



SNS COLLEGE OF TECHNOLOGY

**An Autonomous Institution
Coimbatore – 35**

Accredited by NBA – AICTE and Accredited by NACC – UGC with 'A++' Grade
Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai.

DEPARTMENT OF AGRICULTURAL ENGINEERING

19AGB301 – FARM TRACTORS

II – YEAR IV SEMESTER

UNIT 1 – INTRODUCTION

TOPIC 2 – TRACTOR ENGINES



TRACTORS?

- ❖ Tractors are powerful machines that play a vital role in modern agriculture.
- ❖ At the heart of these machines lies the engine, a complex piece of machinery responsible for converting fuel into mechanical energy.



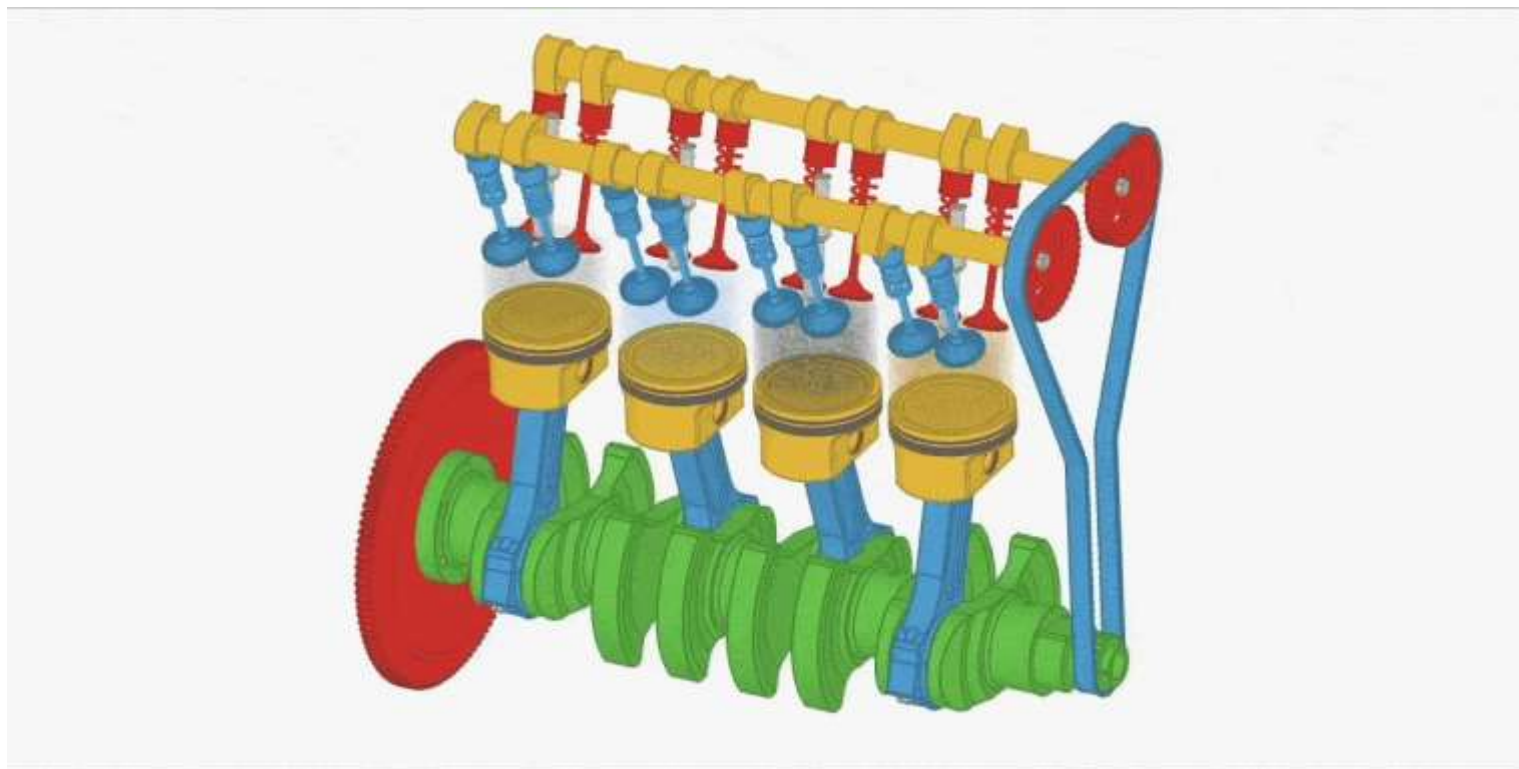


Basic Engine Operation!!!!





