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PRESSURE * VOLUME = (11/14) TEMPERATURE

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ABSTRACT :

The combine relation of volume , pressure and temperature of a given mass of gas can be derived from the combining law of (Boyle's law as well as Charle's law) , (Boyle's law as well as Gay Lussac's law) and (Charle's law as well as Gay Lussac's law). The combine relation of pressure, volume and temperature of a given mass of gas can be derived from the motion of a wheel.

Rotation is motion and vice versa .If a force is applied on a wheel and that force simultaneously converts to the centripetal force as well as the centrifugal force then the wheel moves forward. So every point on the wheel moves vertically on a curved path to cover horizontally on a straight line path.

The following laws are derived from the above fact as follows ,

LAW OF MOTION ---------- Nrusingh's 1st law

(a) INERTIA OF REST : A body is at rest, until the applied force on it , converts to the centripetal force as well as the centrifugal force .

(b) INERTIA OF MOTION : A body is at motion, as long as the applied force on it , converts to the centripetal force as well as the centrifugal force .

The following law is derived from Nrusingh's 1st law

" THE FORCE OF ACTION IS ALWAYS EQUAL TO THE SUM OF OPPOSITE REACTION AND ABSORPTION " ---------- Nrusingh's 2nd law

This implies that **14 PARTS ACTION = 11 PARTS REACTION + 3 PARTS ABSORPTION**

So **1 part action = (11/14) part reaction + (3/14) part absorption**

The following two laws are derived from Nrusingh's 2nd law

FORCE = (11/14) MASS*ACCELERATION ----- Nrusingh's 3rd law

ENERGY = (11/14) MASS (VELOCITY OF LIGHT)^2 ---- Nrusingh's 4th law

The following law is derived from Nrusingh's 3rd law

PRESSURE * VOLUME = (11/14) TEMPERATURE

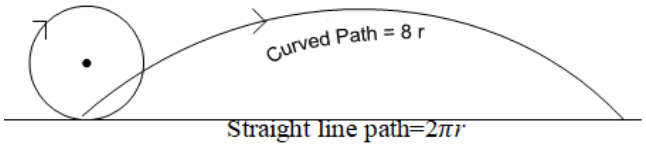
where (11/14) is the constant of proportionality

The above law is the general gas law of volume, pressure and temperature

KEY WORDS :

Pressure, volume, Temperature, Mass, Acceleration Force, Constant of proportionality, Absorption, Action, Reaction, Centripetal force, Centrifugal force, Cycloid path , Straight line path .

INTRODUCTION :



When a force is applied to a wheel so that the force is converted to the centripetal force as well as the centrifugal force then every point of the wheel moves vertically **8r length** in the cycloid path by the centripetal force and Simultaneously the same point covers **$2\pi r$ length** horizontally on the straight line path by the centrifugal force.

Suppose s_1= length of the cycloid path and s_2 = length of the straight line path

So $s_1 = 8$ r and $s_2 = 2\pi$ r

Here $8r > 2\pi r$ => $s_1 > s_2$

Suppose v_1= Velocity of any point on the cycloid path = $\frac{ds_1}{dt}$

And v_2 = Velocity of the same point on the straight line path = $\frac{ds_2}{dt}$

As $s_1 > s_2$ => $\frac{ds_1}{dt} > \frac{ds_2}{dt}$

So $v_1 > v_2$ => $mv_1 > mv_2$

=> $m\frac{dv_1}{dt} > m\frac{dv_2}{dt}$ => $ma_1 > ma_2$

Hence $\boldsymbol{F_1 > F_2}$

where $\frac{dv_1}{dt} = a_1$, $\frac{dv_2}{dt} = a_2$

$F_1 = ma_1$ and $F_2 = ma_2$

The magnitude of the centripetal force is equal to the magnitude of the centrifugal force. But $\boldsymbol{F_1 > F_2}$ =>

$F_1 = F_2$+ SOME ABSORBED FORCE

Here **F_1 = CENTRIPETAL FORCE**

And **F_2 + SOME ABSORBED FORCE = CENTRIFUGAL FORCE**

Now **$F_1 = F_2$+ SOME ABSORBED FORCE**

=> **ACTION FORCE = REACTION FORCE + ABSORPTION FORCE**

=> **ACTION = REACTION + ABSORPTION**

SUBJECT MATTER :

The centripetal force is applied on a point of a wheel so that point moves **8r length** on the cycloid path, Simultaneously the centrifugal force is applied on the same point of the wheel so the point covers **$2\pi r$ length** on the straight line path .

