EXPERIMENT NO. 01

AIM OF THE EXPERIMENT:-

Determination of Young's Modulus usingSearl's Apparatus.

APPARATUS REQURIED:-

SL NO.	NAME OF THE APPARATUS	SPECIFICATION	QUANTITY
01	Searl's apparatus		01
02	Verniercaliper	L.C =0.02mm	01
03	Steel rule	l.c =0.5mm	01
04	Copper wire	D =0.001mm	L =
05	Balancing weight	1Kg	10
06	Weight pan		01
07	Plier		01

THEORY:-

STRESS:-

It is defined as the ratio between the load and cross-sectional area of the given specimen.

Mathematically,

Stress=load/area,σ= (P/A)

Unit of stress is N/M^2 or KN/M^2

STRAIN:-

It is defined as the ratio between the change in the length to its original length of the given specimen.

Mathematically,

Strain = change in length/original length

e= δl/l, It has nounit.

YOUNGS MODULUS:-

It is defined as the ratio between stress to strain.

Mathematically,

Young'smodulus = stress/strain= E = σ/e

Its unit is KN/M^2 or N/M^2.

Technical Specification:

Diameter of copper wire (d)= m^2

Cross-sectional area of the specimen (A)=(∏/4)xD^2 = ...M^2

Original Length of copper wire(L)= m

PROCEDURE:-

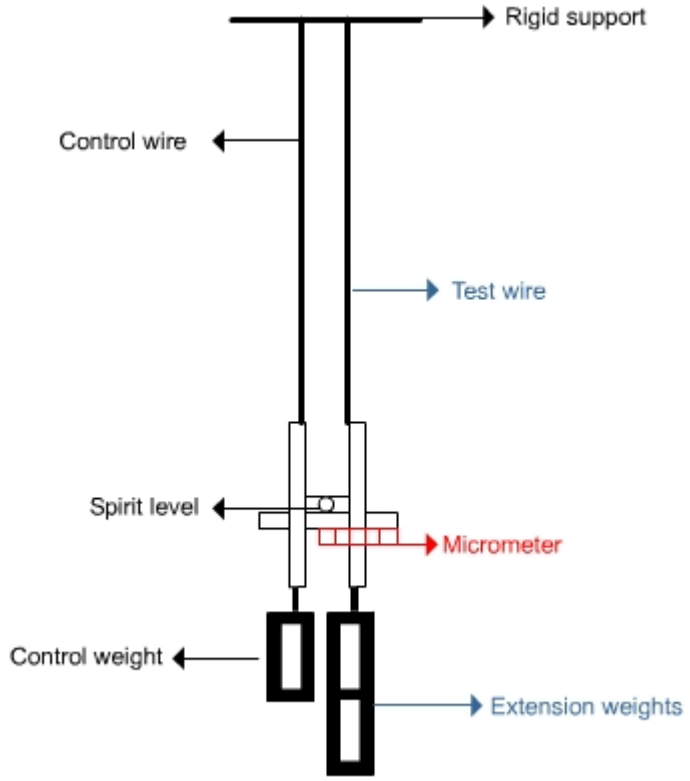
- Take two copper wires.
- Hang the searls apparatus by the two copper wires of which one wire is fixed wire and another is testing wire.
- Now measure the diameter and length of the wire.
- Then set the weight pan in the testing side.
- Then give some load in the load pan. The wire will elongate.
- Now write down the load applied and the change in length in the observation table.
- Then gradually increase the loads and take at least five readings.

OBSERVATION & CALCULATION TABLE:-

SL.NO	LOAD APPLIED(P) Kg	STRESS (P/A)	CHANGE IN LENGTH(ΔL) m	STRAIN (ΔL/L)	YOOUNG'S MODULUS(σ/e)
1					
2					
3					
4					
5					

CONCLUSION:-

From the above experiment we have successfully determine the young's modulus by using the searl's apparatus.



SEARL'S APPARATUS

EXPERIMENT NO:-02

AIM OF THE EXPERIMENT:-

Determination of torsional rigidity of the shaft by using torsion testing machine.

APPARATUS REQUIRED:-

SL.NO	NAME OF THE APPARATUS	SPECIFICATION	QUANTITY
01	Torsion testing machine		01
02	Mild steel specimen	D=..... L=.....	01
03	Steel rule	Least count=0.5mm	01
04	Verniercalliper	Least count=0.02mm	01

THEORY:-

- A torsion test is a quite instrumental in determining the value of modulus of rigidity (ratio of sear stress to shear strain) of a metallic specimen.
- The modulus of rigidity can be found out through observations, made during the experiment by using the torsion equation.
- Torque is defined as the product of twisting force to the distance between the point of application of the force and the axis of the shaft.
- The torsion equation is- $T/J=C\theta/L$.

  So ,$C=TL/J\theta$

  Where,

  T=Torque applied.

J=Polar moment of inertia.= $/_{32}XD^4$

D= Diameter of specimen.

C=Modulus of rigidity.

θ=Angle of twist.

L=Gauge length of the specimen in m.

PROCEDURE:-

- Select the driving dogs to suit the size of the specimen and clamp it in the machine by adjusting the length of the specimen by means of a sliding spindle.
- Measure the diameter of the specimen at about three places and take the average values.
- Choose the appropriate range by capacity change lever.
- Set the maximum load pointer to zero.
- Set the protractor to zero for convenience.
- Carry out straining by rotating the hand lever in either direction.
- Load the machine in suitable increments, observing and recording strain gauge.

OBSERVATION TABLE:-

SL.NO	TORQUE APPLIED in (Kg-m)	ANGLE (θ) in degree	T_{mean}(kgm)	θ_{mean}(degree)
1				
2				
3				
4				