Combustion Process

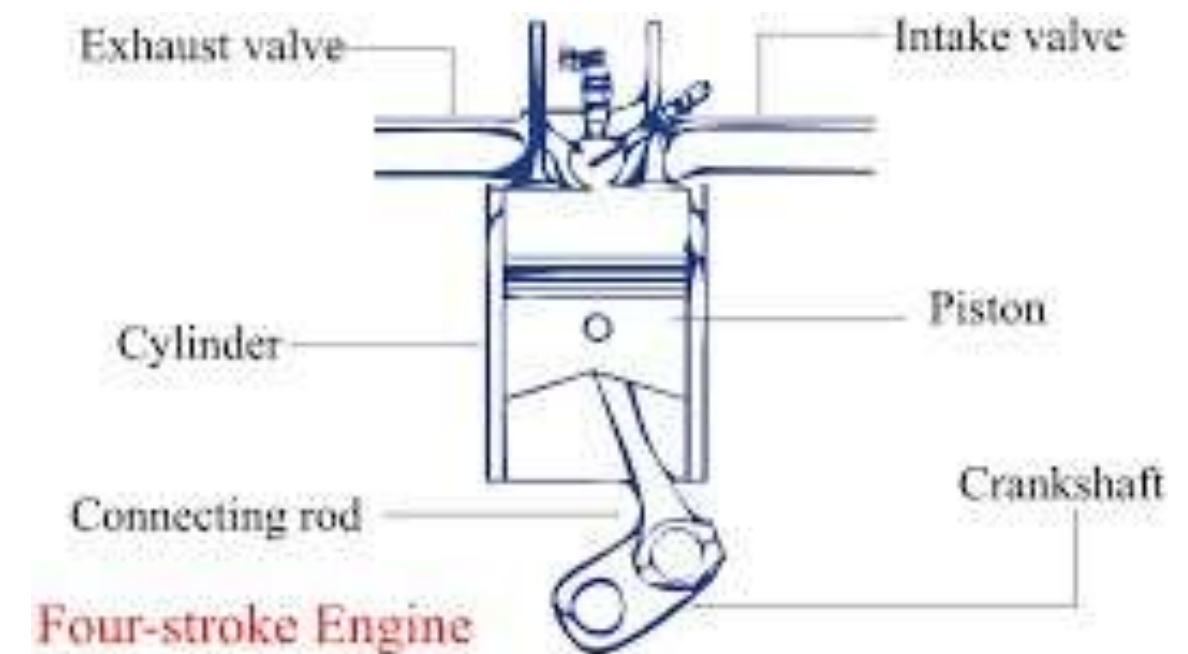


- ❖ A tractor engine operates based on the principle of internal combustion.
- ❖ This involves igniting a fuel-air mixture within a confined space, resulting in a controlled explosion.
- ❖ The energy generated from this explosion is harnessed to power the engine's moving parts.