So $\boldsymbol{F_1 : F_2}$

ACTION OF CENTRIPETAL FORCE :

REACTION OF CENTRIFUGAL FORCE

$$So \quad F_1 : F_2 = 8r : 2\pi r = 8 : 2\pi$$

$$= 8 : (2 * 22/7) = (8 * 7/7) : (2 * 22/7)$$

$$Hence \quad F_1 : F_2 = 56 / 7 : 44 / 7$$

$$= 56 : 44 = 14 : 11$$

This implies that,

" TO EVERY 14 PARTS OF ACTION , THERE IS 11 PARTS OF REACTION "

The magnitude of the centripetal force is equal to the magnitude of the centrifugal force.

So each one of centripetal force as well as the centrifugal force must do equal amount of work. But here centripetal force does more work than the centrifugal force, This implies that some amount of centrifugal force is absorbed on the road .

Hence

14 PARTS ACTION – 11 PARTS REACTION

= 3 PARTS ABSORPTION

To every 14 parts of action, there is 11 parts of reaction and 3 parts of absorption .This implies that

14 PARTS ACTION = 11 PARTS REACTION + 3 PARTS ABSORPTION

So **1 part action = (11/14) part reaction + (3/14) part absorption**

The law of force states that ,

THE ACCELERATION OF A BODY IS DIRECTLY PROPORTIONAL TO THE RESULTANT FORCE AND INVERSELY PROPORTIONAL TO ITS MASS

Suppose F = Resultant force , which makes the body to move,

m = mass of the body and

a = acceleration of the body .

Mathematically , the above law can be expressed in the following two ways

The acceleration of a body is directly proportional to the resultant force

i.e. $a \propto F$ ----------(1)

and also

The acceleration of a body is inversely proportional to its mass

i.e. $a \propto (1/m)$ ----------(2)

Combining the above two facts (1) and (2) it is obvious that

The acceleration of the body is directly proportional to (force/mass)

i.e. $a \propto F * (1/m) = (F/m)$

So $a \propto (F/m)$

Its converse is also true

So **(force / mass) is directly proportional to acceleration of the body i.e.** $(F/m) \propto a$

This implies that ,

Force is directly proportional to the product of the mass and acceleration

i.e. $F \propto (m * a)$

So **Force = k (mass * acceleration)**

Where k = Constant of proportionality

As 1 part action = (11/14) part reaction + (3/14) part absorption

So it is obvious that ,

1 part of the centrifugal force = (11/14) part of the centrifugal force used for motion + (3/14) part of the centrifugal force used for absorption .

The above fact implies that , when 1 part of force is apllied to a wheel ,then the wheel moves by the (11/14) part of that force and the rest (3/14) part of the force is absorbed on the way .

So only (11/14) part of the force is used for the working purpose out of the 1 part of the applied force and the rest 3/14 part of the force is absorbed in the medium .

As only 11/14 part of the force is used for the working purpose out of 1 part of force, So for the working of the force the **Constant of proportionality is k , and the value of k = (11 / 14)**

But **Force = k (mass * acceleration**)

----------(3)

Putting the value of k = (11/14) in equation (3) , It is obtained that

Force = (11/14) mass * acceleration

Hence **F = (11/14) m * a**

IT IS THE ACTUAL RESULTANT FORCE, WHICH DOES THE WORK .

Boyle's law states that ,

The volume of given mass of a gas is inversely proportional to its pressure at constant temperature

Mathematically, Boyle's law can be expressed as follows

Volume ∝ 1/ Pressure ----------(4)

Charle's law states that ,

Pressure remaining constant, the volume of the given mass of a gas is directly proportional to its Kelvin temperature .

Mathematically, Charle's law can be expressed as follows

Volume ∝ Temperature ----------(5)

Gay Lussa's law states that,

The pressure of given mass of a gas is directly proportional to its Kelvin temperature at constant volume

Mathematically, Gay Lussac's law can be expressed as follows

Pressure ∝ Temperature ----------(6)

CASE –I

Combining law of Boyle and Charle

The followings laws are Boyle's law and Charle's law

Volume ∝ 1/ Pressure ----------(4)

and **Volume ∝ Temperature----------(5)**

So combining the laws of (4) and (5) It is obtained that

Volume ∝ (Temperature / Pressure)

=>Pressure ∝ (Temperature / Volume)

where **Volume = V , Pressure = P** and **Temperature = T**

Here Pressure ∝ T / V

=> **Force/Area ∝ T / V**

Since Force / Area = Pressure

Now **Force / Area ∝ T / V**

=> **Force ∝ Area (T / V)**

=> **Force = k * Area (T / V)**

Since (11/14) part of force is used only for the working purpose out of the 1 part of the applied force and the rest 3/14 part of the force is absorbed in the medium .

