

INTERNAL COMBUSTION ENGINES LAB

Description of the Laboratory:

An Internal Combustion Engine converts chemical energy into mechanical work to run different systems of vehicle. The aim of this laboratory work is to teach students, the basic laws of Thermodynamics, heat transfer between various systems and conversion of heat from one form to another form. Students can enhance their knowledge by applying theoretical principles to practical skills. A range of different engines and fuels make students eager to brush their knowledge. After learning, students can understand difference between working of SI and CI engines, evaluate parameters of emissions and understand performance parameters of different engines.

List of Experiments:

1. (a) Valve Timing Diagram using a model of 4-S Diesel, CI engine.
(b) Port timing diagram of a model of 2-S, SI engine.
2. Morse Test on 4-S, 4-C, Petrol Engine using Hydraulic Loading.
3. Retardation Test on 4-S, 1-C, Diesel Engine using Electrical Loading.
4. Performance Test on 2-S, 1-C, Petrol Engine using Electrical Loading.
5. Economic speed test on 2-S, 1-C, Petrol Engine using Electrical Loading.
6. Performance Test on 4-S, 1-C diesel Engine using Mechanical Loading.
7. Heat Balance Test on 4-S, 1-C diesel Engine using Mechanical Loading.
8. Performance Test Variable Compression Ratio Engine (VCR Engine).
9. Motoring Test on Variable Compression Ratio Engine (VCR Engine).
10. Performance Test on 2-Stage Reciprocating Air Compressor Unit.
11. Dismantling / Assembly of Engines to identify the parts and their position in an engine.
12. Experiments on Fuels:
 - a. Bomb calorimeter for Calorific Value of Solid and Liquid fuel.
 - b. Junker's Gas Calorimeter for Calorific Value of gaseous fuel.
 - c. Viscosity measurement using saybolt and redwood viscometer.
13. Flue gas analysis for engine emissions using Exhaust Gas Analyser and Smoke Meter.
14. Performance Test on Computerized 4-S, 1-C, C.I. engine with Eddy Current loading.
15. Demonstration of Vapour Compression Refrigeration System.

List of Equipment:

- Single Cylinder, 4-stroke diesel Engine with heat balance facility
- Single Cylinder, 2- Stroke petrol Engine
- Multi Cylinder, 4-stroke Petrol engine with Morse test facility
- 4-Stroke Diesel Engine with retardation and motoring facility
- Variable Compression Ratio (VCR) petrol engine test rig
- Reciprocating air compressor unit
- Bomb Calorimeter to determination of calorific values of solid and liquid fuels.
- Orsat's apparatus for flue gas analysis and other latest electronic instruments.
- Dead weight pressure gauge tester to calibrate the pressure gauge.
- Vapour compression refrigeration unit
- Abel's Pensky flash point apparatus
- Cleaveland's open cup flash and fire point apparatus

Photographs of the Lab/Equipment:







