TWO STROKE AND FOUR STROKE ENGINES, WORKING PRINCIPLES, APPLICATIONS - TYPES, POWER AND EFFICIENCY

- Heat engine is a machine for converting heat, developed by burning fuel into useful work.
- It can be said that heat engine is equipment which generates thermal energy and transforms it into mechanical energy.

CLASSIFICATION OF HEAT ENGINES

Based on combustion of fuel:

- ✓ External combustion engine
- ✓ Internal combustion engine

External combustion engine

- ✓ Here, the working medium, the steam, is generated in a boiler, located outside the engine and allowed in to the cylinder to operate the piston to do mechanical work.

Internal combustion engine

- ✓ In internal combustion engine, the combustion of fuel takes place inside the engine cylinder and heat is generated within the cylinder.
- ✓ This heat is added to the air inside the cylinder and thus the pressure of the air is increased tremendously.
- ✓ This high-pressure air moves the piston which rotates the crank shaft and thus mechanical work is done.

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Based on fuel used:

- ✓ Diesel engine
- ✓ Petrol engine
- ✓ Gas engine
- ✓ **Diesel engine –** Diesel is used as fuel
- ✓ **Petrol engine –** Petrol is used as fuel
- ✓ **Gas engines** – propane, butane or methane gases are used

Based ignition of fuel:

- ✓ Spark ignition engine (Carburettor type engines)
- ✓ Compression ignition engine (injector type engines)

Spark ignition engine –

- ✓ **It is a Carburettor type engine**
- ✓ A **mixture of air and fuel** is drawn in to the engine cylinder.
- ✓ Ignition of fuel is done by **using a spark plug.**
- ✓ The spark plug produces a spark and ignites the air- fuel mixture. Such combustion is called constant volume combustion (C.V.C.).

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Compression ignition engine –

- ✓ In compression ignition engines air is compressed in to the engine cylinder, Due to this the temperature of the compressed air rises to **700-900 °C.**
- ✓ Due to a very high temperature, the fuel gets ignited. This type of combustion is called **constant pressure combustion (C.P.C.)** because the pressure inside the cylinder is almost constant when combustion is taking place.

Based on working cycle:

- ✓ **Four stroke cycle engine** - When the cycle is completed in **two revolutions** of the crankshaft, it is called four stroke cycle engine.
- ✓ **Two stroke cycle engine.** - When the cycle is completed in **one revolution** of the crankshaft, it is called two stroke cycle engine.

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WHEEL TRACTOR COMPONENTS -

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- **I.C Engine**
- **Clutch**
- **Transmission gears**
- **Differential unit**
- **Final drive**
- **Real wheel**
- **Front wheels**
- **Steering mechanism**
- **Hydraulic control and hitch system**
- **Brakes**
- **Power-take-off unit**
- **Tractor pulley**
- **Draw bar and**
- **Control panel**

• I.C engine

- Internal combustion of suitable horse power is used as a prime mover in a tractor.
- Engines ranging from **8 to 200 hp are used in agricultural tractors**.
- In India, **four-wheel tractors for agricultural operations** are fitted with **25-80 hp**.
- **Walking type tractors are fitted with 8-12 hp engines.**

• Clutch

- Clutch is a device, used to **connect and disconnect the tractor engine** from the transmission gears and drive wheels.
- Clutch transmits power by means of friction between driving

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WHEEL TRACTOR COMPONENTS -

members and driven members

- **Differential unit**

➢ Differential unit is a **special arrangement of gears to permit one of the rear wheels of the tractor to rotate slower or faster than the other.**

➢ While turning the tractor on a curved path, the inner wheel has to travel lesser distance than the outer wheel.

➢ The inner wheel requires lesser power than the outer wheel.

➢ This **condition is fulfilled by differential unit**, which permits one of the rear wheels of the tractor to move faster than the other at a turning point.

- **Differential Lock**

➢ Differential lock is a device to **join both half axles of the tractor** so that even if one wheel is less resistance; the tractor comes out of the mud etc.

➢ as both wheels move with the same speed and apply equal traction.

- **Power take off**

➢ It is a part of tractor transmission system. It consists of a shaft, a shield and a cover.

➢ The shaft is externally spline to transmit torsional power to another machine.

➢ As per **ASAE standards PTO speed is 540+ 10 rpm** when

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WHEEL TRACTOR COMPONENTS -

operating under load.

- In order to operate 1000 rpm PTO drive machine, a new standard has been developed.

- **Belt pulley**

- All tractors are provided with a belt pulley.
- The function of the pulley is to transmit power from the tractor to stationary machinery by means of a belt.
- It is used to operate thresher, centrifugal pump, silage cutter, and several other machineries.

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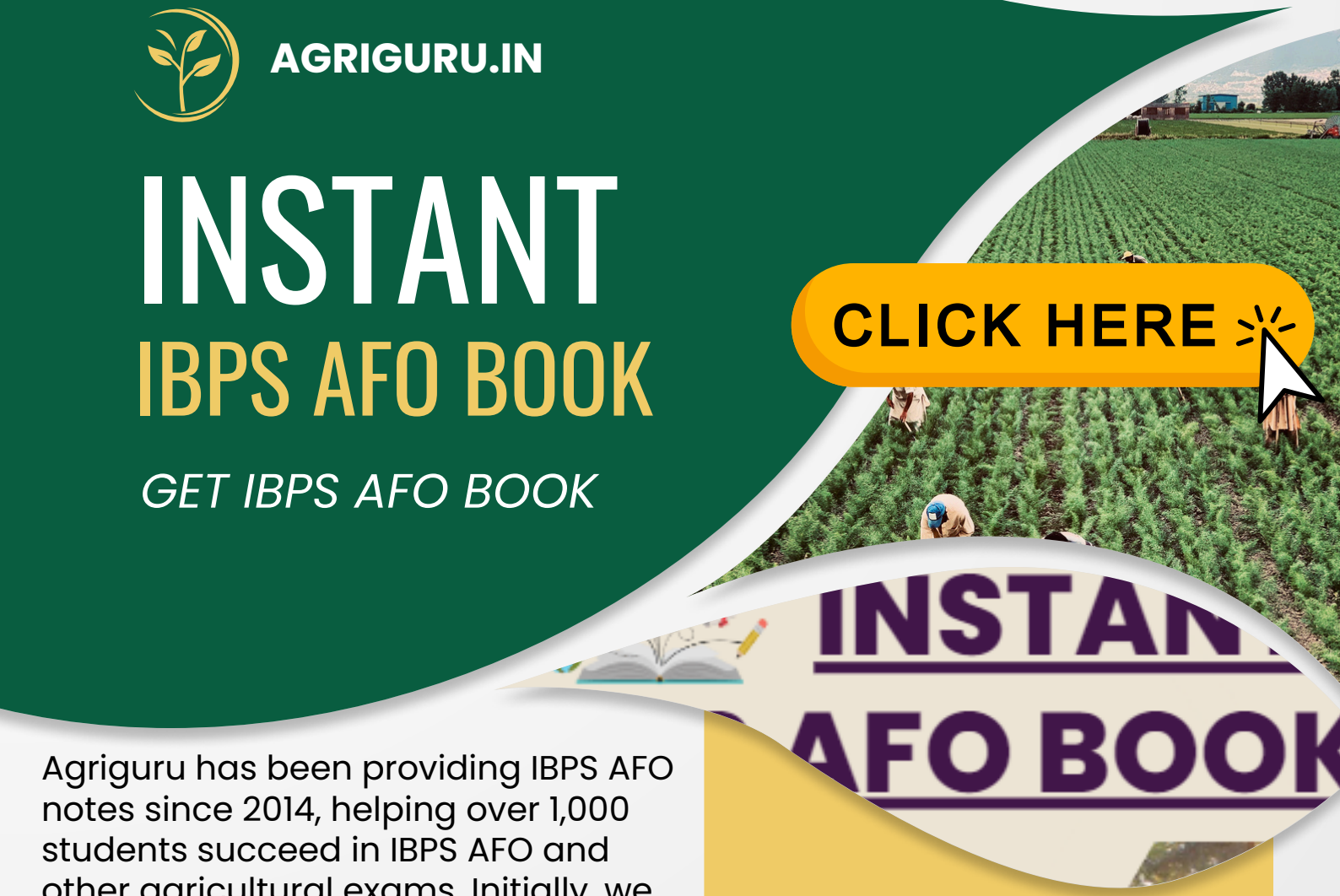
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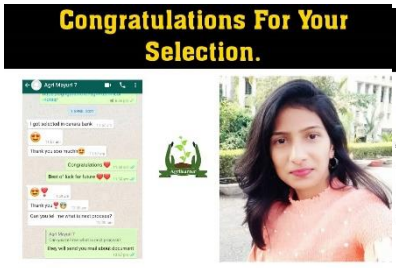
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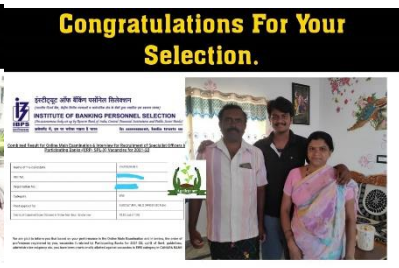
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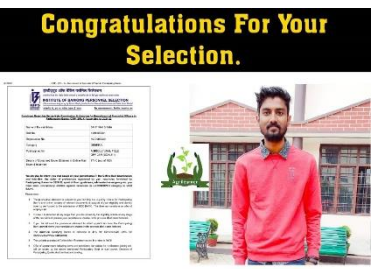
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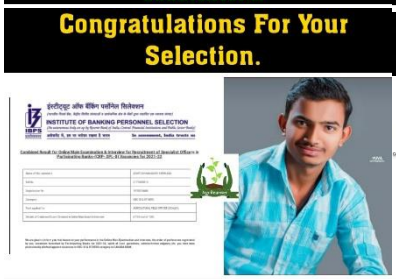
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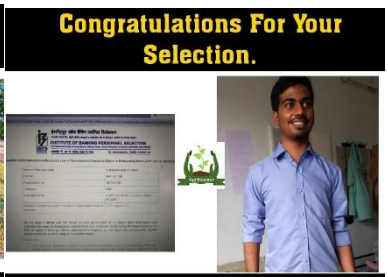






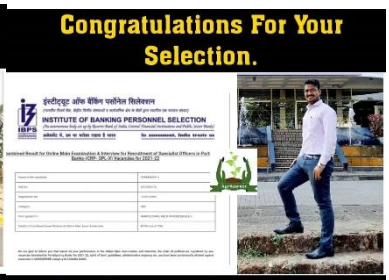


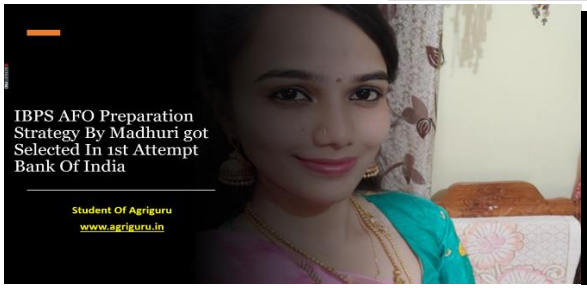


















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