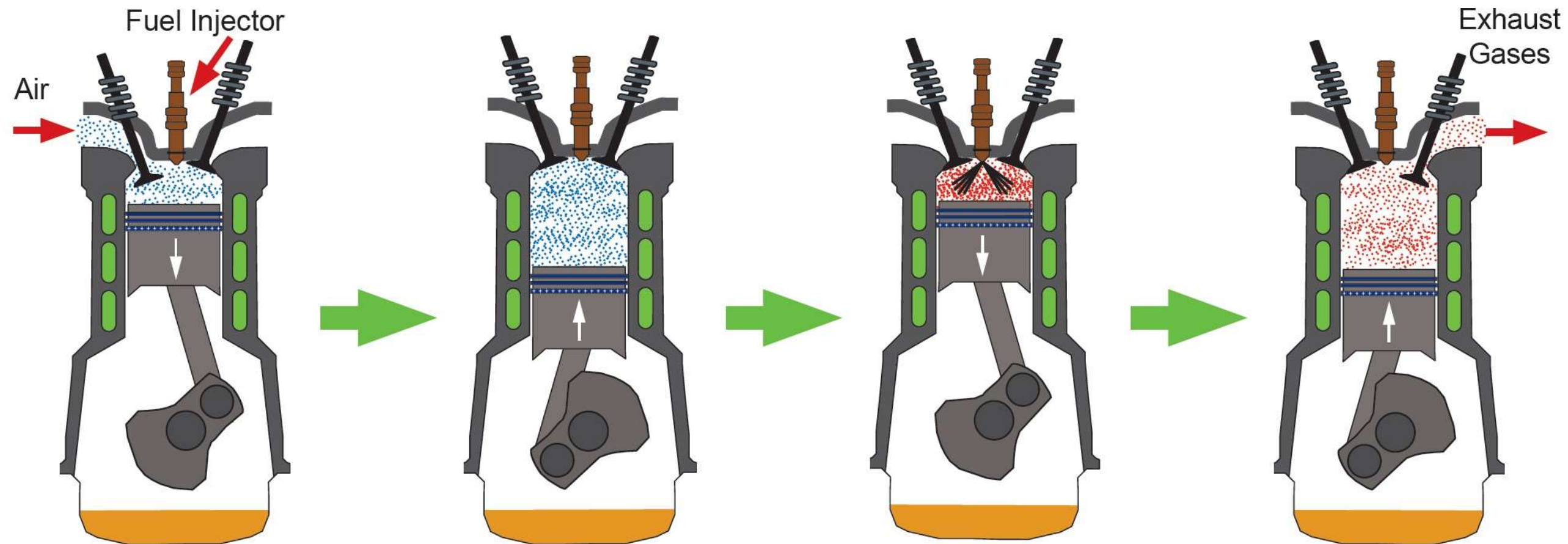
Four-Stroke Cycle

- ❖ Most modern tractor engines use a four-stroke cycle: intake, compression, power, and exhaust.
- ❖ In the intake stroke, air and fuel are drawn into the cylinder.
- ❖ During the compression stroke, the mixture is compressed to increase its energy potential.
- ❖ The power stroke follows, ignited by a spark plug, causing an explosion that drives the piston down.
- ❖ Finally, the exhaust stroke expels the burned gases from the cylinder.





Four Stroke Cycle



Intake Stroke
Intake valve is open. Exhaust valve is closed. Piston moves down. Air enters the combustion chamber.

Compression Stroke
Intake and exhaust valves are closed. Piston moves up. Air is compressed.