CALCULATION:-

Polar moment of inertia (J) =$(\pi/32)xD^4$ mm^4

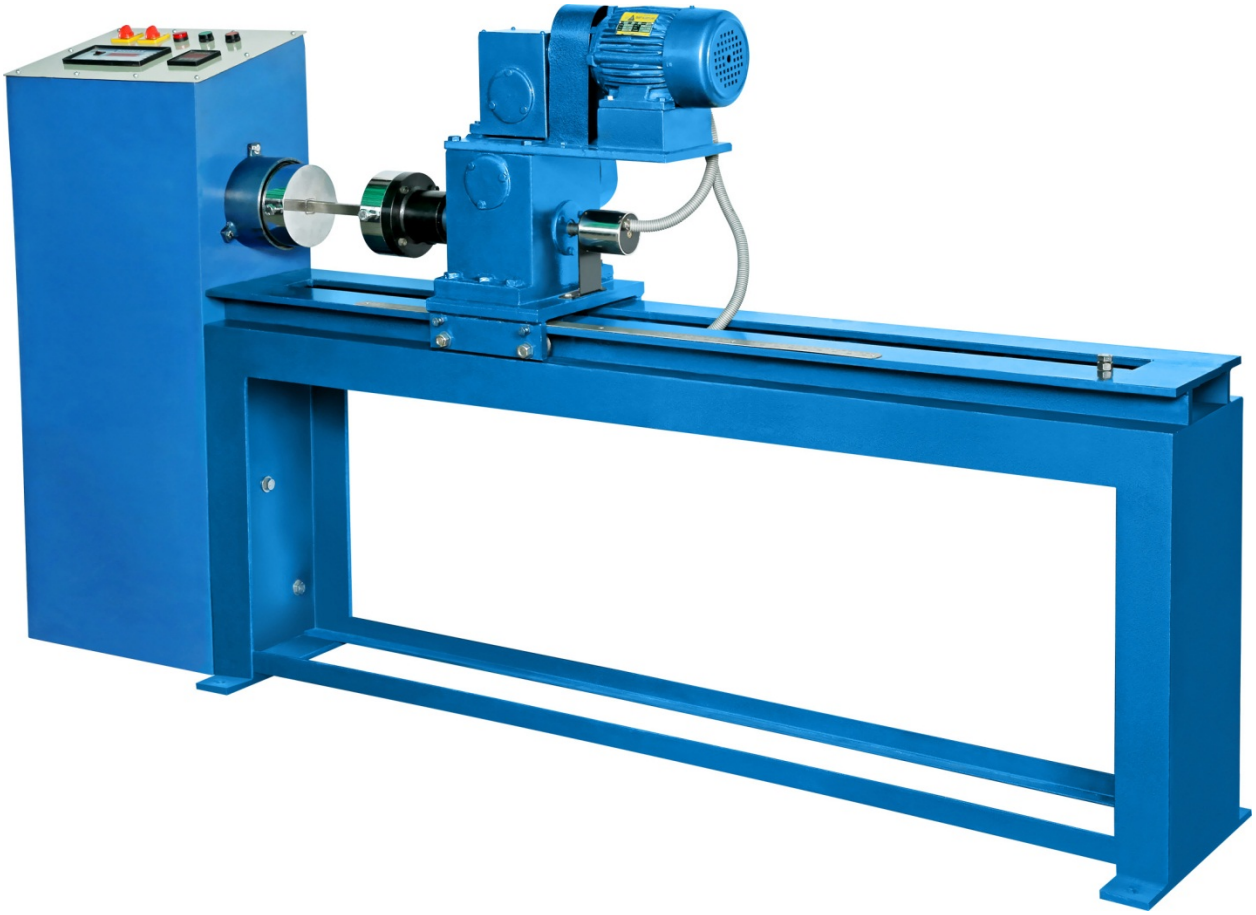
θ_{mean} =.....=.....x(π/180)=.....rad

T_{mean} =.....=.....x9.81=.....N-m

Modulus of rigidity(C)=TL/Jθ =.....N/m^2

CONCLUSION:-

From the above experiment we have successfully determine the modulus of rigidity of mild steel specimen by using torsion testing machine.



TORSION TESTING MACHINE

EXPERIMENT NO:-03

AIM OF THE EXPERIMENT:-

Determination of Salient points(Young's Modulus, Yield Point, Fracture pointfrom stress –strain curve using Universal Testing Machine(UTM).

APPARATUS REQUIRED:-

SL.NO	NAME OF THE APPARATUS	SPECIFICATION	QUANTITY
01	Universal testing machine	200KN	01
02	Mild steel specimen	L=..... D=.....	01
03	Verniercalliper	Least count=0.02mm	01
04	Steel rule	L=300mm	01

THEORY:-

- The result obtained by the tensile test are widely used in design of material for structures and others purposes.
- In this test the specimen pulled out at a constant rate by gradually increasing the axial pole till the rupture takes place.
- The tensile test for a ductile material is generally carried out with the help of UTM.
- The machine has two units ,one is control unit and another is release valve.
- Control unit is used for controlling the load applied and release valve is used for releasing the hydraulic pressure.
- The tensile test of a material is generally performed to determine –
    - Proportional limit
    - Elastic limit
    - Yield point
    - Ultimate point
    - Fracture point or breaking point

PROPERTIONAL LIMIT:-

We see from the above diagram that from point 'o' to 'A' is a straight line which represents that the stress is proportional to strain. Beyond point 'A',The curve isslightly deviated from the straight line. It is then obeys the hook's law hold up to 'A' and is known as proportional limit.

ELASTIC LIMIT:-

It may be noted that even if the load is increased beyond point 'A' up to point 'B' the material will regain its shape and size after the release of loadup to point B is known as elastic limit.

YIELD POINT:-

If the material is stretched beyond point 'B' the elastic stress will be reached i.e on the removal of the load ,the material will not be able recover its original shape and size .The point 'C' and 'D' are called upper yield and lower yield point respectively .The stress corresponding to yield point is known as yield stress.

ULTIMATE POINT:-

After the lower Yield point ,the specimen regains some strength and higher value of stress are required for higher strain.The stress goes on increasing till point 'E' is reached. At 'E' the stress which attainsits maximum values is known as ultimate tensile stress.

BREAKING POINT:-

After the specimen has reached to the ultimate stress the neck is formed which decreases the cross sectional area of the specimen. The stress is therefore reduced until the specimen breaks itself at point 'F'. The stress corresponding to point 'F' is known as breaking sress.

MATHEMATICALFORMULA USED:-

Stress =load/cross sectional area

$\sigma = P/A$

Its unit is N/M^2

Strain =change in length/original length

$e = \Delta l/l$

It is unit less.

Young 's modulus(E)=stress/strain= σ/e

Its unit is N/M^2

OBSERVATION TABLE:-

Sl no.	Load applied(P)	Change in length(Δl)	stress(P/A)	strain(Δl/l)	Young's modulus(σ/e)

CALCULATION:-

Area of specimen=(∏/4)xd^2
=.....
Stress=P/A=.....
Strain=Δl/l=.....
Young's modulus=stress/strain=.....

CONCLUSION:-

From the above experiment we have successfully determine the young's modulus of mild steel specimen by using universal testing machine.

UNIVERSAL TESTING MACHINE(UTM).

