

# JOB ROLE – AUTOMOTIVE SERVICE TECHNICIAN

Sector: Automotive  
(Qualification Pack Code : ASC/Q1401)



PSS Central Institute of Vocational Education  
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# **Unit – 3: Major Systems & Components of an Automobile**

## **Session 2: Engine and its Components**

# Content

Title	Slide No.
Session Objective	4
Introduction of Engine	5-9
Different components of internal combustion engine	10-28
Summary	29
Assignment	30

# Session Objectives

1. The student will be Able to explain engine and label its parts.

# Introduction of Engine

Engine is the heart of an automobile. Its role is very important. It converts the chemical energy to mechanical energy. This energy is utilized for vehicular movement.



# Types of Engine

```
graph TD; A[Types of Engine] --> B[Internal combustion engine]; A --> C[External combustion Engine];
```

Internal  
combustion engine

External combustion  
Engine

# Internal Combustion Engine

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graph TD; A[Internal Combustion Engine] --> B[Spark ignition engine]; A --> C[Compression ignition Engine]
```

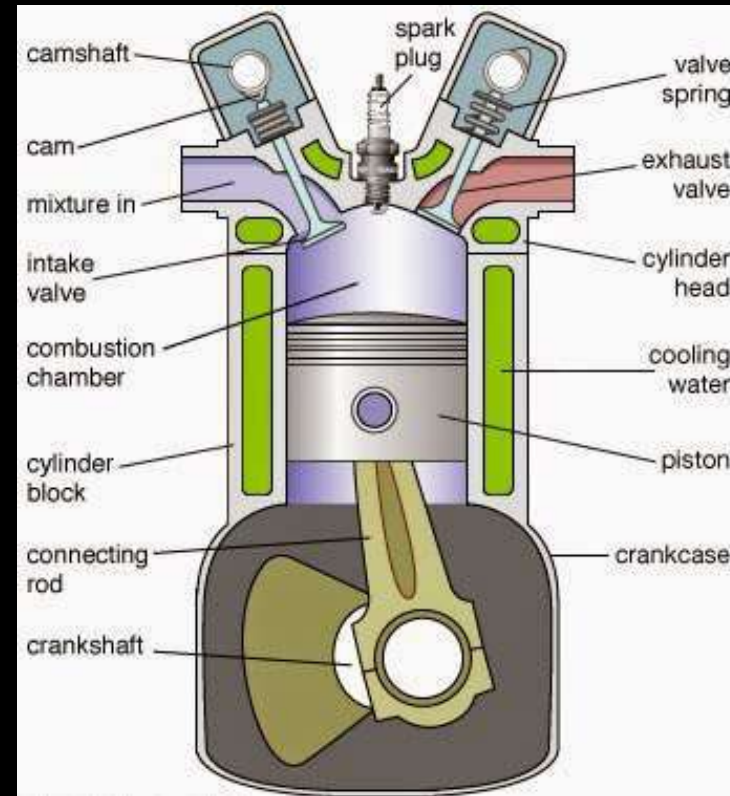
Spark ignition  
engine

Compression ignition  
Engine

# Spark-ignition engine

The spark-ignition (SI) engine uses a highly volatile fuel which turns to vapor easily, such as gasoline or gasohol.

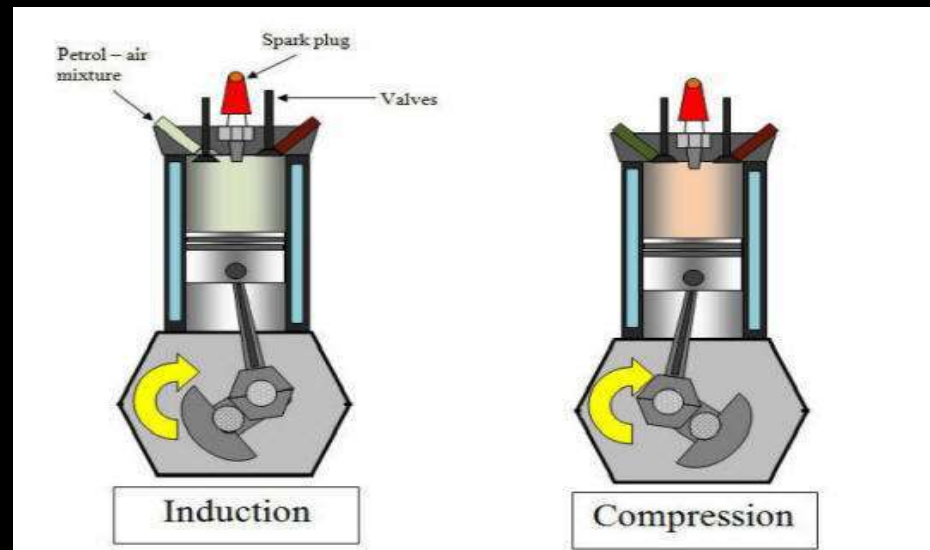
The fuel is mixed with air before it enters the engine cylinders.





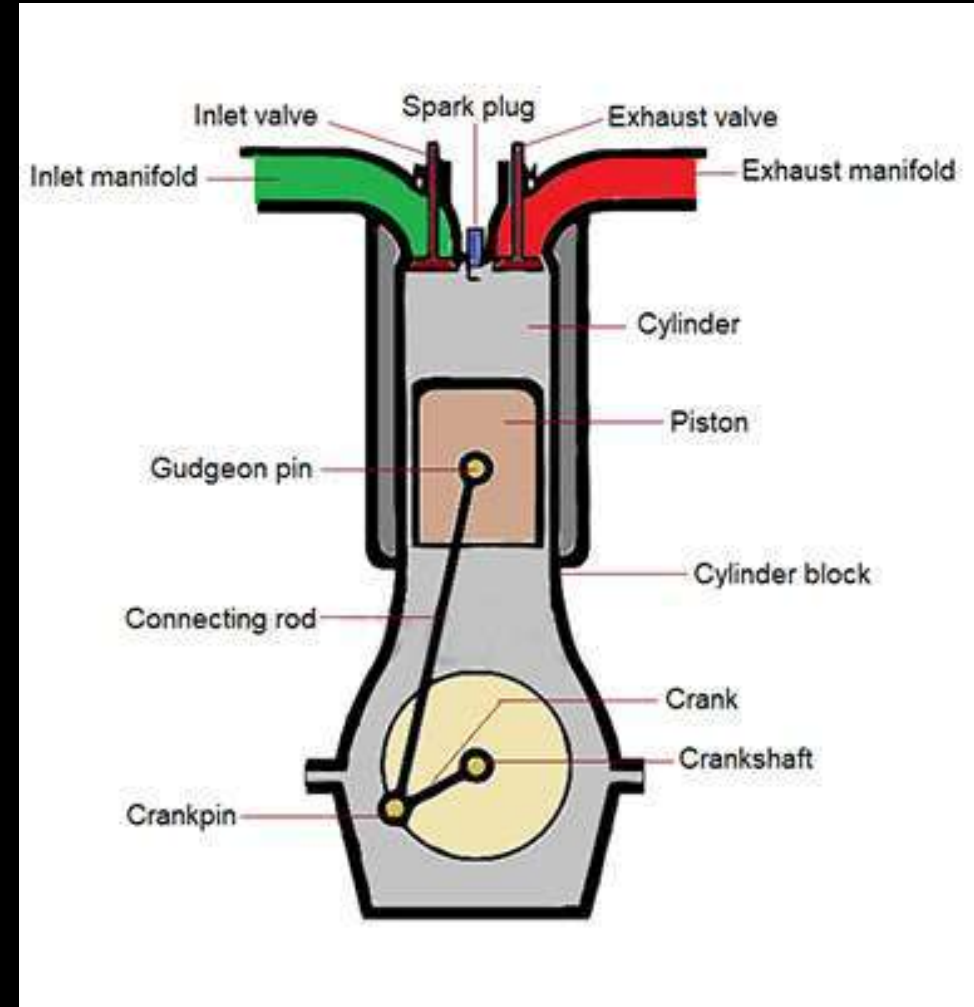
# The compression-ignition (diesel engine)

In the compression-ignition engine or diesel engine, only fresh air enters the cylinder, which is then compressed to a very high