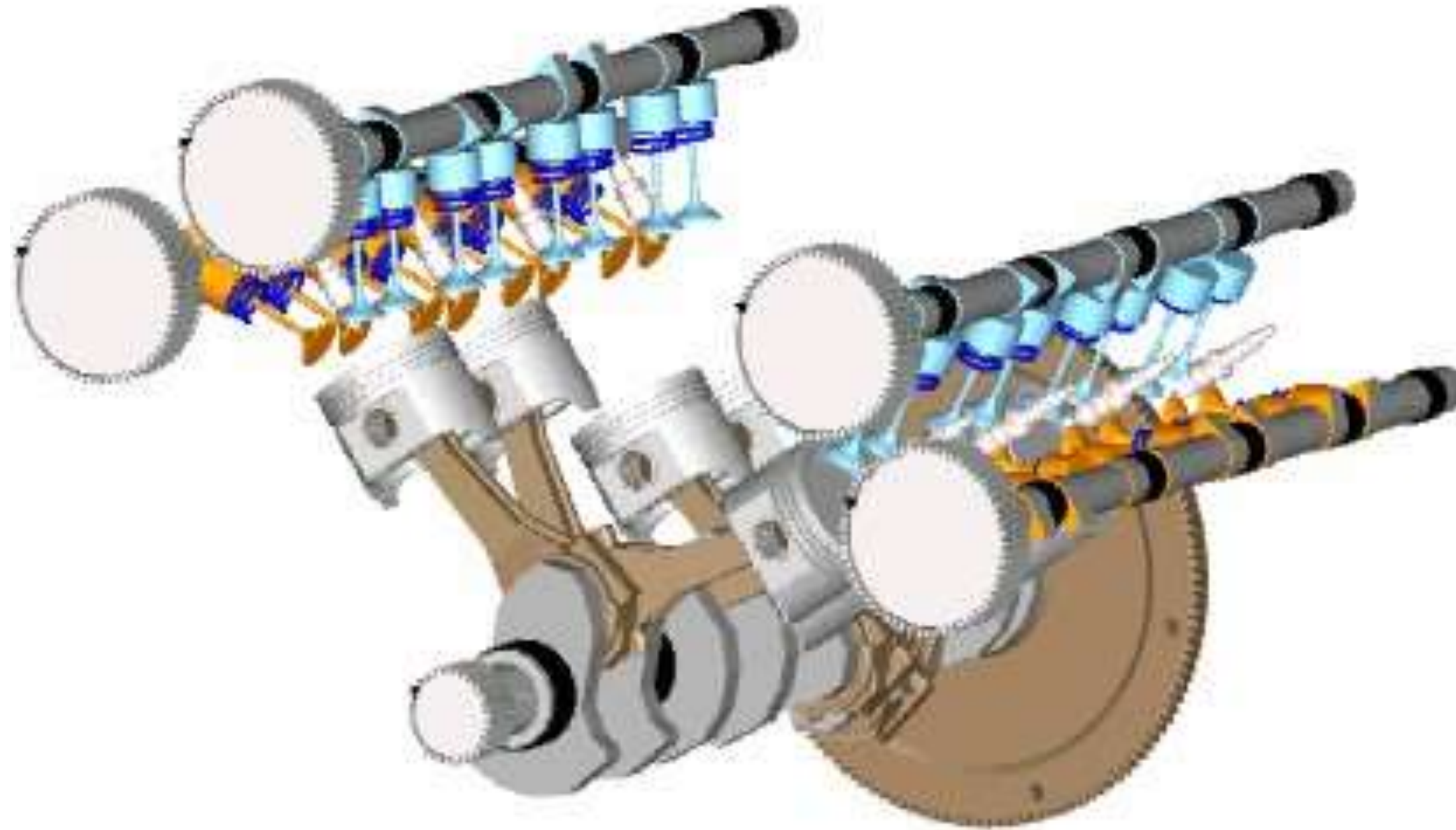
Power (Combustion) Stroke
Intake and exhaust valves are closed. Fuel is injected into the combustion chamber. The high pressure and heat ignite the fuel. Fuel combusts spontaneously. Piston is forced down by combustion. This is the stroke that provides the power.

Exhaust Stroke
Exhaust valve opens. Intake valve is closed. Piston moves up, pushing exhaust gases out of the engine.

Four-Stroke Cycle Repeats

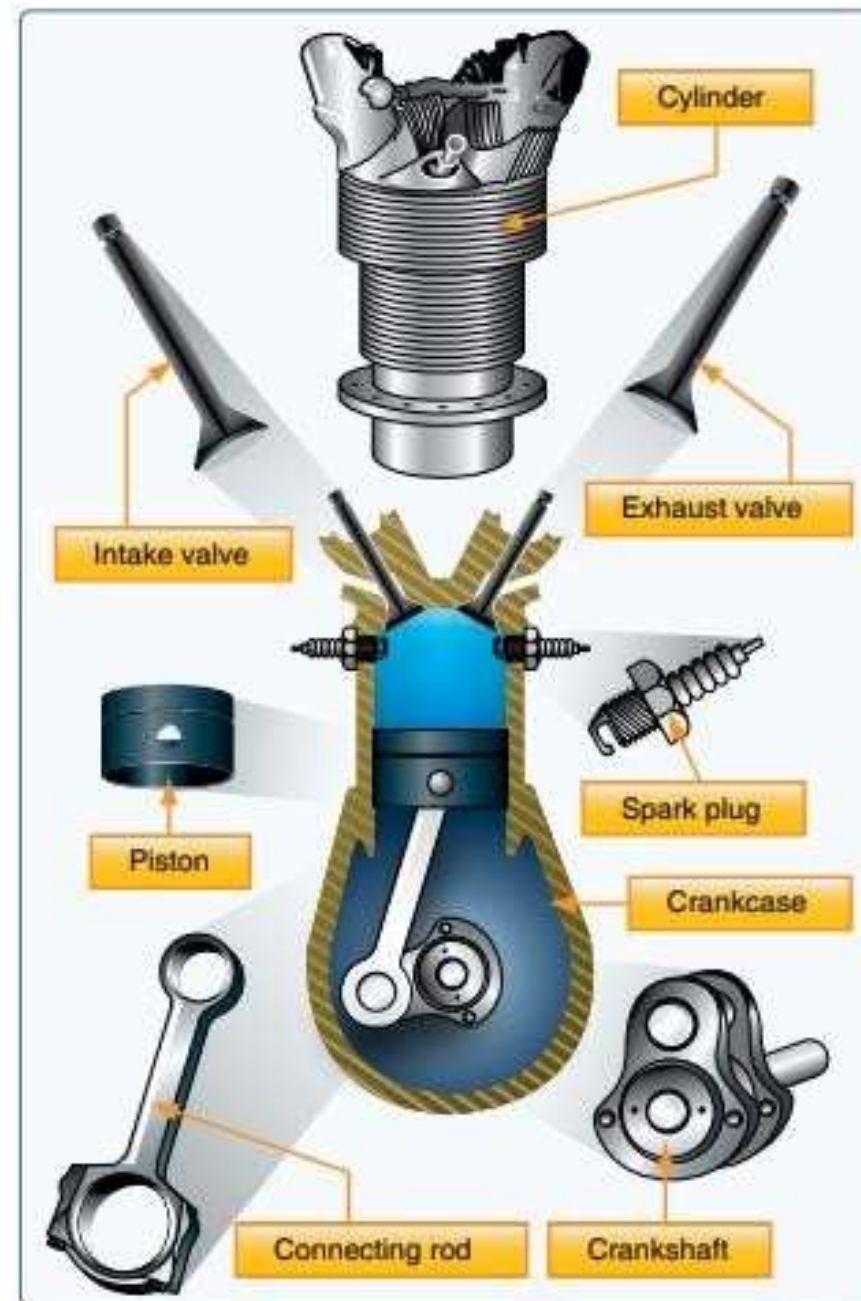


Four Stroke Cycle





Key Engine Components

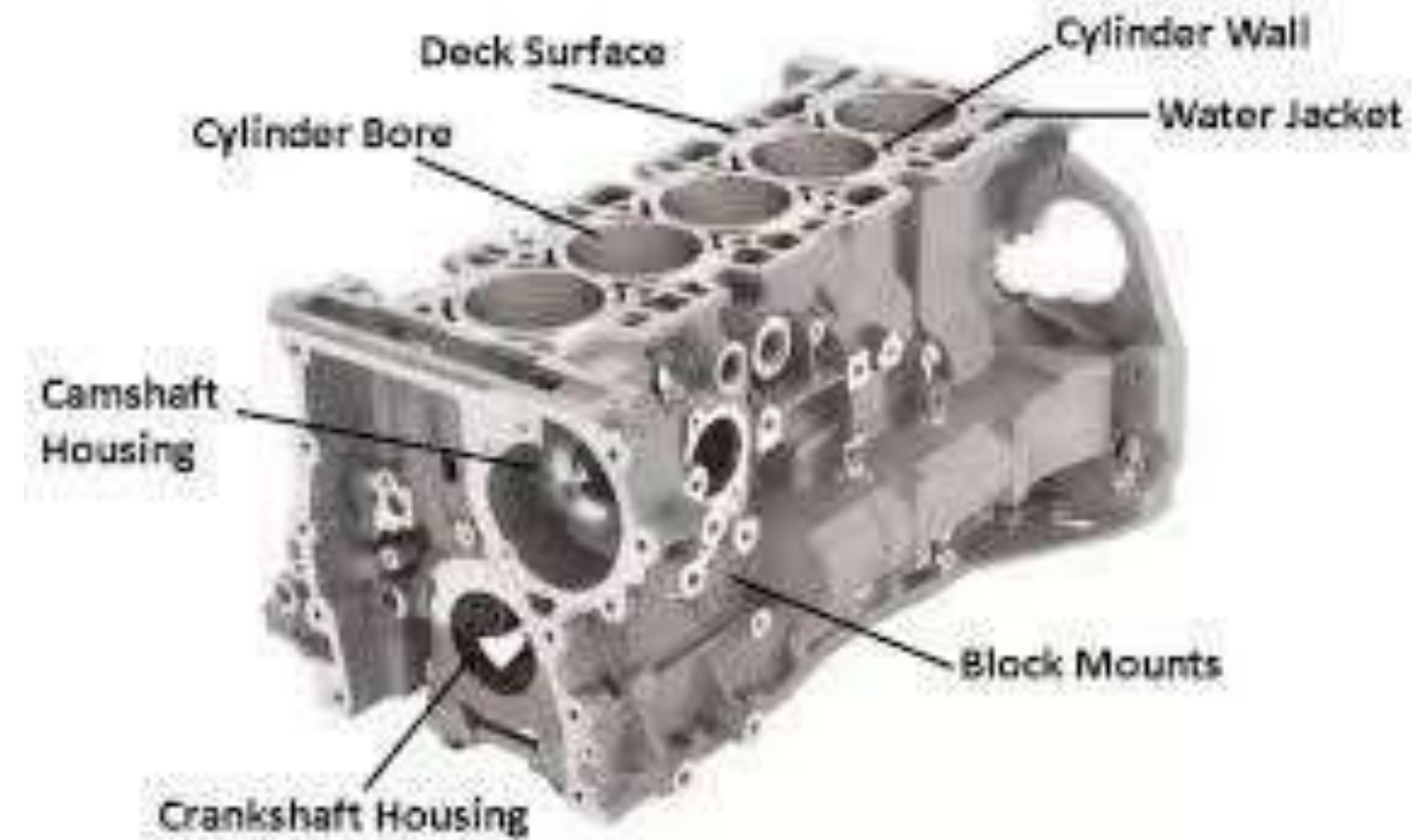


- ❖ Cylinder Block and Pistons
- ❖ Crankshaft and Camshaft
- ❖ Valves and Cylinder Head



Cylinder Block and Pistons

- ❖ The cylinder block houses the engine's cylinders, where combustion occurs.
- ❖ Pistons are situated within these cylinders and move up and down as a result of the four-stroke cycle.
- ❖ This motion is transformed into rotational motion through the crankshaft.

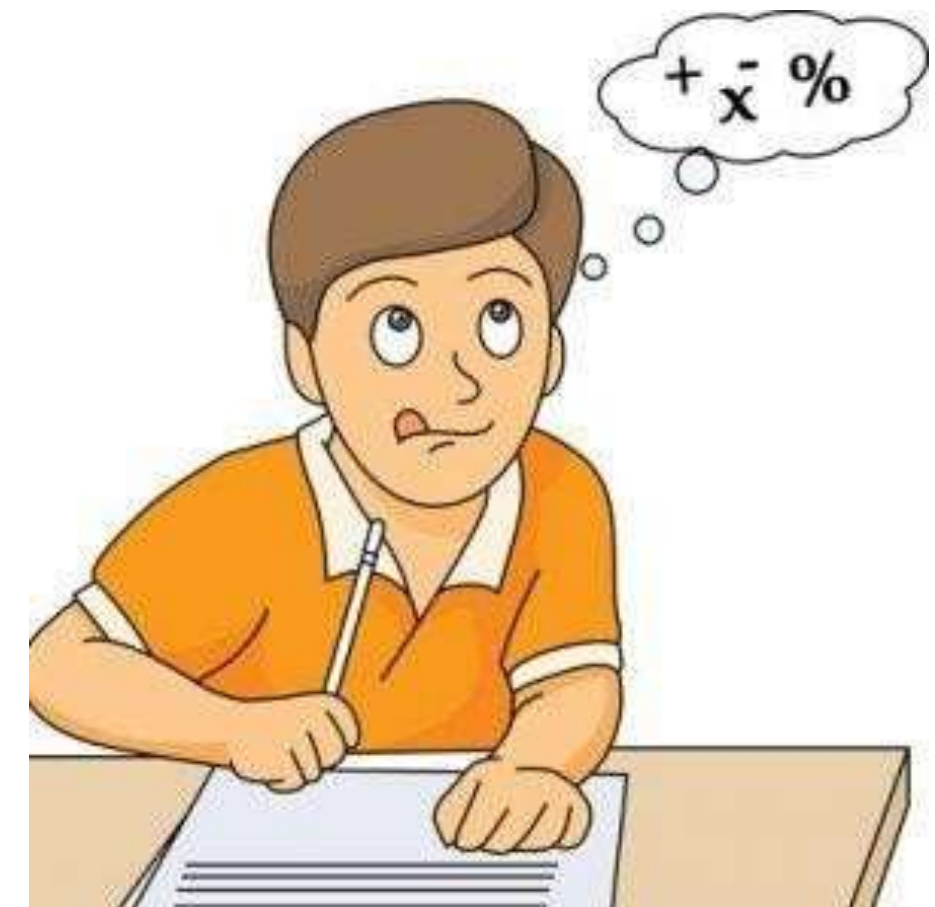




Assessment

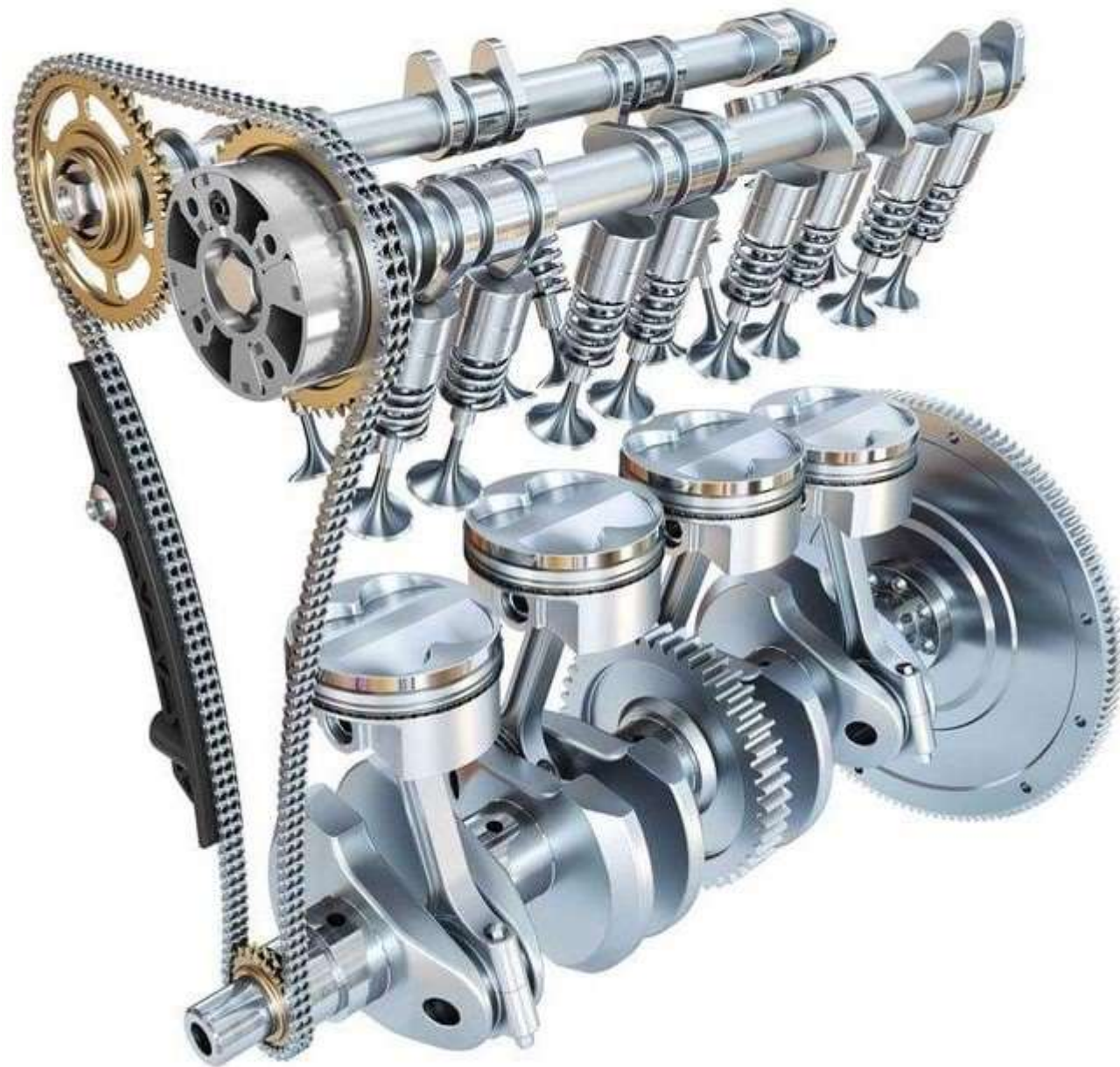


- **What is Tractor?**
- **What is Engine?**





Crankshaft and Camshaft

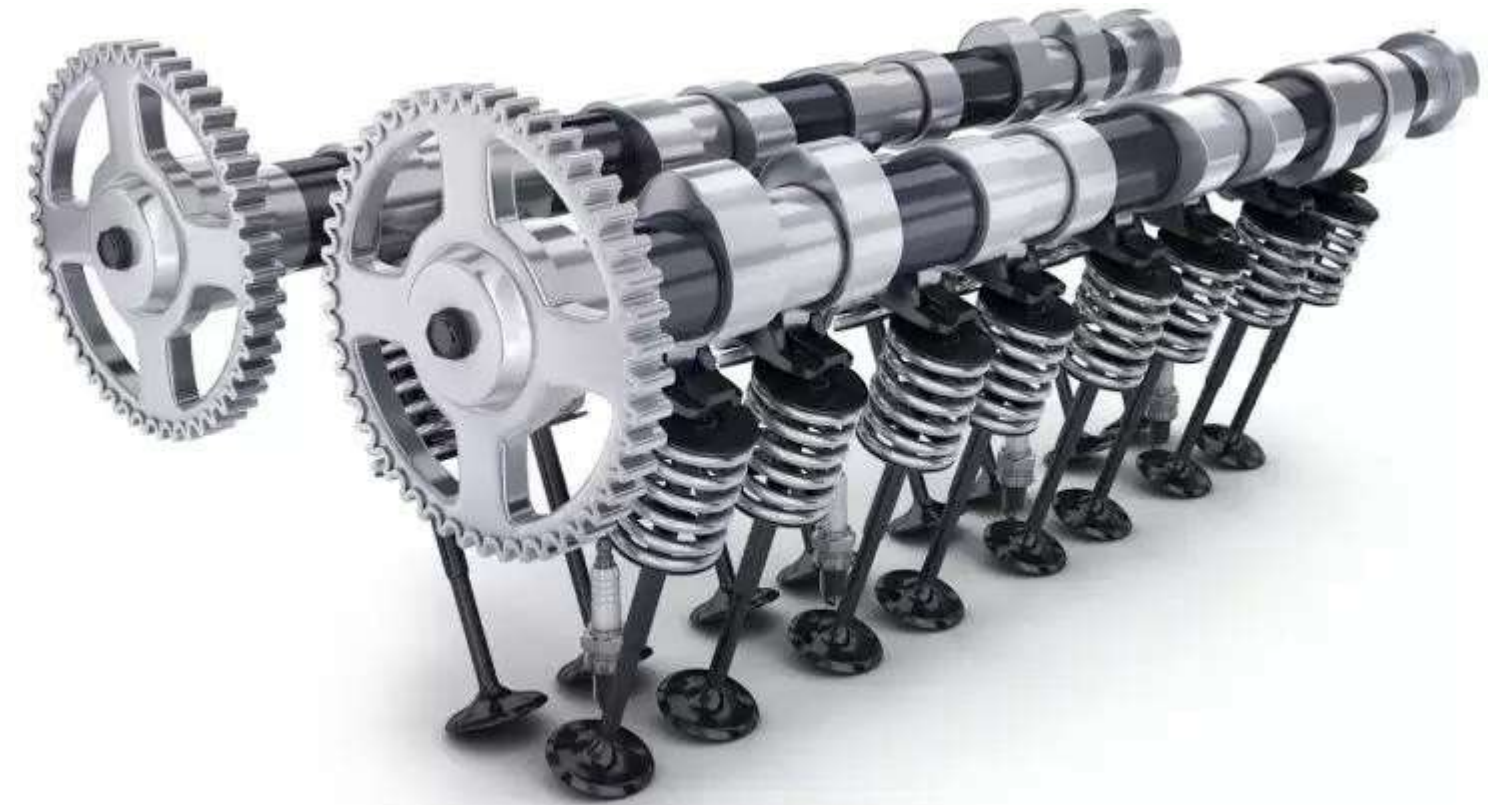


- ❖ The crankshaft converts the reciprocating motion of the pistons into rotational motion, which drives the tractor's wheels.
- ❖ The camshaft controls the opening and closing of valves, synchronizing them with the engine's operation.
- ❖ Located in the “bottom end” of an engine, the crankshaft harnesses the tremendous force of combustion by thrusting the pistons downward, causing the crankshaft to rotate. This rotation is the power source of an engine.



Valves and Cylinder Head

- ❖ Valves regulate the flow of air and fuel into the cylinders and the expulsion of exhaust gases.
- ❖ The cylinder head contains the valves, spark plugs, and often the fuel injector.





Valves and Cylinder Head





See You at Next Class!!!!