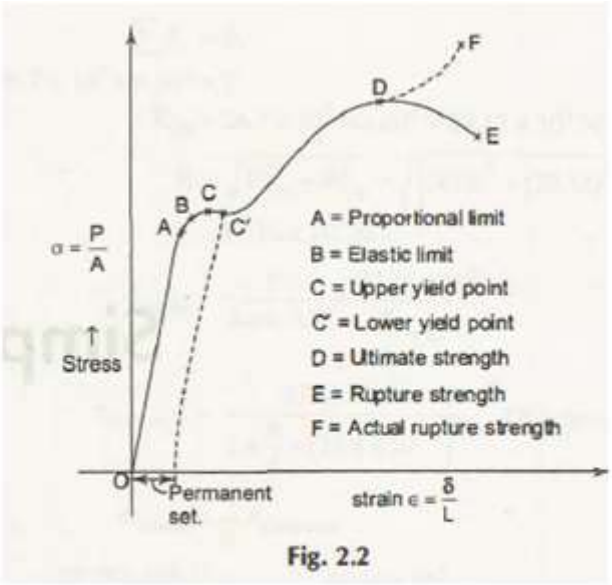


Fig. 2.2

Conditions f-or $\epsilon = \frac{\delta}{L}$ to be constant.

STRESS STRAIN CURVE FOR MILD STEEL

EXPERIMENT:-04

AIM OF THE EXPERIMENT:-

Determination of hardness number by Rockwell OrVickers hardness testing machine.

APPARATUS REQUIRED:-

Sl.no	Name of the apparatus	Specification	Quantity
01	Rockwell hardness testing machine	150Kgf	01
02	High speed steel	HRC/HRB	02
03	Indentors	Diamond tip	01

THEORY:-

- The hardness of a material is resistance to penetration under a localized pressure or resistance to abrasion.
- Hardness test provide an accurate, rapid and economy way of determining the resistance of material to deformation.
- There are generally three types of hardness measurment depending upon the manner in which the test is conducted.
    - Scratch hardness measurement.
    - Rebound hardness measurement.
    - Indentation hardness measurement.

PROCEDURE:-

- Insert indenter on to the machine.
- Make the specimen surface clean by removing the dust ,dirt,oil and grease etc.
- Select 150kgf load.
- Make contact between the surface and the ball by rotating the jack, adjusting wheel till the needle touch the red mark.
- Pull the load release lever and wait for minimum 30sec. The load will automatically apply gradually.
- Note the hardness reading.
- Repeats the entire operation three times.

OBSERVATION:-

Sl.no	Hardness no.	Mean hardness(HRC)	Mean hardness(HRB)

CONCLUSION:-

From the above experiment we have successfully determine the hardness by Rockwell/Vickers hardness testing machine.

ROCKWELL HARDNESS TESTING MACHINE.

EXPERIMENT NO:-05

AIM OF THE EXPERIMENT:-

Determination of toughness of material by using impact testing machine.(charpy/izod).

APPARATUS REQUIRED:-

Sl.no	Name of the apparatus	Specification	Quantity
01	Impact testing machine		01
02	A mild steel specimen	(75x10x10)mm For izod	01
03	A mild steel specimen	(55x10x10)mm For charpy	01

THEORY:-

- An impact test signifies toughness of material that is ability of material to absorb energy during plastic deformation.
- This important factor is determined by impact test .Toughness takes into account both the strength and ductility of the material.
- Several engineering materials have to withstand impact or suddenly applied load while in service.
- Strengths are generally lower as compared to strengths achieved under slowly applied load.
- Of all types of impact test ,the notched bar tests are more extensively used .Therefore the impact test measure the energy necessary to fracture a standard notch bar by applying an impact load.
- The test measures the notch toughness of material under shock loading.

PROCEDURE:-

- Select the test mode i.eizod or charpy ,depending up on the test to be conducted and fix the pendulum holding pipe at the respective anglei.e for izod at 84degree and for charpy at 140 degree and secure it tight with the bolts provided.

- The striker for izod and charpy test are different and depending up on the test to be conducted fix the correct striker on the pendulum hammer end.
- Fix the specimen on the anvil in the position corresponding to the test mode i.eizod or charpy.
- Bring the pointer on the dial to its proper position i.e 16kgm for izod and 30kgm for charpy.
- Release the pendulum by operating the lever for the pendulum to strikes the specimen fitted on the anvil.
- Note the readings indicated by the pointer on the dial, which is the izod or charpy value as the case may be.
- The diagrams of izod and charpy strikers and their positioning on the anvil is enclosed for easy identification and fitment.

OBSERVATION:-

- Energy absorbed by izod test=.....Nm
- Energy absorbed by charpy test=.....Nm

CONCLUSION:-

From the above experiment we determine the toughness of material by using impact testing machine.

CHARPY IMPACT TESTING MACHINE

Izod Impact testing Machine

EXPERIMENT NO:-06

AIM OF THE EXPERIMENT:-

To study about two stroke and four stroke petrol engine.

APPARATUS REQUIRED:-

Sl.no	Name of the apparatus	Specification	Quantity
01	Model of petrol stroke engine	2-stroke	1
02	Model of petrol stroke engine	4-stroke	1

THEORY:-

2-STROKE PETROL ENGINE:-

- A two stroke cycle petrol engine was devised by Dug lad clerk in 1880.
- In this cycle, the suction, compression, expansion, and exhaust takes place during two strokes of the piston. It means that there is one working stroke after every revolution of the crank shaft.
- A two stroke engine has ports instead of valves . the four stages of a two stroke petrol engine are described below:

1. **SUCTION STAGE:-**

- In this stage, the piston ,while going down towards BDC,uncovers both the transfer port and the exhaust port.
- The fresh fuel-air mixture flows into the engine cylinder from the crank case.

