

CIE Physics GCSE

Topic 1.5 - Forces

Flashcards



Define 'resultant force'.



Define 'resultant force'.

The sum of all the individual forces acting on an object (taking directions into account).



What happens if a resultant force acts on an object?



What happens if a resultant force acts on an object?

It causes a change of momentum in the direction of the force.



How can a resultant force change the motion of an object?



How can a resultant force change the motion of an object?

It can change...

- Speed
- Direction



How can the resultant force be found?



How can the resultant force be found?

Adding force vectors together, tip (arrow) to tail.



What happens if there is zero resultant force?



What happens if there is zero resultant force?

The object will remain stationary, or (if moving) will continue to move in the same direction with the same speed.



Define friction.



Define friction.

Friction is the force providing resistance to the motion of two surfaces sliding past each other.



Give an example of a frictional force.



Give an example of a frictional force.

Air resistance.



When work is done overcoming friction,
what occurs?



When work is done overcoming friction, what occurs?

Energy is dissipated, resulting in heating.



When does circular motion occur? (supplement)



When does circular motion occur? (supplement)

When a force is acting perpendicular to the motion of an object.



Describe the speed and velocity of an object in circular motion (supplement)



Describe the speed and velocity of an object in circular motion (**supplement**)

- The speed is constant
- The velocity is always changing, since it is constantly changing direction



Give an example of a force causing
circular motion (supplement)



Give an example of a force causing circular motion
(supplement)

Gravity, which causes the earth to orbit
the sun.



State Hooke's law (supplement)



State Hooke's law (supplement)

The force on an object (eg. a wire or spring) is directly proportional to its extension.



Give the equation for Hooke's law
(supplement)



Give the equation for Hooke's law (supplement)

Where...

$$F = kx$$

F = force (N)

x = extension (m)

k = spring constant (N/m)



At what point does Hooke's law no longer apply?



At what point does Hooke's law no longer apply?

The limit of proportionality.

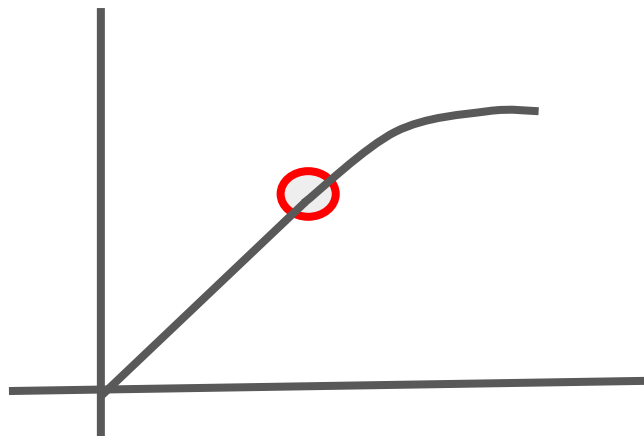


What does the limit of proportionality look like on an extension-load graph?



What does the limit of proportionality look like on an extension-load graph?

Where the graph stops being linear.



What is a moment?



What is a moment?

The rotational (or turning) effect of a force.



Give the equation for moments.



Give the equation for moments.

moment (Nm) = force (N) x distance (m)

(note: distance is the **perpendicular distance** from the force to the pivot)



When does rotational equilibrium occur?



When does rotational equilibrium occur?

When the sum of clockwise moments =
the sum of anticlockwise moments

This is the **principle of moments**.



When is equilibrium reached?



When is equilibrium reached?

When there is no resultant force or turning effect.

(clockwise = anticlockwise moments)



What is a centre of mass?



What is a centre of mass?

A single point through which the force of an object's weight acts. (This is a modelling assumption).



Describe how to find the centre of mass of a plane lamina.



Describe how to find the centre of mass of a plane lamina.

- Suspend the object and a plumb line from the same point
- Trace the thread of the plumb line with a pencil
- Repeat using different points
- The centre of mass is where all the lines cross



What is a vector quantity? (supplement)



What is a vector quantity? (supplement)

A vector quantity has both magnitude (size) and direction.



What is a scalar quantity? (supplement)



What is a scalar quantity? (supplement)

A quantity that has only magnitude, not direction.



Give examples of vectors (supplement)



Give examples of vectors (supplement)

- Velocity
- Force
- Acceleration
- Displacement



Give examples of scalars (supplement)



Give examples of scalars (supplement)

- Speed
- Direction



Describe how resultant forces can be represented visually (supplement)



Describe how resultant forces can be represented visually (**supplement**)

Use scale drawings of vector diagrams.

- Add force vectors tip to tail
- Connect them for the resultant force

