1.5 F=ma / Resultant Forces

Question Paper

Level	IGCSE
Subject	Physics (0625)
Exam Board	Cambridge International Examinations(CIE)
Topic	General Physics
Sub Topic	1.5 F=ma / Resultant Forces
Booklet	Question Paper

Time Allowed: **22 minutes**

Score: **/18**

Percentage: **/100**

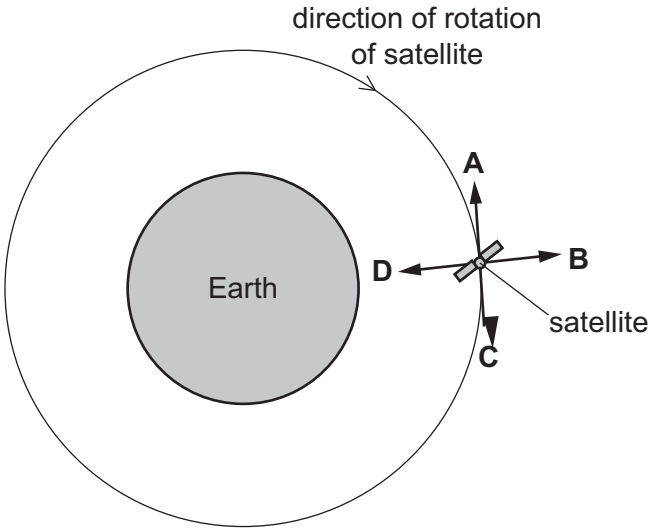
Grade Boundaries:

A*	A	B	C	D	E	U
>85%	75%	60%	45%	35%	25%	<25%

1 A satellite orbits the Earth above the atmosphere at a constant speed.

The diagram shows the satellite at one point in its circular orbit around the Earth.

Which labelled arrow shows the direction of the resultant force on the satellite at the position shown?

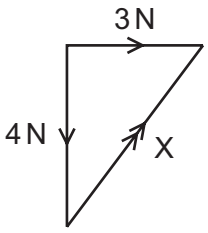


2 An object is acted upon by a 3 N force and by a 4 N force.

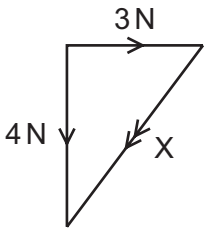
Each diagram shows the two forces.

Which diagram also shows the resultant X of these two forces?

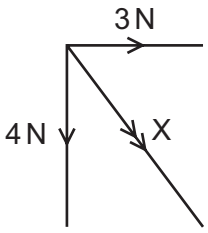
A



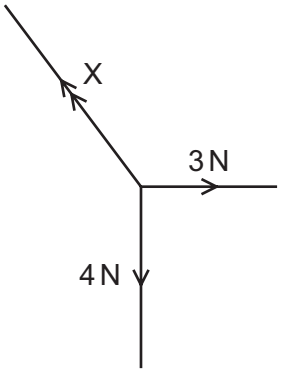
B



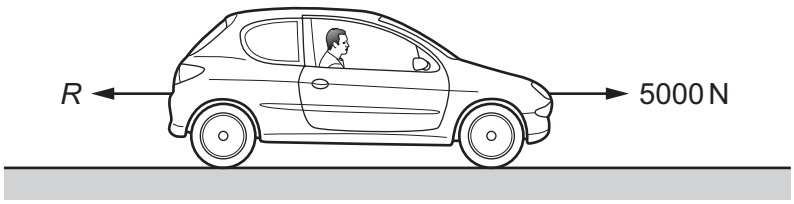
C



D



3 The engine of a car produces a driving force of 5000 N on the car. Resistive forces *R* also act on the car, as shown.



The car has a mass of 800 kg and an acceleration of 1.0 m / s^2.

What is the value of *R*?

A 800 N **B** 4200 N **C** 5800 N **D** 8000 N

4 An object moves in a circle at constant speed.

Which statement about the force needed on the object is correct?

A A force away from the centre of the circle keeps the object moving in the circle.

B A force in the direction of motion of the object keeps it moving in the circle.

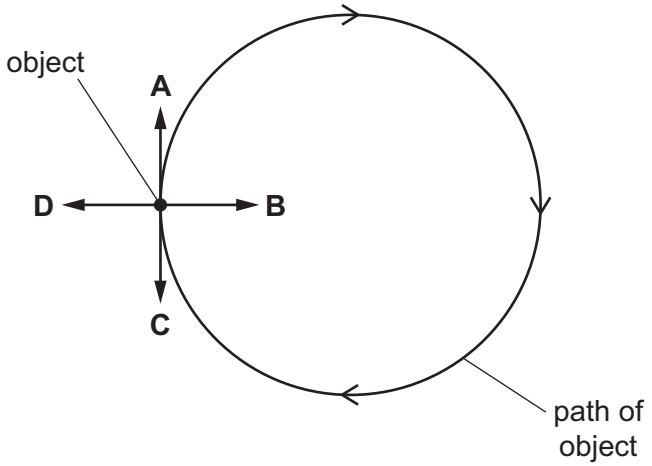
C A force towards the centre of the circle keeps the object moving in the circle.

