Practical No. 10: Verify law of moment of forces using law of moment apparatus for given forces.

I. Practical Significance

The Principle of Moments states that when a body is balanced, the total clockwise moment about a point equals the total anticlockwise moment about the same point. The real examples on moment of force in real life are the opening and closing of a door along a fixed hinge, a seesaw, and unscrewing a nut with a spanner.

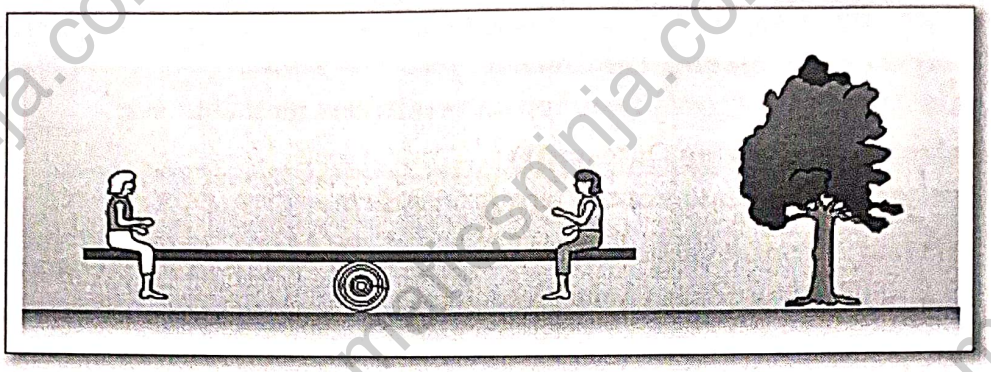

Fig.10.1

When an object is balanced on a pivot the turning effect of the forces on one side of the pivot must balance the turning effect of the forces on the other side of the pivot - if they didn't it would not balance. In the picture (Fig.10.1) two girls are sitting on a see saw. They have moved until it is balanced. They are the same weight and so to balance the see saw they must sit the same distance from the pivot.

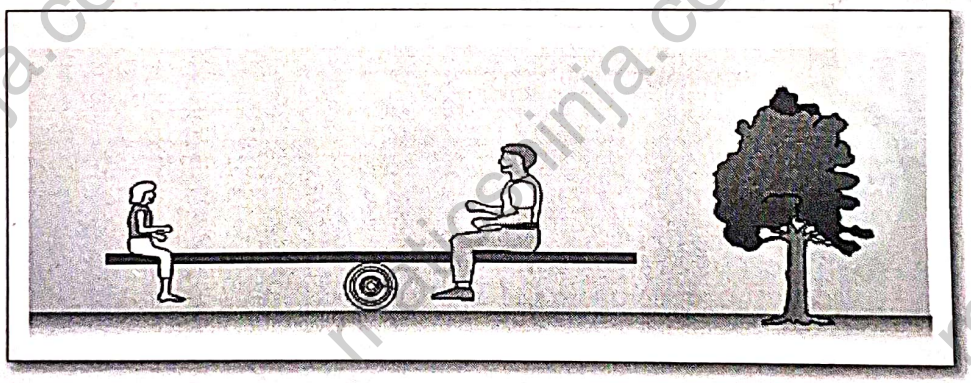

Fig.10.2

In the picture (Fig.10.2) one of the girls gets off and a man sits on instead. They move until the see saw is balanced. The girl is much lighter than the man and so she has to sit further away from the pivot then he does so that she can balance his extra weight.

You should remember that the turning effect of a force is called the moment of the force and is found by multiplying the force by its distance from the pivot. When the see saw is balanced we say that the anticlockwise moments (those trying to turn the object anticlockwise) equal the Clockwise moments (those trying to turn the object clockwise). In our example the man's weight tries to turn the see saw clockwise and the girl's weight tries to turn it anticlockwise.

The Above diagram (Figure 3) shows the effect of having more than one force on each side of the pivot. The Law of Moment is given by $F_1d_1+F_2d_2=F_3d_3+F_4d_4$.

VIII. Requires Recourses/Apparatus/Equipment with Specifications

Sr. No.	Particulars	Broad Specifications	Quantity	Remarks (If Any)
1	Meter rule	With small hole drilled at 50cm mark.	01 for Group of 4 to 5 students	
2	Smooth optical pin	At least 5cm Long	01	
3	Slotted weights	50gms and 100gms	Three sets of 5 weight each	
4	Split cork		01	

IX. Precautions to be followed

1. Meter rule should be perfectly horizontal.
2. Pivot should be at the center.
3. Weight should be place properly at required distance.

X. Procedure

1. Place unequal weights on each side of the pivot.
2. Move the weight until the meter rule balances.
3. When this occurs take note of the anti-clockwise and clockwise moments.
4. Repeat several times by changing distance on each side. And take more sets of observations.

XI. Observations Table

Sr. No.	Force F_1(N)	Force F_2(N)	Distance d_1(cm)	Distance d_2(cm)	Anti-clockwise Moment $F_1 d_1$(N-cm)	Clockwise Moment $F_2 d_2$ (N-cm)
1	6	4	4	6	24	24
2	5	3	3	5	15	15
3	7	2	2	7	14	14
4	8	2	2	8	16	16
5	10	3	3	10	30	30

XII. Results

1. Anticlockwise moment and Clockwise moment are....equal..... (Equal/Nearly eual/Not equal).
1. The difference in anticlockwise moment and Clockwise moment is because of..... .....(Error of manipulation/Instrument error/observation error)

XIII. Interpretation of results

If the body is in equilibrium, than anticlockwise and clock wise moments are nearly same.

XIV. Conclusions and Recommendations

When and object is balance on P.V it telesing of effort of the one side of the must be balanced the effort.

XV. Practical Related Questions

Note: Below given are few sample questions for reference. Teachers must design more such questions so as to ensure the achievement of identified CO. Write answers of minimum three questions.

1. State the Field Situations where this law can be applied.
2. State the Law of moment.
3. Explain Clockwise and Anticlockwise moment.
4. State how the load is shifted from one point to another point using couple.

Space for answers

② ⟶ ?

Ans:- When Number of force acting on the body then the algebric sum of the movement will the forces act the same point.

① ⟶ ?

Ans:- Construction of bridges building and in beam angles.

Q.4 ⟶ ?

Ans:- When two equal unliner parallel and non-Colinear forces act on the a body then the is formed and the own axis of potation.