temperature and pressure. The air is compressed so much that its temperature goes up to  $5380\text{C}$  ( $10000\text{F}$ ) or higher.



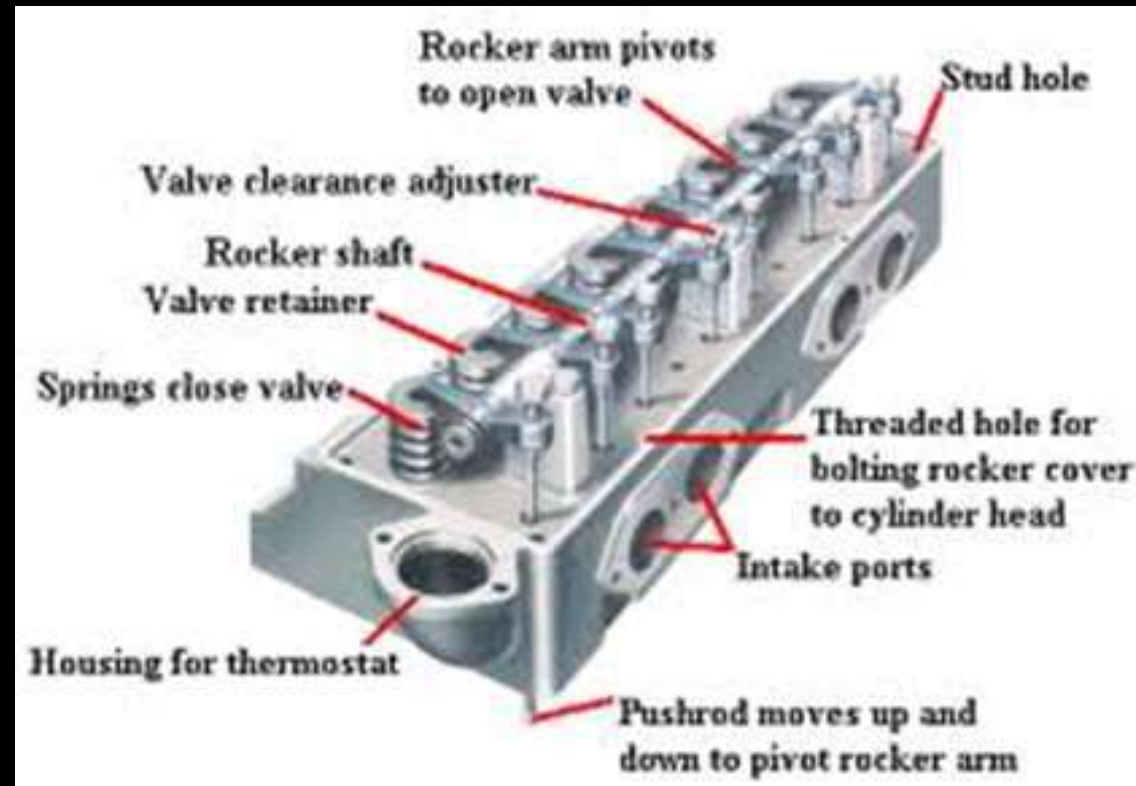
# Components of IC engine

1. Cylinder: The cylinder of an IC engine is considered as the main body of the engine in which piston reciprocates to develop power. It has to withstand very high pressures (about 70 bar or  $70 \times 10^5$  Pa) and temperatures (about  $2200^\circ\text{C}$ ) because there is direct combustion inside the cylinder.



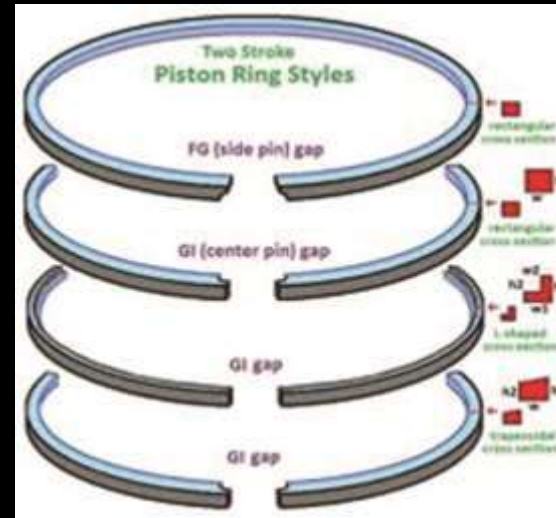
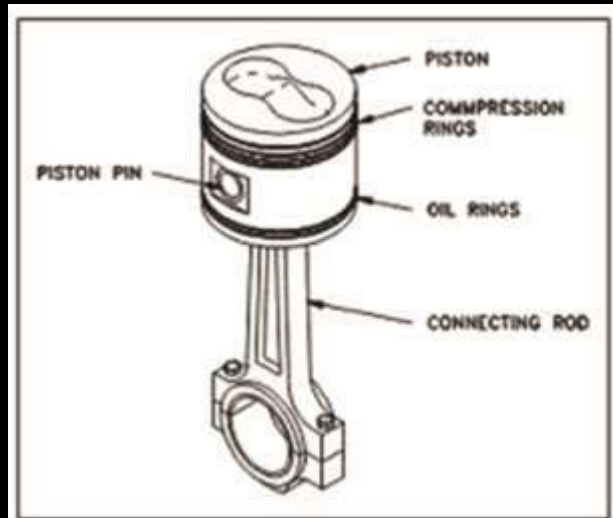
# Components of IC engine

2. **Cylinderhead:** The cylinder head closes one end of the cylinder. It houses the inlet and exhaust valves.



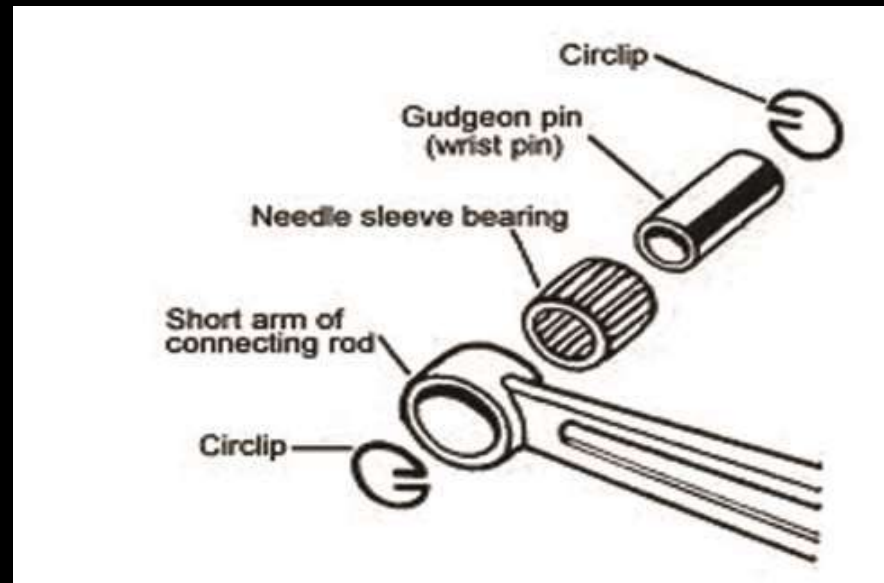
