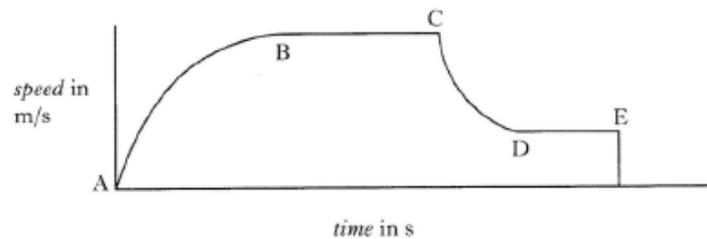## 1.2 Forces Homework Questions

Q1. A parachutist jumps out of an aircraft. Sometime later the parachute is opened.

The graph shows the motion of the parachutist from leaving the aircraft until landing.

Which parts of the graph show when the forces acting on the parachutist are balanced? (1)

Q2 A passenger at an airport pulls a suitcase towards the check-in desk.

The suitcase has been designed to reduce the effects of friction when it is pulled.

  a) Explain how the suitcase has been designed to reduce friction.   (1)
  b) Why is it important to reduce the force of friction on the suitcase?   (1)

Q3 Inside a storm cloud water droplets move around and collide with each other.
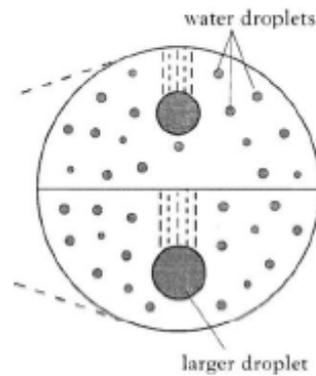
A water droplet within the cloud is falling with a constant speed. Draw a diagram showing the forces acting on this droplet.

Name these forces and show their directions.   (2)

Q4 A skier takes part in a downhill competition.

a) State two ways the skier can reduce friction in order to reach high speeds.   (2)

b) When the skier reaches the maximum speed of 65 ms^{-1} this speed is maintained over the rest of the course.
State how the size of the downhill force compares with the size of the frictional force during this part of the course.   (1)

Q5 A plane is flying horizontally at a constant speed.

a) The aircraft and passengers have a total mass of 50 000kg. Calculate the total weight.   (3)

Q6 A bag of sugar has a mass of 2·0 kilograms.

The weight of the bag of sugar is

A   0·20 newtons

B   2·0 kilograms

C   2·0 newtons

D   20 kilograms

E   20 newtons.

1

Q7 A car is moving along a road.

The brakes of the car provide a force to change its speed.

The largest change in speed is produced by

A   a force of 2000 newtons acting for 4 seconds

B   a force of 2000 newtons acting for 8 seconds

C   a force of 4000 newtons acting for 2 seconds

D   a force of 6000 newtons acting for 4 seconds

E   a force of 8000 newtons acting for 8 seconds.

1

Q8 Netball is one of the sports at the Commonwealth Games in Glasgow.
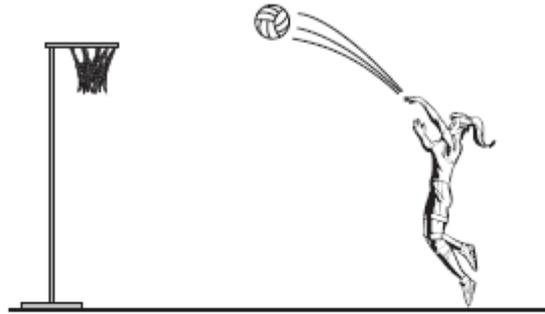
A player stands 5 metres from the net. She throws the ball into the net to score.

(a) The player now stands closer to the net and throws the ball at the same speed.

What other change to the throw would be needed to score now? **1**

(b) After scoring, the player runs back to a different position on the court.

She runs 7·0 metres in 2·0 seconds.

Calculate her average speed. **3**

(c) The player wears trainers to prevent herself slipping on the court.

Name the force that prevents the player from slipping on the court.

1

(d) After watching a game, two students investigate how the speed of the throw affects the range of the ball.

Their results are shown in the table.

Speed of launch in metres per second	Range in metres
4	3·0
8	8·0
12	16
16	27

(i) What conclusion can the students make from their investigation?

1

(ii) Estimate a value for the range of the ball thrown at 10 metres per second.

1

Q9 Two boats are competing in a sailing race.

Copy and complete the sentences below using some of the following words.

direction   weights   forces   unbalanced

streamlined   balanced   gravity

When a boat travels at a constant speed the [   ]

acting on the boat are [   ].

The shape of the boat is [   ] to allow the

boat to travel faster through the water.

When forces acting on the boat are not balanced the speed and

[   ] of the boat could change.   **4**

(b) At the start of the race the boats accelerate.
     The table below gives details of the two boats.

Boat name	Maximum speed in miles per hour	Time to go from 0 to 10 miles per hour in seconds
Fair Lady	10	25
Wind Dancer	10	33

(i) Which boat has the greater acceleration?   **1**

Total Marks 25