2. COMPRESSION STAGE:-

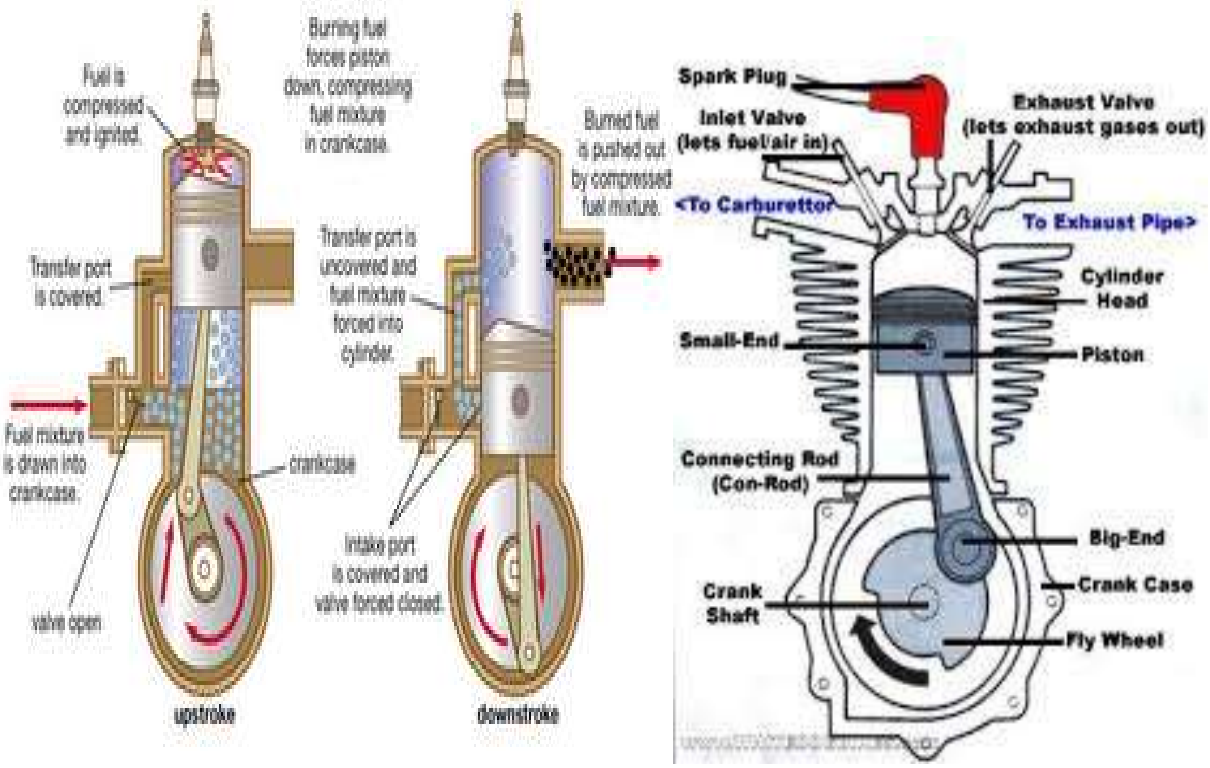
- In this stage , the piston, while moving up, first covers the transfer port .
- After that the fuel is compressed as the piston moves upwards BDC to TDC.
- In this stage, the inlet port opens and fresh fuel-air mixture enters into the crank case.

3. EXPANSION STROKE:-

- Shortly before the piston reaches the TDC (during compression stroke)the charge is ignited with the help of a spark plug.

- It suddenly increases the pressure and temperature of the product of combustion. But the volume, practically remains constant.
- Due to rise in the pressure, the piston is pushed downwards with a great force.
- The hot burnt gases expand due to high speed of the piston. During this expansion, some of the heat energy produced is transformed into mechanical work.

- **EXHAUST STROKE**:-
  - In this stage, the exhaust port is opened as the piston moves downwards.
  - The product of combustion, from the engine cylinder is exhausted through the exhaust port into the atmosphere.
  - This completes the cycle and the engine cylinders ready to suck the charge again.



4- STROKE PETROL ENGINE:-

Itrequires four strokes of the piston to complete one cycle of operation in the engine cylinder. The four strokes of a petrol engine are described below:

1.SUCTION STROKE:-

- In this stroke, the inlet valve opens and the charge is sucked into the cylinder as the piston moves downward from TDC.
- It continues till the piston reaches its BDC.

2.COMPRESSION STROKE:-

- In this stroke, both the inlet and exhaust valves are closed and the charge is compressed as the piston moves upwards from BDC to TDC.
- As a result of compression, the pressure and temperature of the charge increases considerably.
- This completes one revolution of the crank shaft.

3.EXPANSION STROKE:-

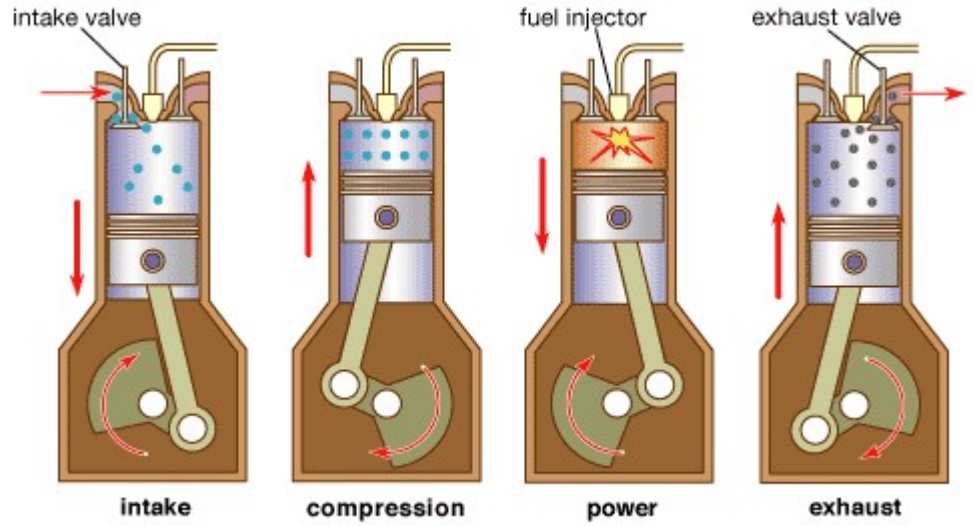
- Shortly before the piston reaches TDC (during compression stroke),the charge is ignited with the help of a spark plug.
- It suddenly increases the pressure and temperature of the products of combustion but the volume,practically remains constant.
- Due to the rise in pressure, the piston is pushed down with a great force. The hot burnt gases expand due to high speed of the piston.
- During this expansion,some of the heat energy produced is transformed into mechanical work.

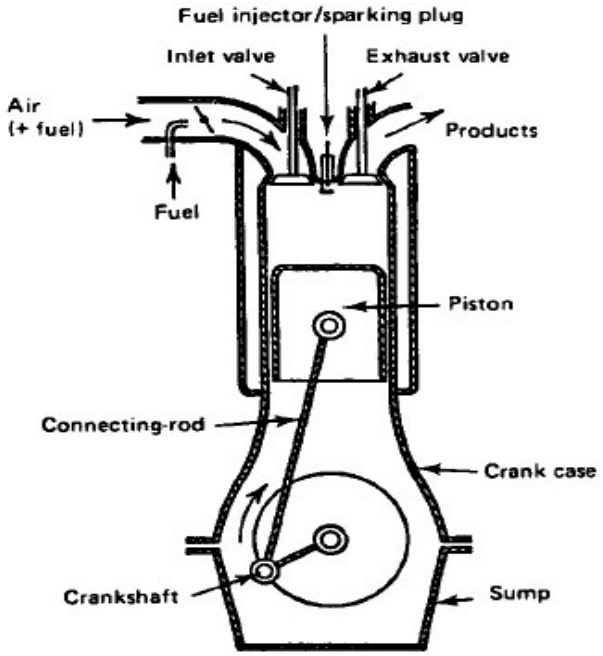
4. EXHAUST STROKE:-

- In this stroke,the exhaust valve is open as piston moves from BDC to TDC.
- This movement of the piston pushes out the products of combustion, from the engine cylinder and is exhausted through the exhaust valve into the atmosphere.
- This completes the cycle, and the engine cylinder is ready to suck the chargeagain.