D No force is needed to keep the object moving at constant speed in the circle.

5 The diagram shows an object moving at a constant speed in a circular path in the direction shown.

A force acts on the object to keep it in the circular path.

In which labelled direction does this force act, when the object is in the position shown?



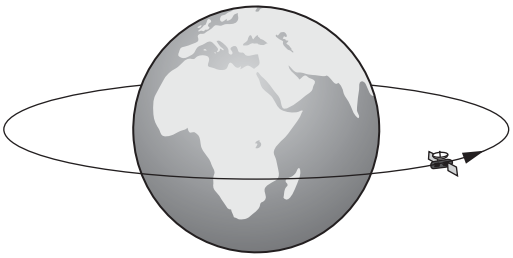
6 A parachutist is falling at terminal velocity, without her parachute open.

She now opens her parachute.

What is the direction of her motion, and what is the direction of her acceleration, immediately after she opens her parachute?

	direction of motion of the parachutist	direction of acceleration of the parachutist
A	downwards	downwards
B	downwards	upwards
C	upwards	downwards
D	upwards	upwards

7 The diagram shows a satellite that is moving at a uniform rate in a circular orbit around the Earth.



Which statement describes the motion of this satellite?

A It is accelerating because its speed is changing.

B It is accelerating because its velocity is changing.

C It is not accelerating but its speed is changing.

D It is not accelerating but its velocity is changing.

8 Which statement about an object moving in a straight line through air is correct?

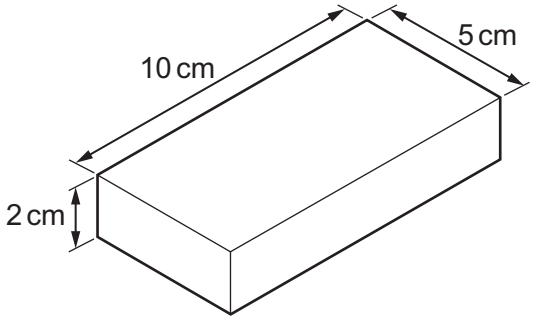
A When it accelerates, the resultant force acting on it is zero.

B When it moves at a steady speed, the air resistance acting on it is zero.

C When it moves at a steady speed, the resultant force acting on it is zero.

D When it moves, there is a resultant force acting on it.

9 A metal block has the dimensions shown. Its mass is 1000 g.



What is the density of the metal?

A $\left(\frac{5 \times 10}{1000 \times 2}\right) \text{g/cm}^3$

B $\left(\frac{2 \times 5 \times 10}{1000}\right) \text{g/cm}^3$

C $\left(\frac{1000 \times 2}{5 \times 10}\right) \text{g/cm}^3$

D $\left(\frac{1000}{2 \times 5 \times 10}\right) \text{g/cm}^3$

10 The diagrams show four identical objects. Each object is acted on by only the three forces shown.

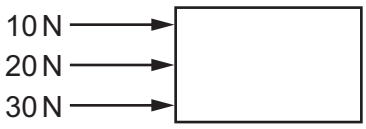
Which object accelerates to the right, with the **smallest** acceleration?

A

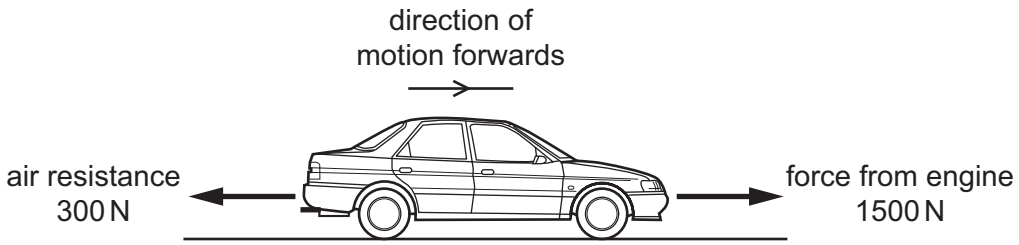
B

C

D



11 A car travels along a horizontal road at a constant speed. Three horizontal forces act on the car. The diagram shows two of these three forces.



What is the size and the direction of the third horizontal force acting on the car?

