

# FORCES & MOTION

## KEY WORDS & DEFINITIONS

### 1. Resultant Force

The result of resolving forces on an object in a particular direction.

### 2. Weight

The force due to gravity acting on an object

## NEWTON'S LAWS OF MOTION

### Newton's First Law of Motion

Objects in equilibrium will not accelerate. An object will only accelerate (or decelerate) if an unbalanced force acts on the object.

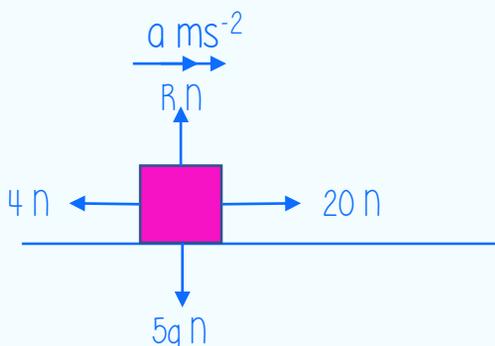
### Newton's Second Law of Motion

The acceleration of an object depends on the overall net force acting on the object and the object's mass.

### Newton's Third Law of Motion

For every action there is an equal and opposite reaction.

## ALWAYS DRAW A DIAGRAM!



## FORMULAE

Formula of Newton's Second Law of Motion

$$F = ma$$

Formula to calculate the weight of an object

$$W = mg$$

## WHAT DO I NEED TO KNOW

1. To resolve forces given as vectors add the vectors

If 2 forces  $(p\mathbf{i} + q\mathbf{j})\text{ N}$  and  $(r\mathbf{i} + s\mathbf{j})\text{ N}$  are acting on a particle, the resultant force will be  $(p + r)\mathbf{i} + (q + s)\mathbf{j}\text{ N}$

2. To solve problems involving connected particles moving in the same straight line consider the particles as a single unit, moving as one.

Particles need to remain in contact or be connected by an inextensible rod or string to be considered a single particle

3. To solve problems involving connected particles that are not moving in the same straight line consider the particles, and the forces acting on them, separately.

Particles need to be considered separately in order to find the tension in any string between them

4. The tension in an inextensible string passing over a smooth pulley is the same on both sides

You cannot treat a system involving a pulley as a single particle as the particles are moving in different directions