CONCLUSION:-

From the above experiment we have successfully studied about 2-stroke and 4-stroke petrol engine.





4- STROKE PETROL ENGINE

EXPERIMENT NO:-07

AIM OF THE EXPERIMENT:-

To study about twostroke and four stroke diesel engine.

Sl.no	Name of the apparatus	specification	Quantity
01	Model of diesel engine	2-stroke01	01
02	Model of di0esel engine	4-stroke	02

THEORY:-

2-STROKE DIESEL ENGINE:-

A two stroke cycle diesel engine also has one working stroke after revolution of the crank shaft.All the four stages of a two stroke cycle diesel engine are described below:

1.SUCTION STAGE:-

- In this stage,the piston while going down towards BDC uncovers the transfer port and the exhaust port.
- The fresh air flows into the engine cylinder from the crank case.

2.COMPRESSION STAGE:-

- In this stage,the piston while moving up, first covers the transfer port and then exhausts post.
- After that the air is compressed as the piston moves upward.
- In this stage, the inlet port opens and the fresh air enters in to the crank case.

3.EXPANSION STAGE:-

- Shortly before the piston reaches the TDC (during compression stroke),the fuel oil is injected in the form of very fine spray into the engine cylinder through the nozzle known as fuel injection valve.
- At this moment, temperature of the compressed air is sufficiently high to ignite the fuel. It suddenly increases the pressure and temperature of the products of combustion.
- Due to increase in pressure,the piston is pushed with a great force .The hot burnt gases expand due to high speed of the piston.
- During the expansion,some of the heat energy produced is transformed into mechanical work.

4. EXHAUST STAGE:-

- In this stage, the exhaust port is opened and the piston moves downwards.
- The product of combustion from the engine cylinder is exhausted through the exhaust port into the atmosphere.
- This completes the cycle,and the engine cylinder is ready to suck the air again.

4-STROKE DIESEL ENGINE:-

It is also known compression ignition engine.Because the ignition takes place due to the heat produced in the engine cylinder at the end of compression stroke.The four stokes of the diesel engine are described below:

1.SUCTION STROKE:-

- In this stroke,the inlet valve opens and the pure air is sucked into the cylinder as the piston moves downwards from TDC.
- It continues till the piston reaches in the BDC.

2.COMPRESSION STROKE:-

- In this stroke,both the valves are closed and the air is compressed as the piston moves upwards from BDC to TDC.
- As result of compression,pressure and temperature of the air increases considerably.
- This completes the revolution of the crank shaft.

3.EXPANSION STROKE:-

- Shortly before the piston reaches the TDC, fuel is injected in the form of very fine spray in to the engine cylinder through the nozzle known as fuel injector or fuel injection valve.
- At this moment, temperature of the compressed air is sufficiently high to ignite the fuel.It suddenly increases the pressure and temperature of product of combustion.
- Due to increased pressure, the piston is pushed down with a great force.The hot burnt gases expand due to high speed of the piston.
- During the expansion,some of heat energy is transformed into mechanical work.

4.EXHAUST STROKE:-

- In this stroke the exhaust valve is open as the piston moves from BDC to TDC.
- This movement of the piston pushes out the product of combustion from the engine cylinder through the exhaust valve into the atmosphere.
- This completes the cycle and the engine cylinder is ready to suck the fresh air again.

CONCLUSION:-

From the above experiment we have successfully studied about the 2-stroke and 4-stroke diesel engine.

