AIM OF THE EXPERIMENT:-

To determine the co-efficient of discharge (Cd) of venturimeter.

APPARATUS REQUIRED:-

Sl.No	EQUIPMENT	SPECIFICATION	QUANTITY
01	Venturimeter test rig		01
02	stop watch	Digital	01
03	steel Rule	L = 30cm	01

THEORY:-

A venturimeter is an instrument used to measure the rate of discharge at different sections of the pipe line. A venturimeter consists of 3 - parts.

- Converging section
- Throat section
- Divergent Section

Co-efficient of discharge $Cd = \frac{Qact}{Qth}$

where $Qact = \frac{lxbxh}{t}$

l = length of discharge tank

b = breadth of discharge tank

h = height of discharge tank

t = time taken in sec.

$Qth = \frac{A_1 A_2 \sqrt{2gH}}{(\sqrt{A_1^2 - A_2^2})}$ where A_1 = inlet area of venturimeter

A_2 = outlet area of venturimeter

EXPERIMENTAL PROCEDURE:-

→ Set the manometric pressure tube to atmospheric pressure by opening the upper valve.

→ Now the supply of water may be controlled by the stop valve.

→ One of the valves of any pipe may be opened and close all of other three valves.

→ Note the discharge reading for the particular flow by measuring the height of the discharge tank.

→ Note the time taken by stop watch for the particular flow.

→ Note the reading for the pressure head from the U-tube manometer with its corresponding reading of discharge.

→ Now take three readings for this pipe and calculate Cd for that instrument using formula given above

→ Now close this valve and open another valve having different diameter pipe and repeat the procedure as mentioned above. Three such readings also taken and calculate Cd.

→ Similarly take readings for all other diameter pipe and calculate Cd for each case.

TECHNICAL SPECIFICATION:-

Length of discharge tank. $l = 40cm = 0.4m$ Breadth of the discharge tank $b = 30 cm = 0.3 m$

Height of discharge tank $h = 100cm = 0.1cm$ inlet dia of Venturimeter $D_1 = 2cm = 0.02m$

Inlet Area $(A_1) = \pi/4 \times (D_1)^2 = \pi/4 \times (0.02)^2 =$ _____ m^2

outlet dia of venturimeter (throat dia) $D^2 = 1cm = 0.01m$

outlet Area $(A_2) = \pi/4 \times (D_2)^2 = \pi/4 \times (0.01)^2 =$ _____ m^2

Specific gravity of mercury $(S_g) = \frac{\rho_{Hg}}{\rho_{H_2O}} = \frac{136mm}{1000} = 13.6$

Specific gravity of water $(S_0) = \frac{\rho_{H_2O}}{\rho_{H_2O}} = \frac{1000}{1000} = 1$

CALCULATION TABLE:-

SL NO	MANOMETER READING (m)			$a_2 = \frac{1}{3}bh$ (m^3/sec)	$a_2 = \frac{A_1 A_2 \sqrt{2gh}}{\sqrt{A_1^2 - A_2^2}}$	$C_d = C_{act}/C_{th}$	Remarks
	Initial height h_1 (m)	Final height h_2 (m)	net head $h = h_1 - h_2$				
01	52.5cm	46.5cm		0.00014	6.0507	231×10^{-4}	
02	71.5cm	64.5cm		0.00015	6.0507	2.47×10^{-5}	2.93×10^{-4}
03	45.5cm	43.cm		0.000136	3.616	3.76×10^{-5}	

CONCLUSION:- From the above experiment we have calculated the co-efficient of discharge of venturimeter to be.

AIM OF THE EXPERIMENT:-

To determine the break thermal efficiency of the single cylinder diesel engine.

APPARATUS REQUIRED:-

S.No	EQUIPMENT	ENGINE SPECIFICATION	
01	Single cylinder Diesel Engine Test Rig	MAKE	
		BHP	0.5

PROCEDURE:-

→ Fill fuel into the fuel tank mounted on the panel frame.

→ Check the lubricant oil in the engine sump with help of dipstick provide.

