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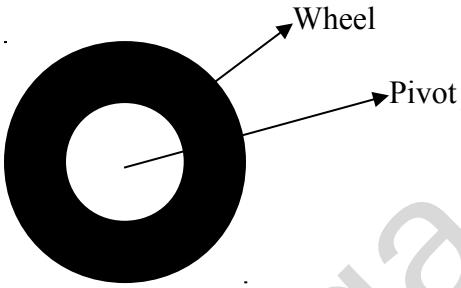
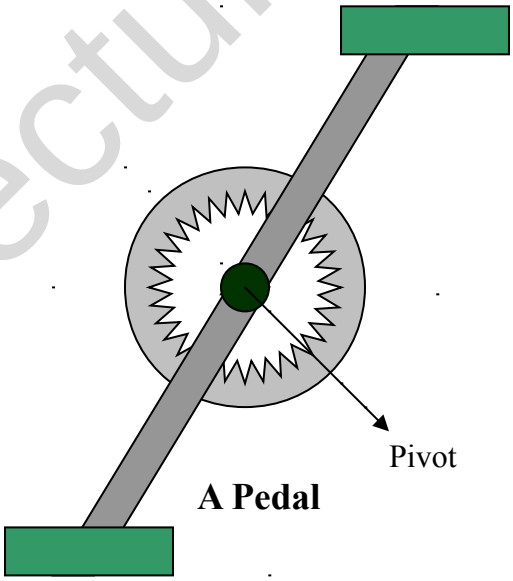
Turning Effects of Forces
O level by Anon

Objects fixed in such a way that they could move about the point are said to experience a turning effect.
The position at which they are fixed so they can move around, such a position is called a pivot.
Pivot can also be a position or point at which an object is placed in such way that object can turn around that position. Example: A position where a bottle opener is placed.

Examples of Turning Effects:

- **Opening or closing a door**
- **Movement of a rotating fan**
- **Movement of a human arm**
- **Lifting a weight with a lever**





A Pedal

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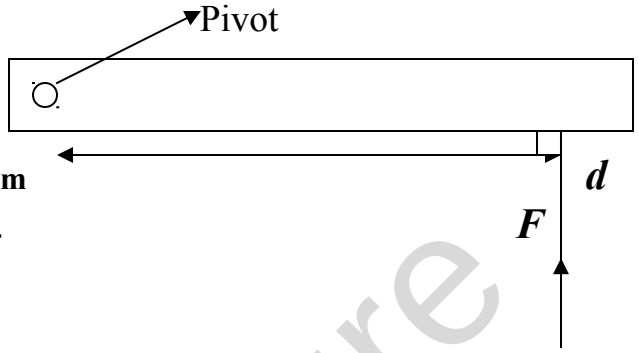
Moments:

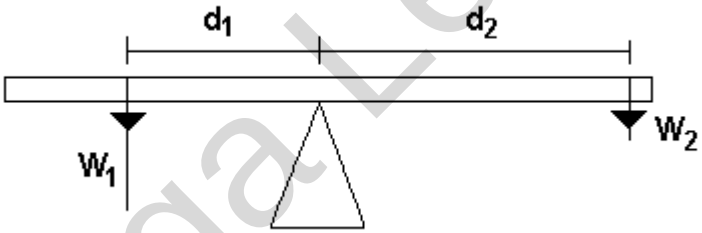
It is the product of force and perpendicular distance from the line of action of the force till the pivot. Moment causes a turning effects.

Moment = *F* x *d*
SI unit of moment = Nm
Where F = force in Newton
d = Perpendicular distance from line of action in meter (m).



Principal of moments:

For a system to be in equilibrium, the sum of the clockwise moment must be equal to the sum of anti-clockwise moment.



Sum of anti-clockwise moment = Sum of clockwise moment
$W_1d_1=W_2d_2$

Sample Question:

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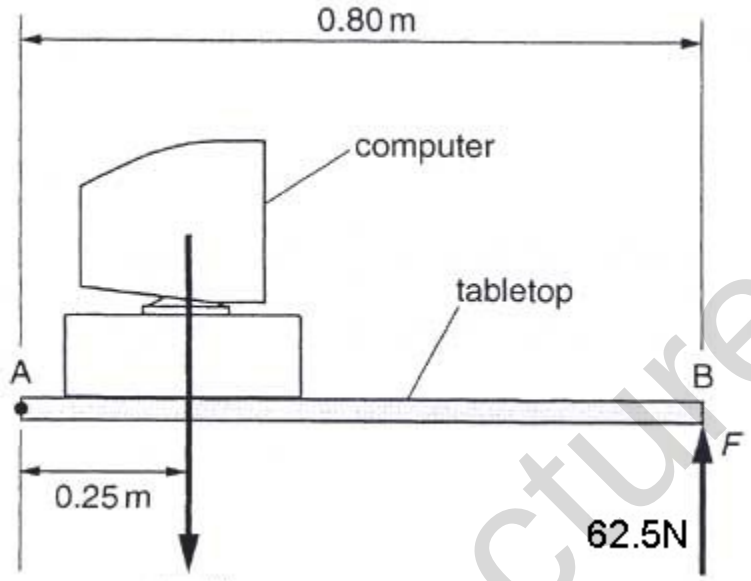
Find the weight of the computer if the tabletop is in equilibrium:



Answer

Sum of clockwise moment = Sum of anti-clockwise moment
0.25m x W = 62.5N x 0.8m
W = $\frac{62.5N \times 0.8m}{0.25m}$
W = $\frac{50}{0.25}$

W = 200N Ans.

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Determination of the center of mass of a plain lamina:

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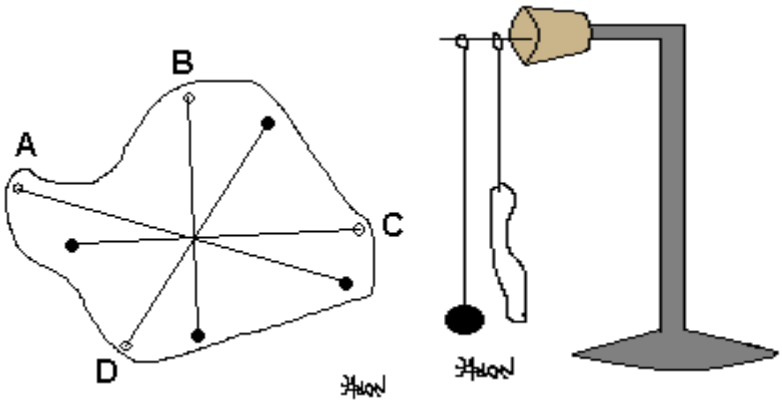

1) **First make four holes at the different edges of plain lamina,**

2) **Set up a retort stand with a cork and pin it as shown in the figure**

3) **Tie hole A with a thread on the pin and let the lamina move freely until it stops.**

4) **Attach a plumbline, which is a thread attach to a mass on one end, to the pin.**

5) **Mark the dot on the other end of A corresponding to the plumbline, and join this dot to A with a line.**

6) **Repeat this with B,C and D**

7) **The point of intersection of four lines is the center of mass of the lamina**

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<u>Stability of an object:</u>

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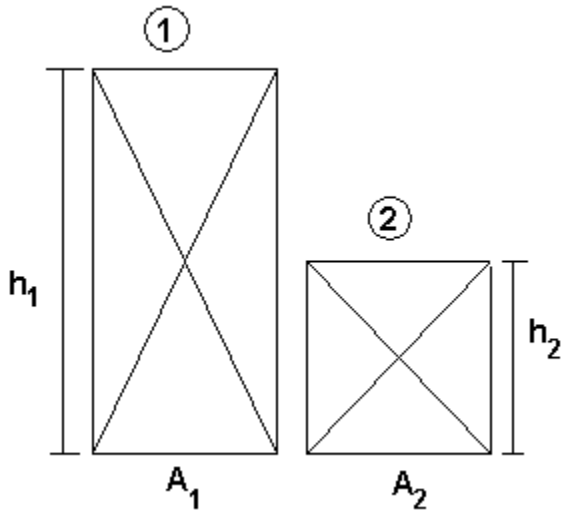
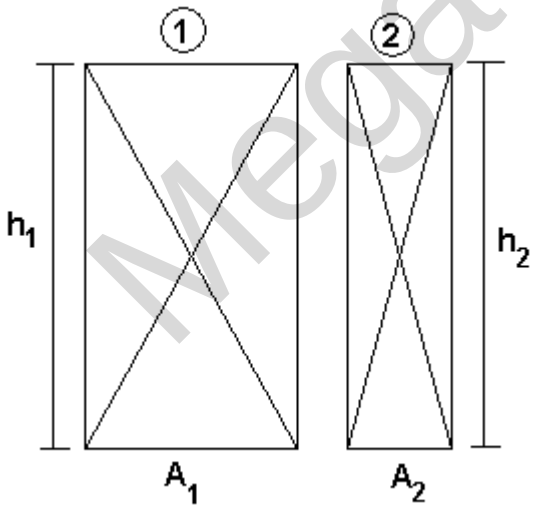
Where A = Base Area
And h = Height

Case1:



If $A_1 = A_2$
And $h_1 > h2$
Then 2 is more stable then 1
Because the center of gravity of 2 is comparatively lower than 1

Case 2:



If $h_1 = h_2$
And $A_1 > A_2$
Then 1 is more stable then 2
Because the base area of 1 is comparatively greater then 2

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