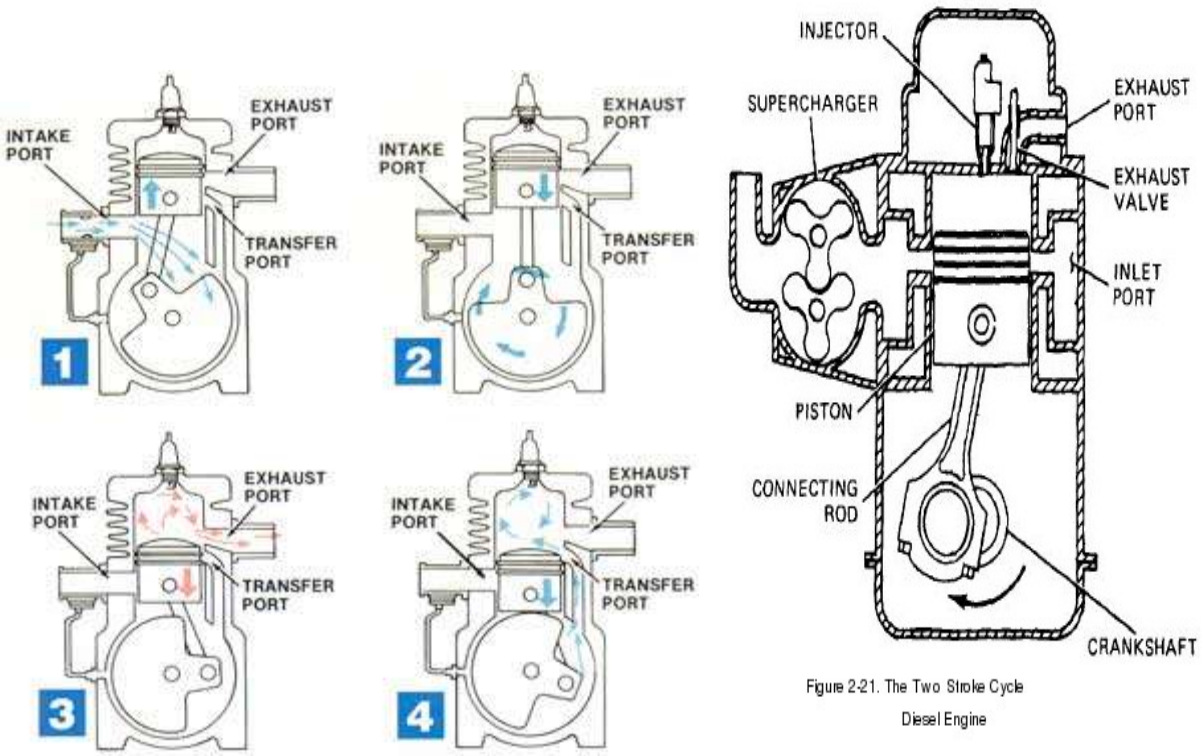
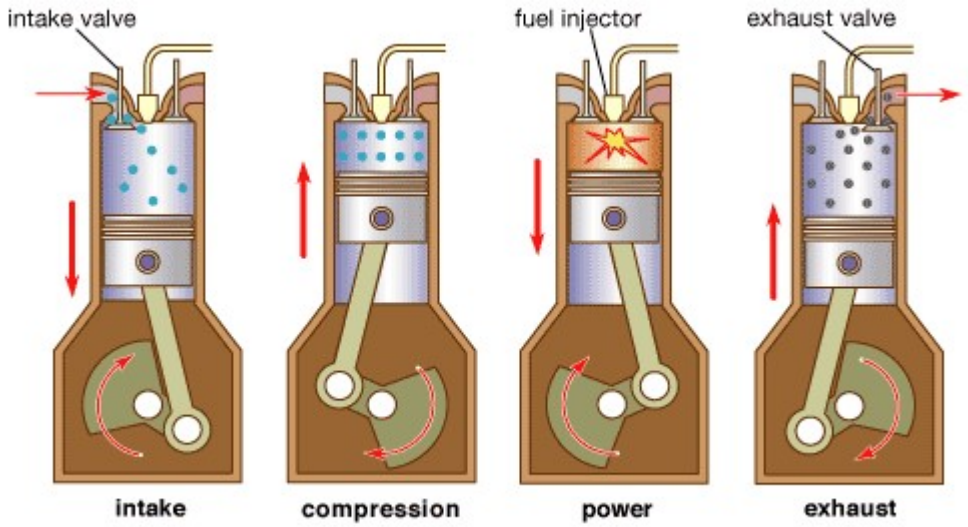
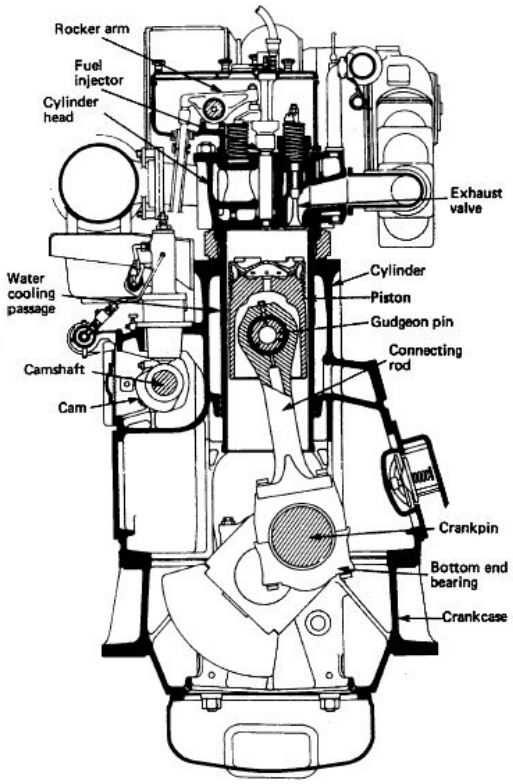


Figure 2-21. The Two Stroke Cycle Diesel Engine





4-STROKE DIESEL ENGINE

EXPERIMENT:-08

AIM OF THE EXPERIMENT:-

Study of boilers (fire tube, water tube)

APPARATUS REQUIRED:-

SL.NO	NAME OF THE APPARATUS	SPECIFICATION	QUANTITY
01	Fire tube boiler	Cochran boiler	01
`02	Water tube boiler	Babcock and Wilcox boiler	01

THEORY:-

BOILER:-

A steam generator or boiler is, usually, a closed vessel made of steel. Its function is to transfer the heat produced by the combustion of fuel (solid, liquid or gaseous) to water,and ultimately to generate steam.

FIRE TUBE BOILER:-

The boiler in which The hot gases form the furnace pass through the tubes which are surrounded by water is called fire tube boiler.

Example:- Cochran Boiler.

COCHRAN BOILER :-

- There are various designs of vertical multitubularboilers. A Cochran boiler is considered to be one of the most efficient types of such boilers. It is an improved type of simple vertical boiler.
- The boiler consists of an external cylindrical shell and a fire box. The shell and fire box are both hemispherical, the hemispherical crown of the boiler shell gives maximum space and strength to withstand the pressure of steam inside theboiler.
- The hemispherical crown of the fire box also advantages for resisting intense heat.
- The firebox and the combustion chamber is connected through a short pipe.
- The flue gases from the combustion chamber flow to the smoke box through a number of smoke tubes. These tubes generally have 62.5mm external dia. And are 165 in number.

- The gases from the smoke box pass to the atmosphere through a chimney.
- The combustion chamber is lined with fire bricks on the shell side. A man hole near the top of the crown on the shell is provided for cleaning.
- At the bottom of the firebox, there is grate and the coal is fed through the fire hole.

WATER TUBE BOILER :-

The boiler in which The water circulates inside the tubes which are surrounded by hot gases from the furnace is called water tube boiler.

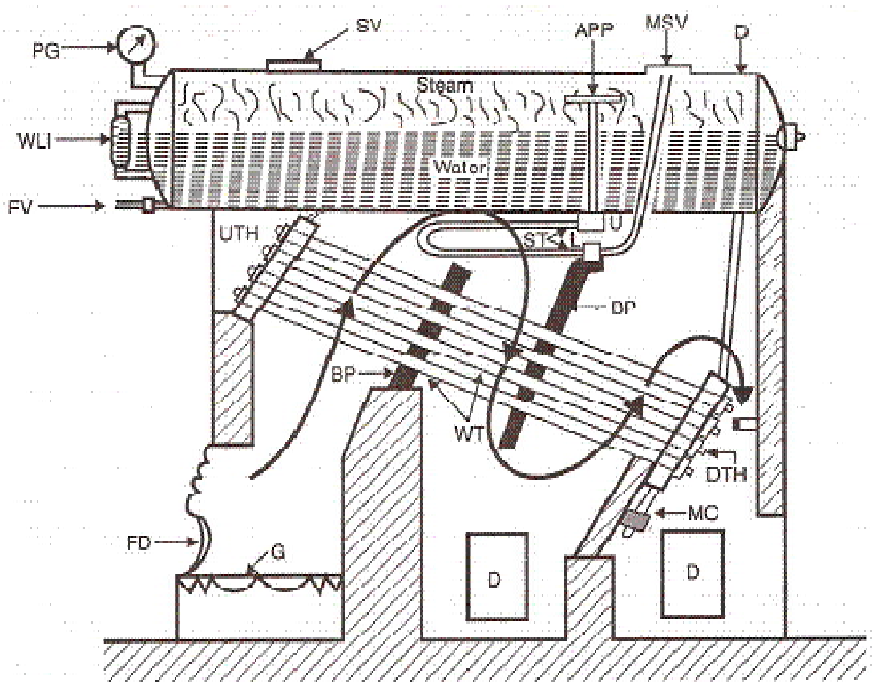
Example : Babcock and Wilcox boiler.