# Components of IC Engine

3. **Piston and Piston Rings**:- Piston is the heart of the engine. The functions of the piston are to compress the charge during compression stroke and to transmit the gas force to the connecting rod and then to the crank during power stroke.



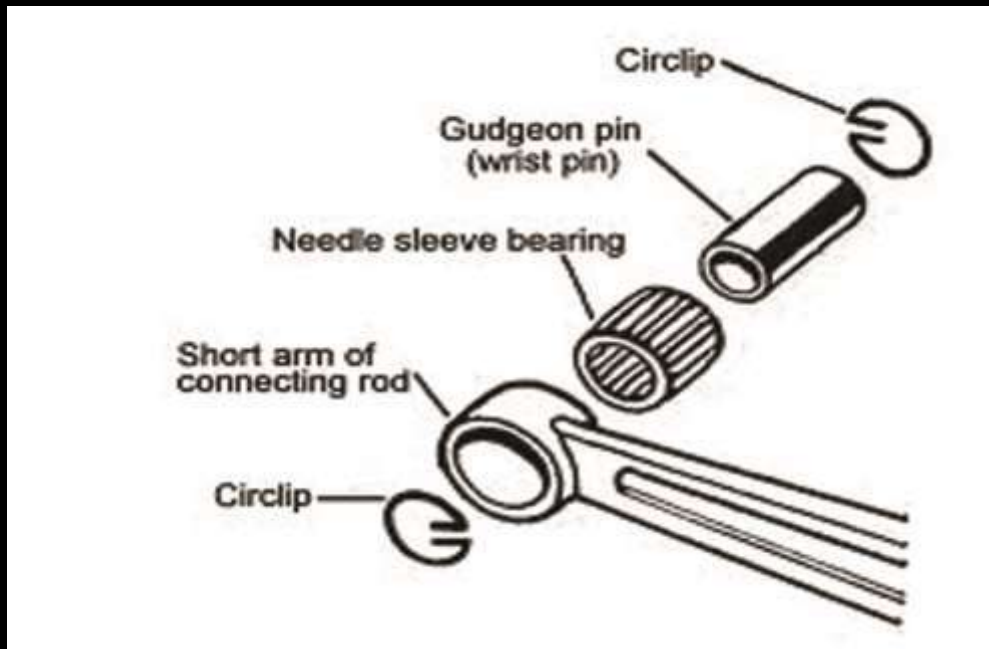
# Components of IC Engine

4. **Connecting Rod** : It is usually a steel forging of circular, rectangular, I-, T-, or H-section and is highly polished for increased strength. Its small end forms a hinge and pin joint with the piston and its big end is connected to the crank by crank pin.



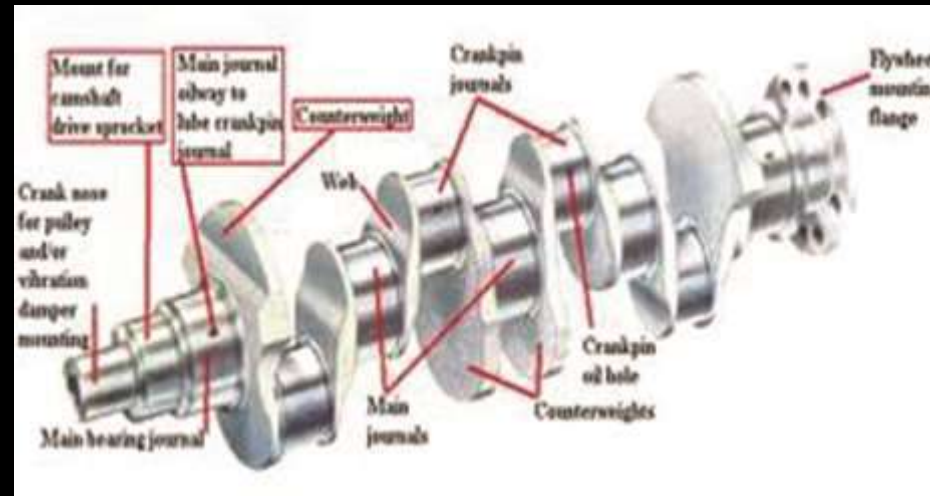
# Components of IC Engine

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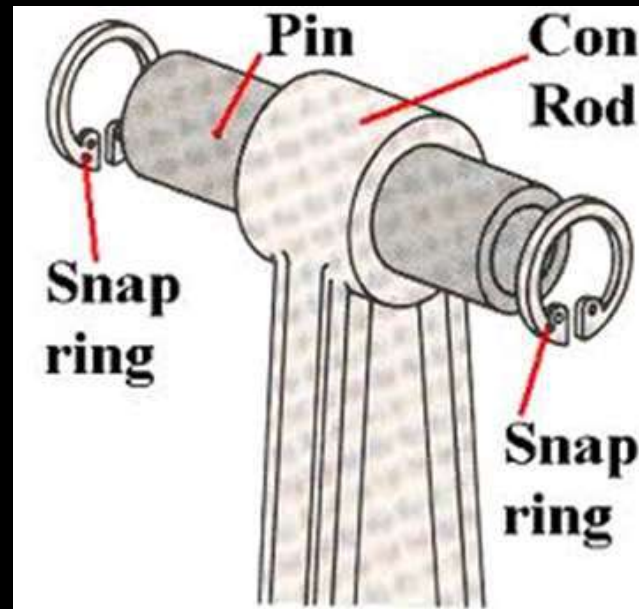
# Components of IC Engine

5. **Crank and Crankshaft:** Both crank and crankshaft are steel forged and machined to a smooth finish. The two are held together