

Monad University, Hapur

Program: - B .Tech & Diploma (Auto)

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Topic: - Engine

**Sub Topic: - Engine and Working Principle of Four stroke S.I.
Engine**

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Engine & Working Principle of four stroke S.I. Engine

Heat engine is a machine element which is converts heat source into mechanical work. The burn of fuel such as petrol and diesel create heat. This heat energy is supplied to a working part at a high temperature by the expansion process. This heat energy is converted into a suitable work.

Classification of heat engine

- (i) External combustion engine
- (ii) Internal combustion engine

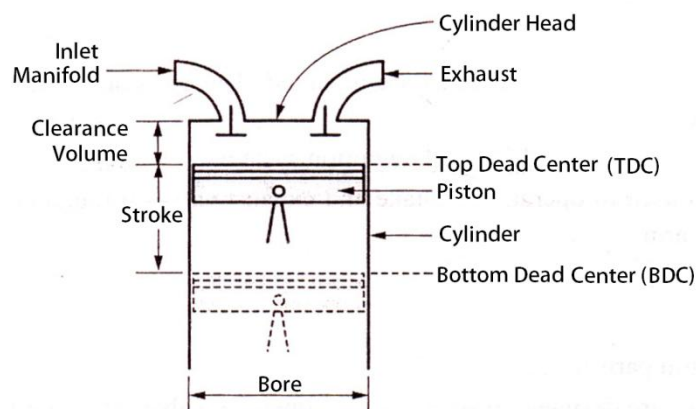
In a heat engine the combustion of fuel outside the engine cylinder and the steam thus formed is used to run the heat engine known as external combustion engine .The internal combustion engine of fuel burn inside the engine cylinder known as internal combustion engine.

Constructional feature of I.C.Engine:-

Cylinder: - The cylinder of an heat engine constitute the basic and simple which support of the engine unit .Its major working is to provide space in which the piston can move to draw in fuel mixture . Cylinders are made a cast iron steel. In some cases to give greater and wear resistance with less weight chromium nickel and molybdenum are add to the cast iron.

Cylinder head: - The working of cylinder head is to seal the top end of the cylinder portion.

Piston: - The working principle of piston is to be transmitting the gas power to connecting rod, hence to the work. Piston slides in the cylinder. Pistons are made of cast steel and aluminum



because it requires high strength.

Connecting Rod: - One end of connecting rod is connected to piston through a piston pin and the other end to crank through the crank pin call large end.

Engine bearing: - Engine bearing is a supporting member. Working of bearing is to facilitate smooth motion to crankshaft and reduce friction between them.

Crankcase: - Crankcase just like an engine chamber. The bottom of the engine is close by means of oil sump which carries lubricating oil.

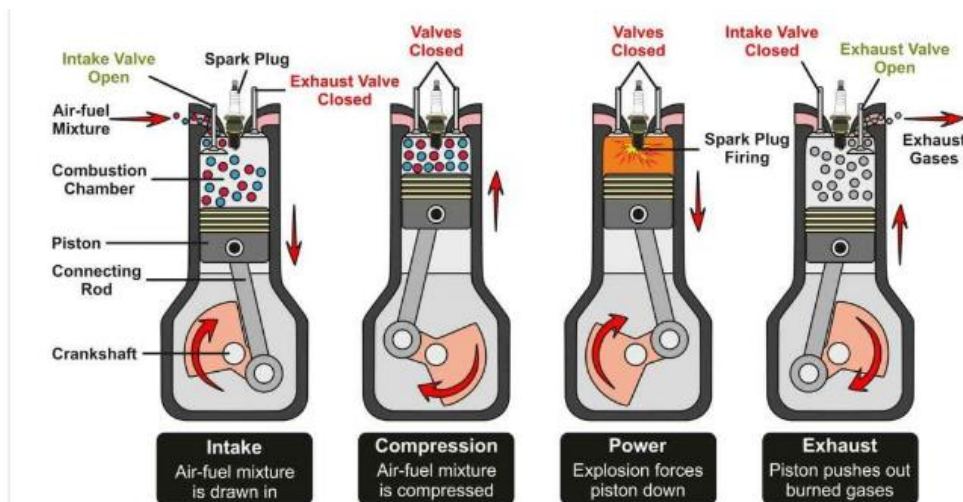
Flywheel: -Fly wheel is rotating element which attached to crankshaft outside the crankcase called flywheel. Its working is to provide smooth cyclic functions of torque developed by the reciprocating engine during a cycle.

Spark plug:-The main working of a spark plug is to provide a high intensity spark for combustion of fuel.

Working of four strokes S.I. Engine:-

Suction stroke:- In this time this stroke the inlet valve remains opened and the exhaust valve remains closed and mixture of fuel and air called charge is drawn during the piston movement from top dead centre(T.D.C) to bottom dead centre (B.D.C) .

Compression Stroke:- During this stroke inlet and exhaust valves both remain closed. Piston moves from B.D.C. to T.D.C. and the charge is compressed up to its clearance volume. During the process the pressure and temperature of the mixture rise. Just before the end of compression stroke, the mixture is ignite with the help of spark plug and due to release of chemical of fuel, the pressure and temperature of the mixture further rises.



Expansion stroke: - This stroke time inlet and exhaust valve remain closed and the piston moves from T.D.C. to B.D.C. high pressure and temperature gases push down the piston to create the motive power.

Exhaust stroke: In this time stroke the inlet valve remains closed and the exhaust valve is open. The piston moves from B.D.C. to T.D.C. and during this motion the piston pushes out the burnt

gases from the cylinder. The exhaust valve closed at the end of the stroke and a part of burnt gases called residual gases remain in the clearance space. Again the inlet opens and a new cycle starts.

Advantage of four strokes S.I. Engine:-

1. High volumetric efficiency over a wide engine speed.
2. Low pressure losses in the exhaust system.
3. Effective control of the charging efficiency through appropriate valve timing and intake system design.

Disadvantage of four strokes S.I. Engine:-

1. High complexity of the valve mechanism control.
2. Reduce power because the work is creating only every second shaft rotation.