→ To stop the engine after the experiment is over push / pull governor lever towards the engine cranking side.

CALCULATION:-

$$BP = \frac{\pi N (W-S) \frac{1}{2} (D+d)}{60 \times 1000} \text{ in kW}$$

where W = Dead weight in N

S = Spring Balance reading in N

D = ~~Diameter~~ Diameter of brake drum in meter

d = Diameter of rope in meter

N = Speed of the engine

Brake in thermal efficiency = $\frac{\text{Brake power}}{\text{Energy supplied to the engine}}$

$$\eta = \frac{BP}{m_f \times C_v}$$

CONCLUSION:-

we determine the breake thermal efficiency of the single cylinder diesel engine.

Experiment No.: 4 Date:

AIM OF THE EXPERIMENT:-

Determine the B.H.P, I.H.P and S.F.C of multi cylinder petrol engine by morse trust

APPARATUS REQUIRED:-

Sl No	EQUIPMENT	SPECIFICATION	
01	Four cylinders petrol Engine trust Rig	BHP	10
		No of cylinder	Four
		Speed	1500 Rpm
		Compression Ratio	8.5:1
		Bore	73 mm
		Stroke	89 mm
		Orifice Dia	20 mm
		Type of ignition	
		Type of cooling	
		Type of loading	
		Type of starting	

THEORY:-

→ The morse test is used to find out the indicated power of a multi cylinder reciprocating engine.

→ The engine is run at a particular speed and the torque is measured by cutting out the firing of each cylinder in turn and noting the trail in brake power each time while maintaining the set engine

speed by reducing load.

Let W = Dynamometer load in kg

N = RPM of the engine

A = BHP of 4 cylinder

$$BHP = \frac{(W-S)\pi(D+d)N}{4500}$$ in horse power

THEN IHP CALCULATION:-

1HP of 1st cylinder = A-B

1HP of 2nd cylinder = A-C

1HP of 3rd cylinder = A-D

1HP of 4th cylinder = A-E

Total 1 HP calculation

= Total 1HP of the engine = 1HP (1st + 2nd + 3rd + 4th)

BSFC CALCULATION:-

It is the ratio bet^n the mass of fuel consumed per hour to the BHP.

$$S.F.C = \frac{mf}{BHP} \text{ kg / BHP Hr}$$

Bf = fuel consumed in kg/hr

CALCULATION:-

Sl.NO	CONDITION	N IN RPM	W IN KG	
01	A	1500	1kg	
02	B	1500	1.5 kg	
03	C	1500	2.0kg	
04	D	1500	2.5 kg	
05	E	1500	3.0 kg	

CONCLUSION:-

We have successfully studied the experiment.

AIM OF THE EXPERIMENT:-

To determine the mechanical efficiency of a single stage compressor.

APPARATUS REQUIRED:-

SL NO	EQUIPMENT	SPECIFICATION	QUANTITY
01	Air compressor test		01
02	Tachometer		01
03	Stop watch		01

THEORY:-

An air compressor is the machine which compress the air and to raise the pressure.

The air compressor sucks air from atmosphere, compress it and then delivers the same under a high pressure to as storage vessel.

From the storage vessel it may be conveyed by the pipe line to a place where the supply of compressed air is required since the compression of air required some work to be done on it.

CALCULATION :-

Mechanical efficiency of compression in mech = $\frac{I.P}{B.P}$

W = work by the compression = $\frac{n}{n-1} \times m R T_1 \times \left\{\left(\frac{P_2}{P_1}\right)^{\frac{n-1}{n}} - 1\right\}$

Break power = $\frac{3600 \times 10 \times 0.8}{t \times 0}$ kw

Where W = work done

N = Number of revolution in RPM

P_1 = Pressure of air at the inlet at the compressor

P_2 = Pressure of the air at the outlet of the compression.

T_1 = Absolute temp of air the inlet of the compressure.

T_2 = Absolute temp of air the outlet of the compressure.

S.LNO	Temperature	pressure	No of strip working the row = n)	

CONCLUSION' -

we have sucessfully determined.