by means of a key. Crankshaft is supported in main bearings and has a heavy wheel, called flywheel, to even out the fluctuations of torque.



# Components of IC Engine

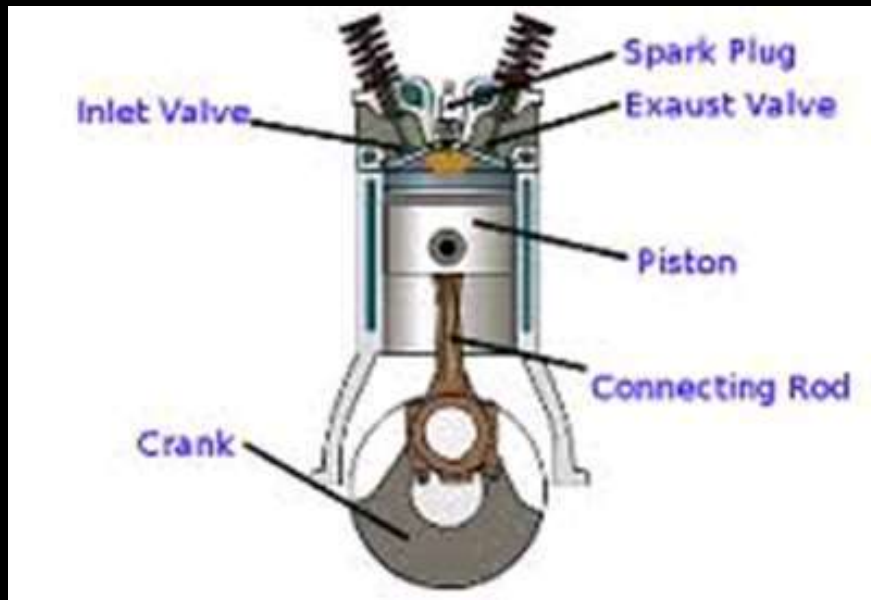
6. **Piston Pin or Wrist Pin:** The piston pin provides the bearing for the oscillating small end of the connecting rod.





# Components of IC Engine

7. **Inlet Valve:** This valve controls the admission of the charge into the petrol engine or air into diesel engine during suction stroke of the engine.



# Components of IC Engine

8. **Exhaust Valve.** The removal of exhaust gases after doing work on the piston, is controlled by this valve.
9. **Valve Spring.** The valves are kept closed by the valve springs.



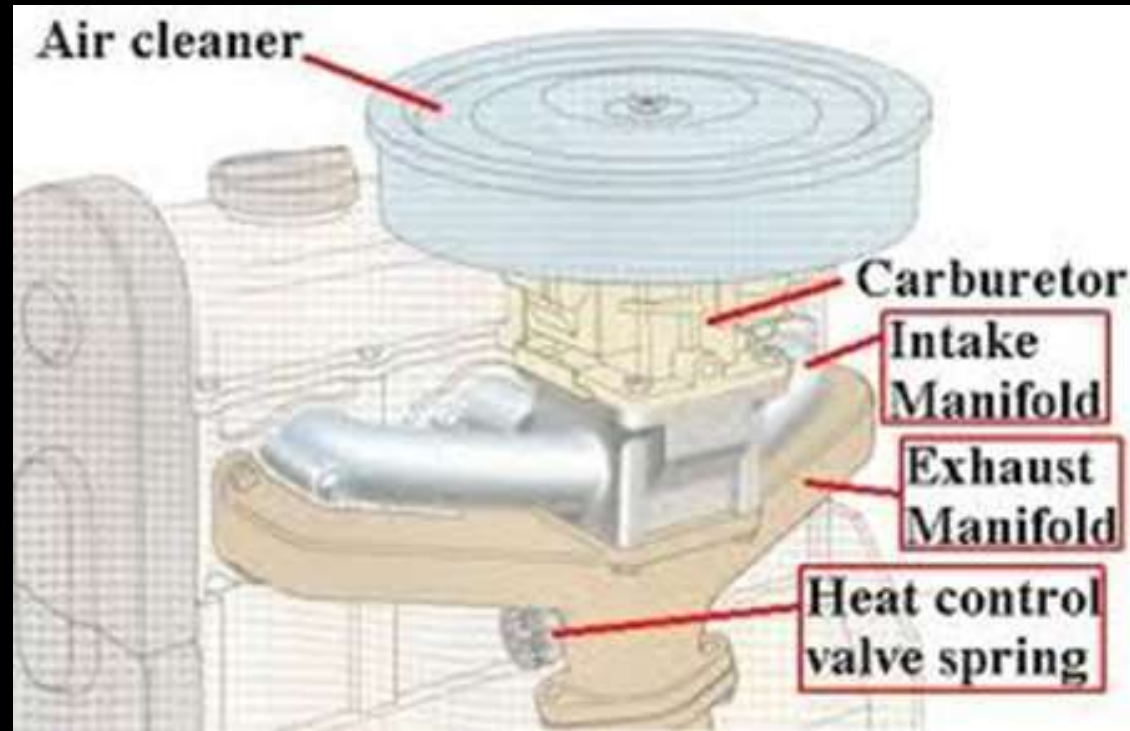
