

REVISION
QUESTIONS

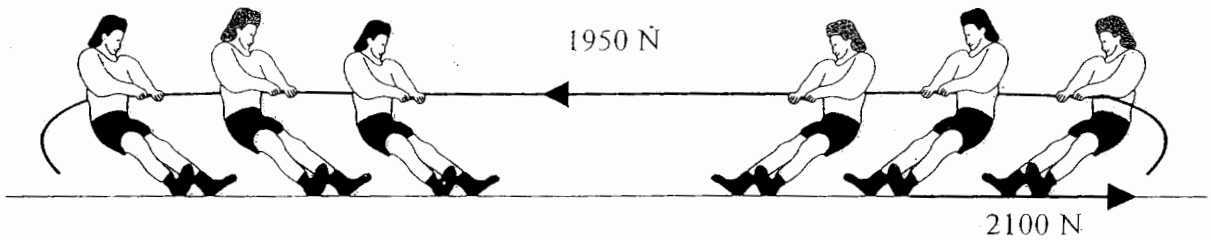
FORCES +
MOTION

1. (a) Place a tick (✓) next to the vector quantities in the table.

acceleration	
distance	
kinetic energy	
power	
speed	
velocity	

(2)

(b) (i) Force is a vector quantity. Two tug-of-war teams are pulling in opposite directions. The horizontal forces on one team are shown.



Describe the movement of this team.

.....

(1)

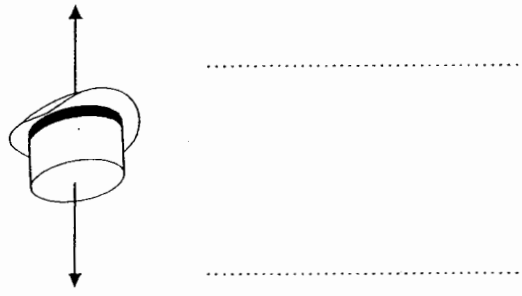
(ii) The team has a mass of 300 kg. Calculate the acceleration of the team and give its unit.

.....

Acceleration =

(3)

(c) (i) A supporter of the winning team throws his hat high in the air. The diagram shows the forces acting on the hat as it falls back. Label these forces.



(2)

(ii) Explain why the hat reaches a terminal velocity.

.....
.....

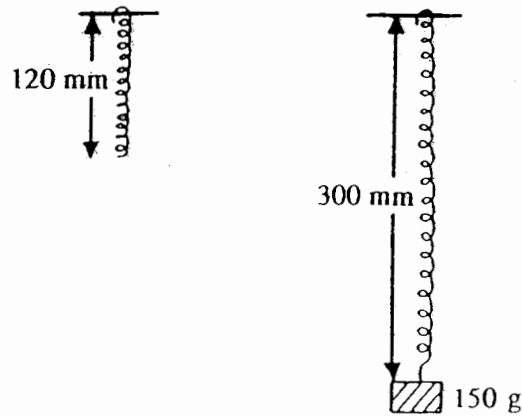
(2)

(Total 10 marks)

Q10

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2. A clamp holds the top end of a spring so that the spring hangs vertically. The spring is 120 mm long. When a mass of 150 g is hung on the spring it becomes 300 mm long.



- (a) What is the weight of the mass?

[2]

- (b) A pupil pulls down the mass with his hand. The spring stretches a further 30 mm.

What is the size of the force the pupil exerts on the mass?

[3]

What have you assumed about the behaviour of the spring?

[1]

- (c) The pupil lets go of the mass. Explain why the mass accelerates upwards.

[2]

- (d) Explain why the upward acceleration of the mass is not constant.

[2]

(Total 10 marks)