A 1200 N backwards

B 1200 N forwards

C 1800 N backwards

D 1800 N forwards

12 Which list contains only properties of an object that can be changed by a force?

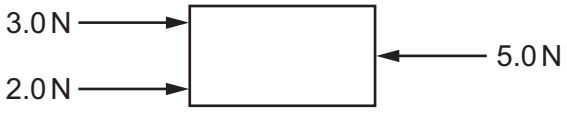
A direction of motion, mass, shape

B direction of motion, mass, speed

C direction of motion, shape, speed

D mass, shape, speed

13 The diagram shows the only three forces acting on an object.



What is the resultant force on the object?

A 0 N

B 5.0 N towards the left

C 5.0 N towards the right

D 10.0 N towards the right

14 In which situation is **no** resultant force needed?

A a car changing direction at a steady speed

B a car moving in a straight line at a steady speed

C a car slowing down

D a car speeding up

15 Which properties of a body can be changed by applying a force to the body?

A mass, motion and shape

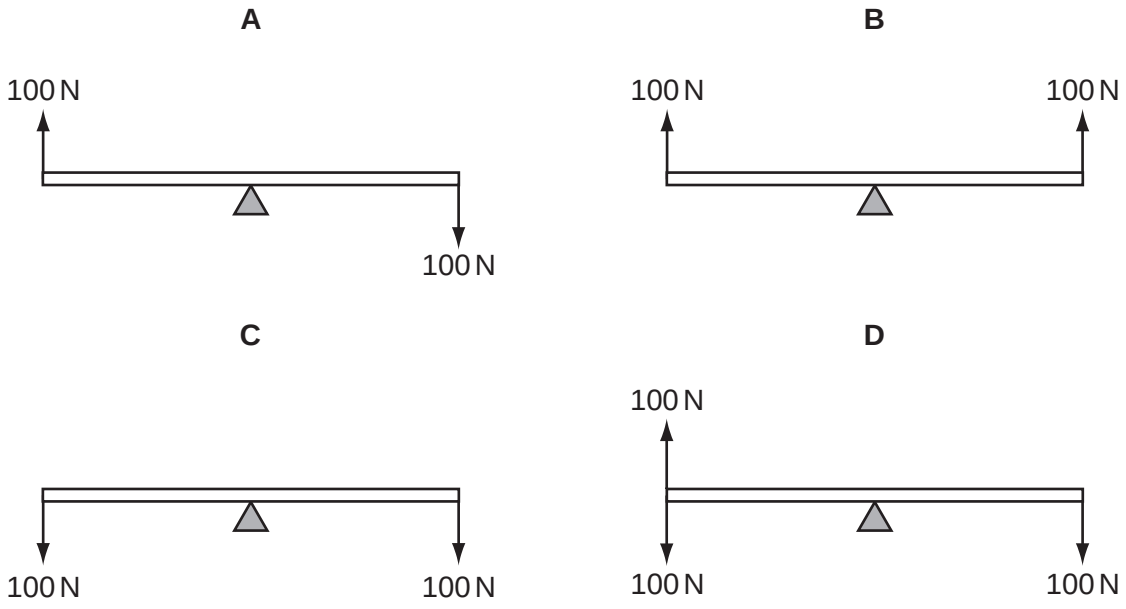
B mass and motion, but not shape

C mass and shape, but not motion

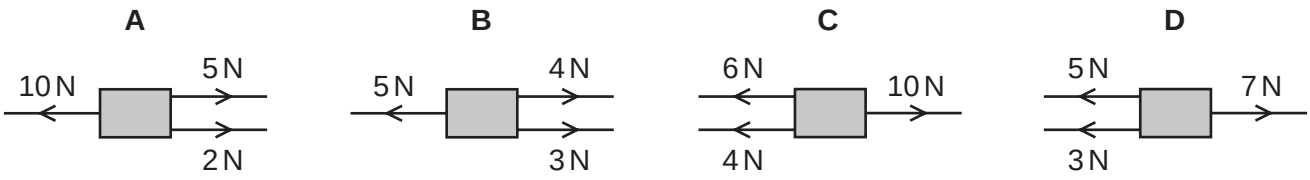
D motion and shape, but not mass

16 A uniform rod rests on a pivot at its centre. The rod is not attached to the pivot. Forces are then applied to the rod in four different ways, as shown. The weight of the rod can be ignored.

Which diagram shows the rod in equilibrium?



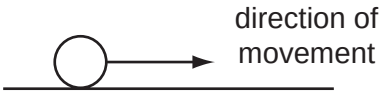
17 Which combination of forces produces a resultant force acting towards the right?



18 On which ball is a non-zero resultant force acting?

A

a ball moving at constant speed on a smooth surface

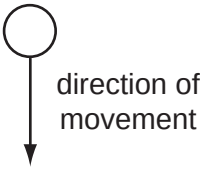


B

a ball at rest on a bench

C

a free-falling ball which has just been released



D

a ball floating on water