# Components of IC Engine

10. **Inlet Manifold** : It is the passage which carries the charge from carburetor to the petrol engine or only air to the diesel engine.



# Components of IC Engine

11. **Exhaust Manifold.** It is the passage which carries the exhaust gases from the exhaust valve to the atmosphere.



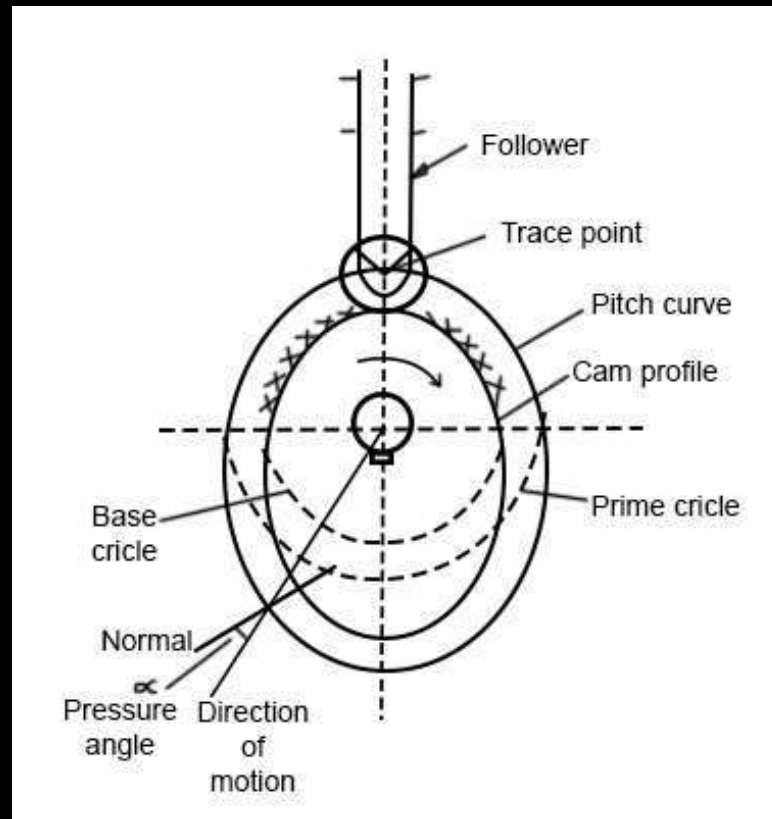
# Components of IC Engine

12. **Camshaft.** The function of the cam shaft is to operate the intake and exhaust valves through the cams, cam followers, push rods and rocker arms.



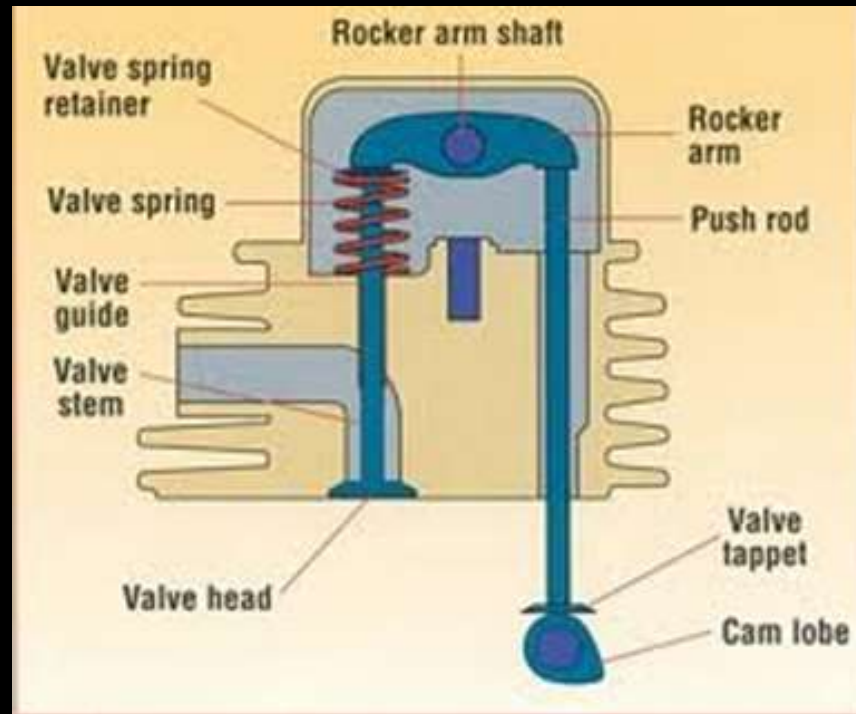
# Components of IC Engine

13. **Cam and Cam follower.** It is made of a required profile to give desired motion to the valve through the follower.



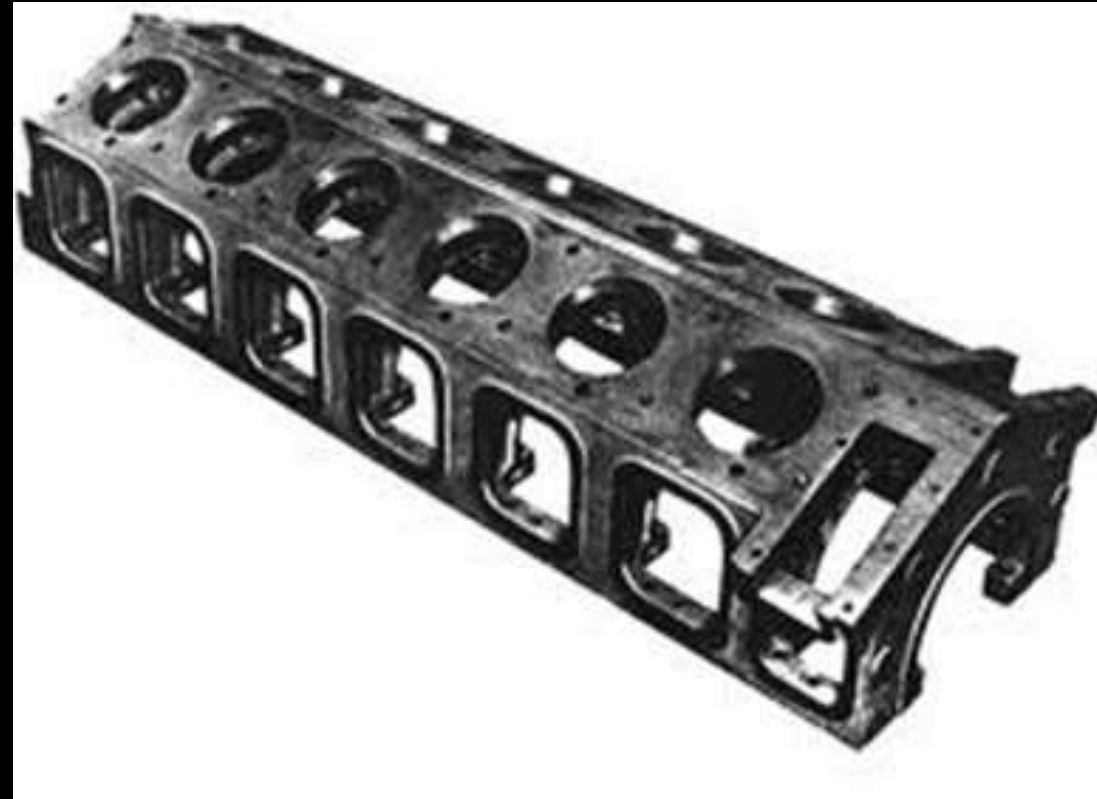
# Components of IC Engine

14. **Push Rod and Rocker Arm.** The motion of the cam is transmitted to the valve through the push rod and rocker arm. These links together are also known as valve gear.



# Components of IC Engine

15. Crank case. It is the base which holds the cylinder and crankshaft. It also serves as the sump for the lubricating oil.





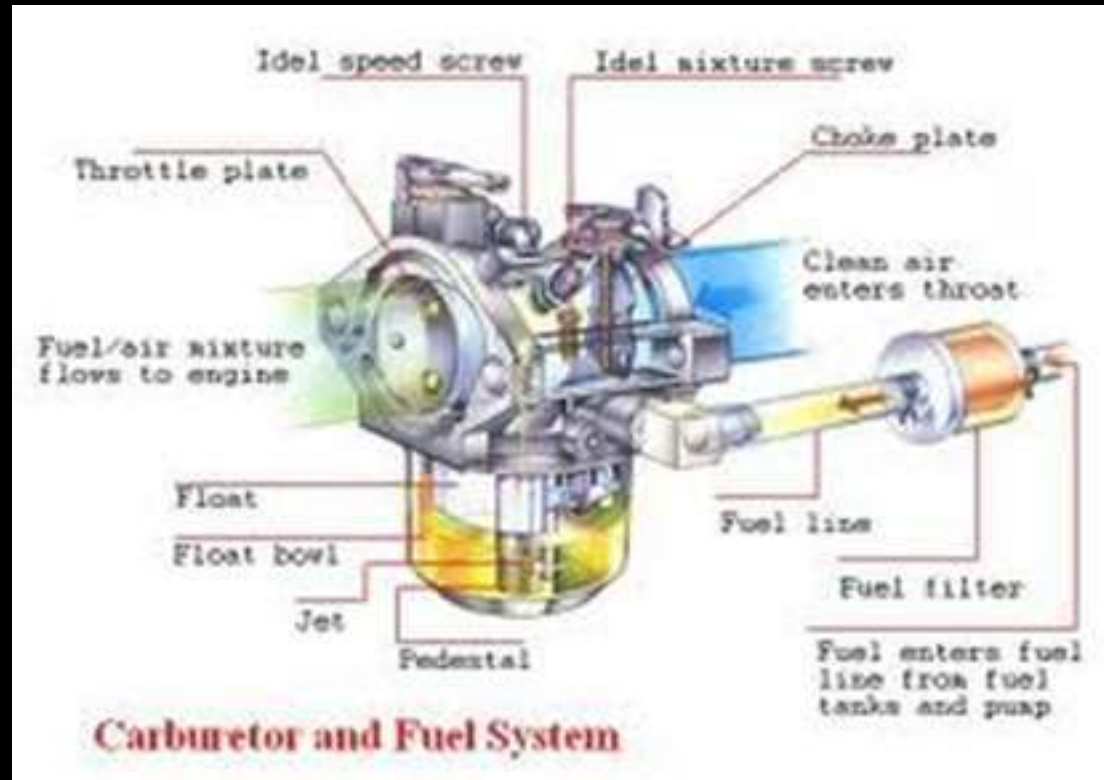
# Components of IC Engine

16. **Flywheel:** It is a wheel mounted on the crankshaft which stores the energy during the power stroke and transmits the energy through transmission to the wheels when the clutch is engaged.



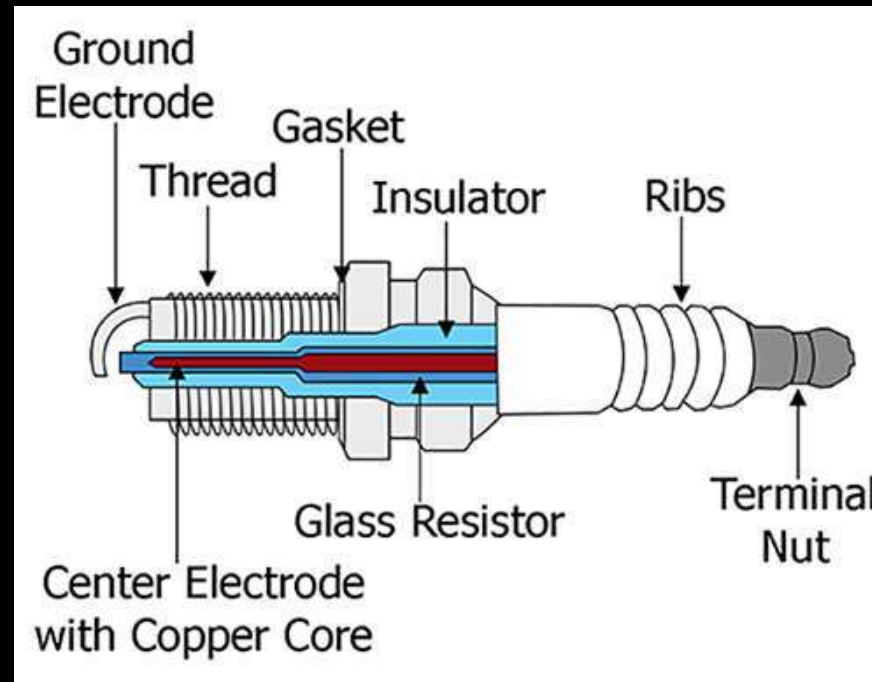
# Components of IC Engine

17. **Carburetor** : The function of the carburetor is to supply the uniform air-fuel to the cylinder of a petrol engine through the intake manifold.



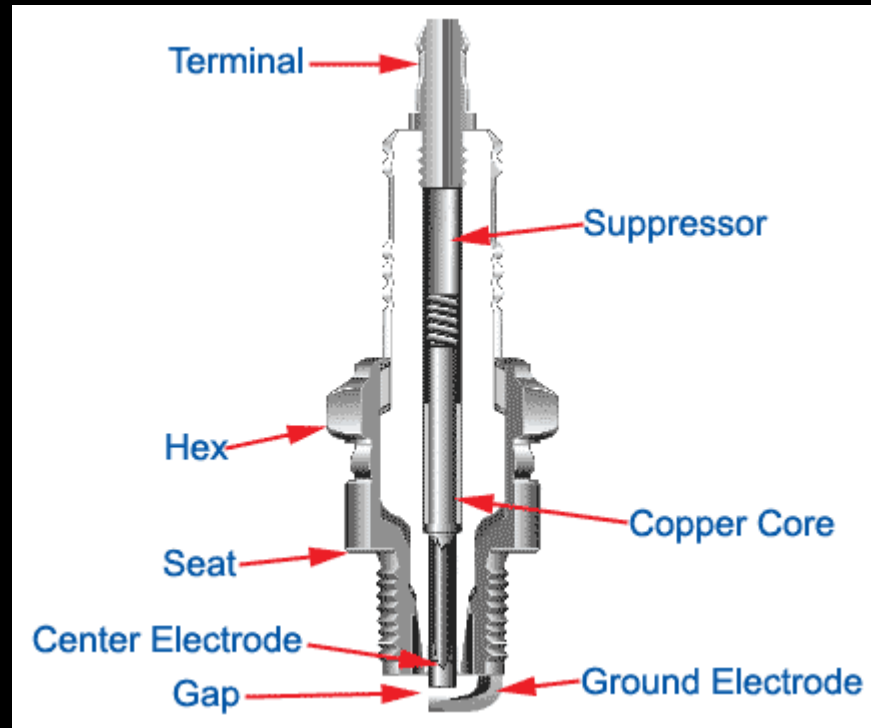
# Components of IC Engine

18. **Spark Plug.** The function of the spark plug is to ignite the mixture after completing the compression in the petrol engine. It is generally mounted in the cylinder head. This is only used in petrol engine.



# Components of IC Engine

19. Fuel Injector. The function of fuel injector is to break up the oil into fine spray (atomized condition) as it enters the cylinder of diesel engine.



# Summary

In this session, you have learnt about the Engine and its various components. Engine is the heart of an automobile. Its role is very important. It converts the chemical energy to mechanical energy. This energy is utilized for vehicular movement. There are different ways of igniting fuel in an auto engine.

- Internal combustion (IC) external combustion engines  
Automotive engines are called internal-combustion (IC) engines because the fuel that runs is burned internally or inside the engine.

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