BABCOCK AND WILCOX BOILER:-

- It is straight tube, stationary tube water tube boiler.]
- It consists of steam and water drum. It is connected by a short tube with header at the back end.
- The water tubes are inclined to the horizontal and connect the uptake header to the down take header.
- Each row of the tube is connected with two headers, and there are plenty of such rows.
- A mud box is provided with each down take header and the mud, that settles down is removed.
- A hopper is provided to supply the coal.
- A baffle is present which moves upward and down to circulate the smoke inside the boiler.
- The dampers are operated by a chain which passes over a pulley to the front of a boiler to regulate the draught.
- The boiler is suspended on steel girders, and surrounded on all the 4 sides by the fire brick walls.
- A door is provided for a man to enter the boiler for repairing and cooling.
- Water circulates from the drum into the header and through the tubes to header and again to the drum.
- Water continues to circulate like this till it is evaporated.
- A steam super heater consists of a large number of steel tubes and contains two boxes ;one is superheated steam box and other is saturated steam box.

- The steam generated above the water level in the drum flows in the dry pipe and through the inlet tubes into the superheated steam box.
- The steam ,during its passage through the tubes ,gets further heated and through the outlet pipe to the stop valve.
- The boiler is fitted with usual mountings, such as safety valve, feed valve, water level indicator and pressure gauge.

CONCLUSION:- From the above experiment we have successfully studied about water tube and fire tube boiler.



D = Drum
DTH = Down take header
WT = Water tubes
BP = Baffle plates
D = Doors
G = Grate
FD = Fire door
MC = Mud collector
WLI = Water level indicator
PG = Pressure gauge
ST = Superheater tubes
SV = Safety valve
MSV = Main stop valve
APP = Antipriming pipe
L = Lower junction box
U = Upper junction box
FV = Feed valve

BABCOCK AND WILCOX BOILER

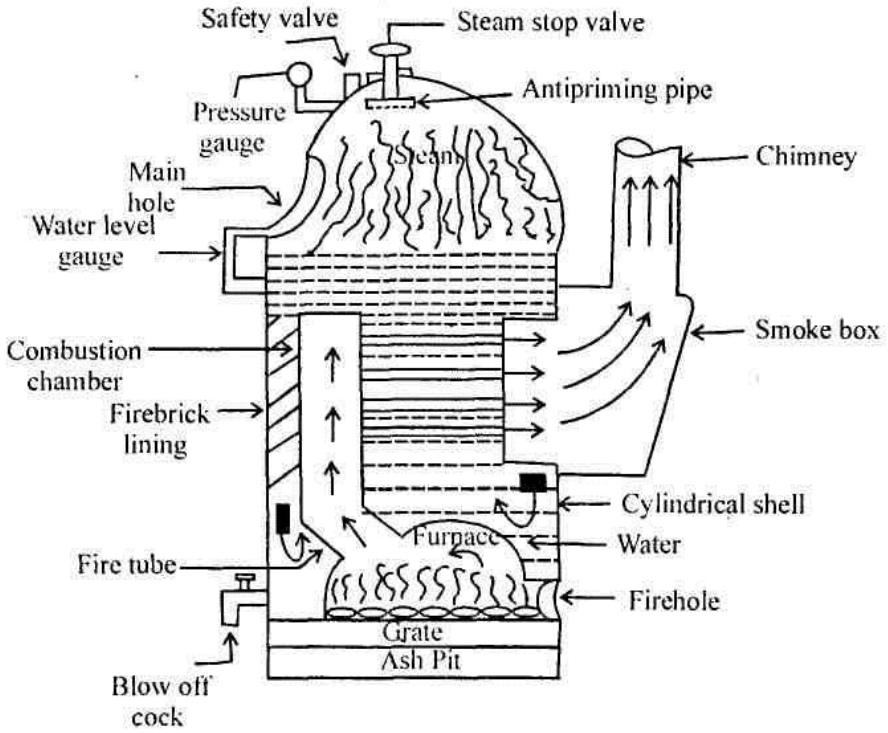


Fig. Cochran Boiler

EXPERIMENT:-09

AIM OF THE EXPERIMENT :-

To Study about Steam Engine.

APPARATUS REQUIRED:-

SL.NO	NAME OF THE APPARATUS	SPECIFICATION	QUANTITY
01	Steam engine	Model	01

THEORY:-

- In a reciprocating steam engine, as the heat energy in the steam is converted into mechanical work by the reciprocating motion of the piston, it is also known as reciprocating steam engine
- The superheated steam at a high pressure from the boiler is entered into the steam chest.
- After that the steam makes its way into the cylinder through any inlet ports depending upon the position of the D-slide valve.
- When port A is open, the steam rushes into the left side of the piston and forces it to the right side. At this stage the slide valve covers the exhaust port and another steam port.
- Since the pressure of the steam is greater on the left side thus the piston moves to the right side.
- When the piston reaches near the end of the cylinder, the D-slide valve closes the exhaust port and the steam port A. The steam port B is now open and the steam rushes to the right side of the piston.
- This forces the piston to the left at the same time the exhaust steam goes out through the exhaust pipe and thus complete the cycle of operation.

IMPORTANT PARTS OF STEAM ENGINE:-

FRAME :-

It is a heavy cast iron part which supports all the stationary as well as moving parts and holds them in proper position. It generally, rests on engine foundations.

CYLINDER :-

It is also a cast iron cylindrical hollow vessel in which the piston reciprocates under the steam pressure both ends of the cylinder are closed and made steam tight.

STEAM CHEST :

It is an integral part of the cylinder, it supplies steam to the cylinder with the movement of D-slide valve. .

D-SLIDE VALVE:-

It moves in the steam chest with simple harmonic motion. Its function is to exhaust steam from the cylinder with proper movement.

INLET AND EXHAUST PORT:-

These are holes provided in the body of the cylinder for the movement of steam .the steam is admitted from the steam chest alternatively to either sides of the cylinder through the inlet ports .The steam ,after doing its work in the cylinder, is exhausted through the exhaust port.