So F = (11/14) m * a

Hence for the working purpose of force, k = constant of proportionality =(11/14),

Hence **Force = k * Area (T / V)**

=> **Force = (11/14) * Area (T / V)**

=> **Force/Area = (11/14) (T / V)**

=> **Pressure = (11/14) (T / V)**

=> **Pressure * Volume = (11/14) T**

=> **Pressure * Volume**

= (11/14) Temperature

=> **P V = (11/14) T**

So the combining law of Boyle and Charle states that

PRESSURE * VOLUME

= (11/14) TEMPERATURE

=> **P V = (11/14) T**

CASE -II

Combining law of Charle and Gay Lussac

The followings laws are Boyle's law and Gay lussac's law .

Boyle's law states that

Volume ∝ 1/ Pressure

The converse of this statement is also true,

So **Pressure ∝ 1/ Volume -------(4)**

and Gay lussac's law states that

Pressure ∝ Temperature -----(6)

So combining the laws of (4) and (6)

It is obtained that ,

Pressure ∝ Temperature / Volume

=>**(Force/Area) ∝ Temperature/Volume**

Since **Pressure = Force/Area**

So **Force ∝Area(Temperature /Volume)**

Now **Force ∝ Area (T / V)**

=> **Force = k * Area (T / V)**

Since (11/14) part of force is used only for the working purpose out of 1 part of the applied force and the rest 3/14 part of the force is absorbed in the medium . So F = (11/14) m * a

Hence for the working purpose of force, k = constant of proportionality = (11/14)

Hence **Force = k * Area (T / V)**

=> **Force = (11/14) Area (T / V)**

=> **Force/Area = (11/14) (T / V)**

=> **Pressure = (11/14) (T / V)**

=> **Pressure * Volume**

= (11/14) Temperature

So the Combining law of Boyle and Gay Lussac states that

PRESSURE * VOLUME

= (11/14) TEMPERATURE

This implies that **P V = (11/14) T**

CASE -III

Combining law of Charle and Gay Lussac

The followings are Charle's law and Gay Lussac's law

Volume ∝ Temperature

The converse of this statement is also true,

So **Temperature ∝ Volume -------(5)**

and **Pressure ∝ Temperature**

The converse of this statement is also true,

So **Temperature ∝ Pressure -----(6)**

Hence combining the laws of (5) and (6) , it is obtained that

Temperature ∝ Volume * Pressure

The converse of this statement is also true,

So **Pressure * Volume ∝ Temperature**

=>**Pressure ∝ (Temperature/Volume)**

=>**(Force/Area) ∝ Temperature/Volume**

Since Force / Area = Pressure

=>**Force ∝ Area*(Temperature/Volume)**

=> **Force ∝ Area * (T/ V)**

=> **Force = k * Area (T/ V)**

Since (11/14) part of force is used only for the working purpose out of the 1 part of the applied force and the rest 3/14 part of the force is absorbed in the medium.

So F = (11/14) m * a

Hence for the working purpose of force, k = constant of proportionality = (11/14)

Hence **Force = k * Area (T / V)**

=> **Force = (11/14) Area (T / V)**

=> **(Force/Area) = (11/14) (T / V)**

=> **Pressure = (11/14)(Temperature / Volume)**

Since Force / Area = Pressure

Hence **Pressure * Volume = (11/14) Temperature**

So the combining law of Charle and Gay Lussac states that

PRESSURE * VOLUME

= (11/14) TEMPERATURE

=> **PV = (11/14) T**

CONCLUSION :

All the combining laws of (**Boyle's law** as well as **Charle's law) , (Boyle's law** as well as **Gay Lussac's law)** and (**Charle's law** as well as **Gay Lussac's law)** state that

PRESSURE * VOLUME

= (11/14) TEMPERATURE

This law is the general gas law of volume, pressure and temperature .

If any two of the pressure, volume and temperature of a given mass of gas are given then the third one can be found out by the following way .

The general gas law of volume, pressure and temperature of a given mass of gas States that

PRESSURE * VOLUME

= (11/14) TEMPERATURE

=> **PV = (11/14) T**

If the volume and the pressure of given mass of a gas is given, then the temperature of it can be found out as follows

Since **PV = (11/14) T**

=> **T = (14/11) PV ---------- (I)**

If the volume and the temperature of given mass of a gas is given ,then the pressure of it can be found out as follows

Since **PV = (11/14) T**

=> **P = (11/14) (T/V) ---------- (II)**

If the temperature and the pressure of given mass of a gas is give ,then the volume of it can be found out as follows

Since **PV = (11/14) T**

=> **V = (11/14) (T/P) ----------(III)**

Here P = Pressure , V = volume and

T = Temperature

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