.C. Engines
- 5.5 Governing methods of I.C. Engines.

### 6. I.C. ENGINES PERFORMANCE:

- 6.1 Introduction to basic performance parameters
- 6.2 Measurement of brake power by rope brake, prony brake and hydraulic dynamometer

- 6.3 Measurement of Indicated power by engine indicator and Morse test method.
- 6.4 Energy balance sheet of I.C. engines
- 6.5 Numerical problems

#### **UNIT-7 GAS TURBINES:**

- 7.1 Classification and application of gas turbines
- 7.2 Description of constant pressure (open cycle and closed cycle) and constant volume gas turbines.
- 7.3 Methods of increasing thermal efficiency of gas turbines, regeneration, inter cooling, reheating.
- 7.4 Simple numerical problems

#### **Reference books:**

1. Internal Combustion Engine Mathur & Sharma
2. Thermal Engineering (In Hindi) Verma & Gulecha
3. Thermal Engineering Vol 1 Mathur & Metha.
4. Thermal Engineering R.S. Khurmi
5. Thermal Engineering R.K. Purohit