PISTON:-

- Its function is to convert heat energy of the steam into mechanical work.
- Piston rings are fitted in the grooves of the piston. Their purpose is to prevent the leakage of steam.

PISTON ROD:-

It is a circular rod, which is connected to the piston on one side and cross head to the other. Its main function is to transfer motion to the cross head.

CROSS-HEAD:-

It is a link between the piston rod and connecting rod. Its function is to guide motion of the piston rod and to prevent it from bending.

CONNECTING ROD:-

It is made of forged steel, whose one end is connected to the cross head and the other to the crank. Its function is to convert reciprocating motion of the piston into rotary motion of the crank.

CRANK SHAFT:-

It is the main shaft of the engine having a crank. The crank works on the lever principle and products rotary motion of the shaft. The crank shaft is supported on main bearing of the engine.

ECCENTRIC:-

It is generally made up cast iron, and is fitted to the crank shaft. Its function is to provide reciprocating motion to the D-slide valve.

FLY WHEEL:-

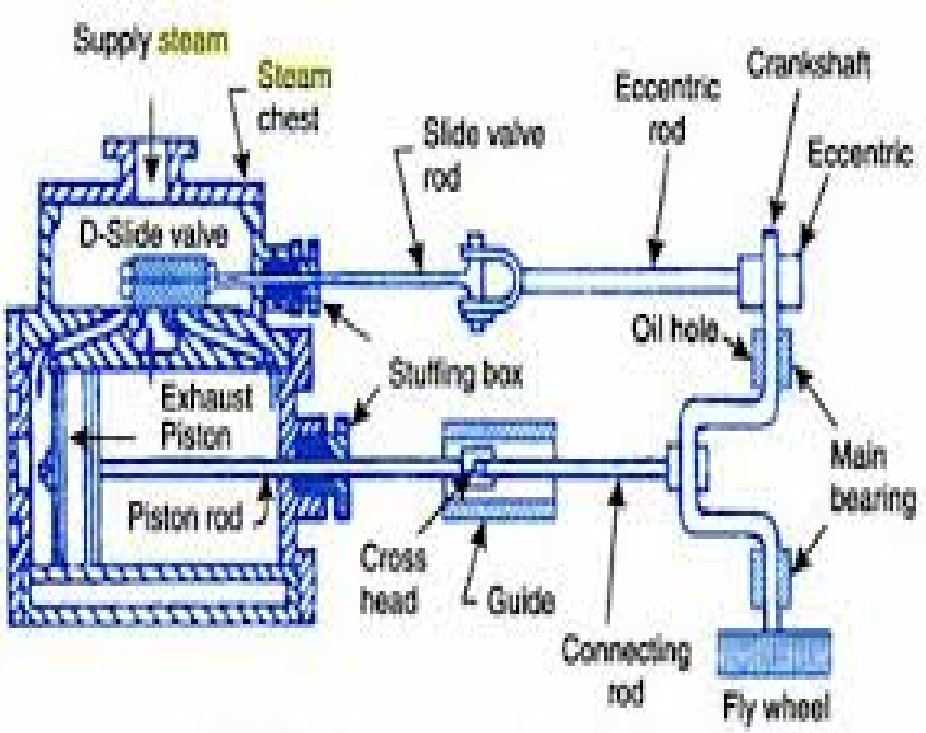
It is a heavy cast iron wheel, mounted on the crank shaft. Its function is to prevent the fluctuation of engine .It also prevents the jerks to the crank shaft.

ECCENTRIC ROD AND VALVE ROD:-

The eccentric rod is made of forged steel, whose one end is fixed to the eccentric and other to the valve rod. Its function is to convert rotary motion of the crank shaft into to and fro motion of the valve rod .The valve rod connects the eccentric and the D-slide valve. Its function is to provide simple harmonic motion to the D-slide valve.

CONCLUSION:-

From the above experiment we have successfully studied about steam engine.



STEAM ENGINE

EXPERIMENT:-10

AIM OF THE EXPERIMENT :-

Determination offlash point and fire point.

APPARATUS REQUIRED:-

SL.NO	NAME OF THE APPARATUS	SPECIFICATION	QUANTITY
01	Flash point and fire point apparatus		01
02	Fuel	Petrol/Kerosene/Diesel	0.5lit
03	Ignition source	Cotton	
04	Thermometer	Degree Celsius	01

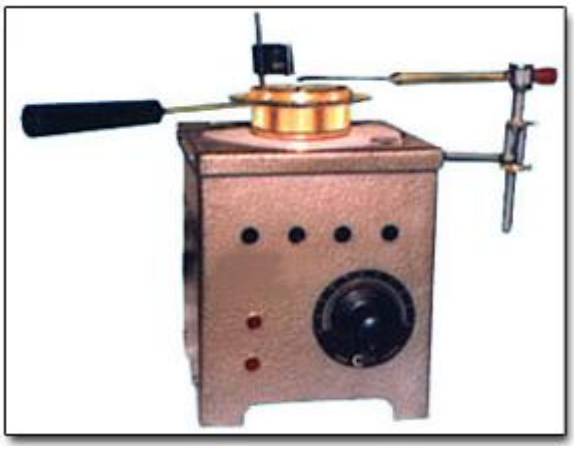
THEORY:-

Flash Point:-

The flash point of any fuel is the lowest temperature at which it can vaporize to form an ignitable mixture in air. At flash point the vapor may easy to burn the source of ignition is removed. The flash is not to be confused with auto ignition temp. Which does not requires an ignition source.

Fire Point:-

The fire point of a fuel is the temp. At which it will continue to burn for at least 5 sec. After ignition by an open flame, fire point can be assumed to be about 10° C higher than the flash point.



FLASH POINT AND FIRE POINT APPARATUS

PROCEDURE:-

- We take the flash point and fire point apparatus.
- Then, its electric wire plug is connected to the electric circuit board.
- Then, we choose a fuel for testing.
- Then, take a thermometer for taking temp. Of the fuel.
- Fuel is inserted in to the apparatus.
- Set the thermometer and switch on the apparatus for heating.
- Then, the fuel is heating and also you can raise the temp. By a temp Adjustment switches on the apparatus.
- And set the ignition source on the fuel of the apparatus. If it will catch the fire frequently or slightly that is called flash point.
- Then, adjust the ignition source of the fuel. Then, if that ignition source catches the fire continuously that is fire point.

TABULATION:-

Types of fuel	Flash point	Fire point
Petrol		
Diesel		
Kerosene		

CONCLUSION:-

From the above experiment we determine the flash point and the fire point of the fuel.