Turn over

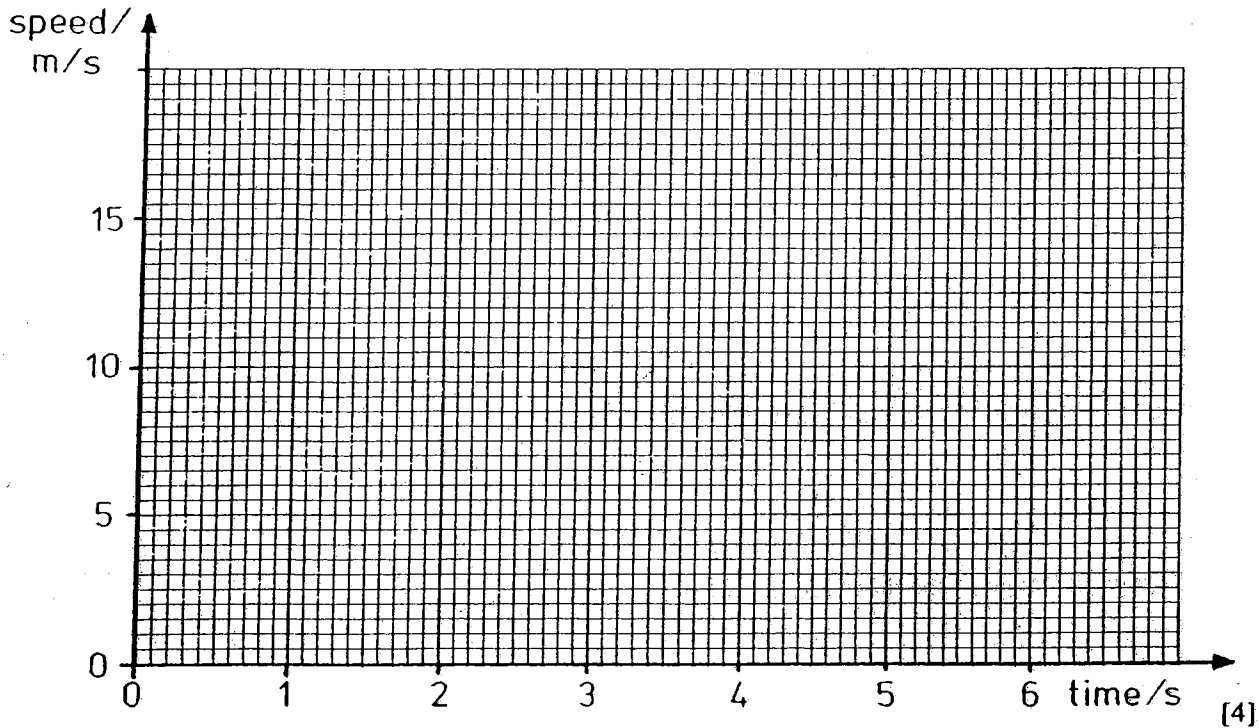
3. A car is travelling at a constant speed of 18 m/s. The driver sees a child chasing a ball run out into the road some distance in front of him. He brakes as hard as he can and stops.

It takes the driver 0.7 seconds 'thinking time' from seeing the child run out to putting on the brakes. Once the brakes are on, the car decelerates uniformly at 6 m/s^2 until it stops.

- (a) Calculate the time between the driver seeing the child and the car stopping moving.

.....
.....
..... [3]

- (b) Draw a graph on the axes below to show how the speed of the car varies with time from when the driver first sees the child.

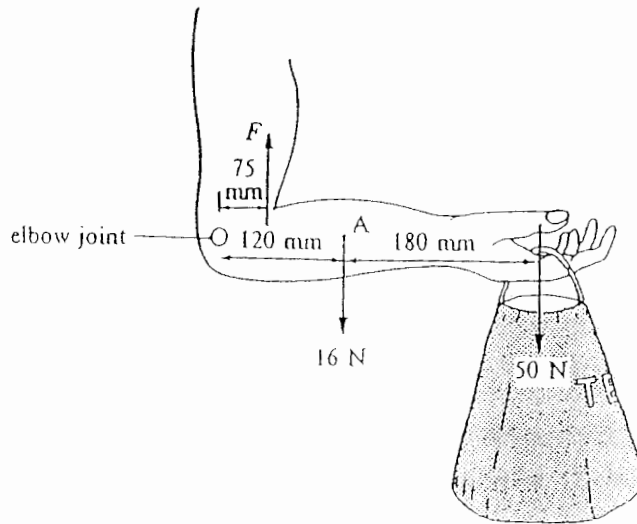


- (c) Calculate the total distance travelled by the car after the child is seen.

.....
.....
..... [4]

(Total 11 marks)

4. The diagram shows a hand carrying a bag of shopping of weight 50 N. The weight of the lower arm and hand is 16 N and acts as shown through the point A.



(a) Muscles exert a force F to hold the arm in equilibrium.

Use the principle of moments to calculate the force F .

Assume the elbow joint acts as the pivot.

.....

.....

.....

.....

.....

[4]

(b) The same bag of shopping is moved towards A. What happens to the force F ?

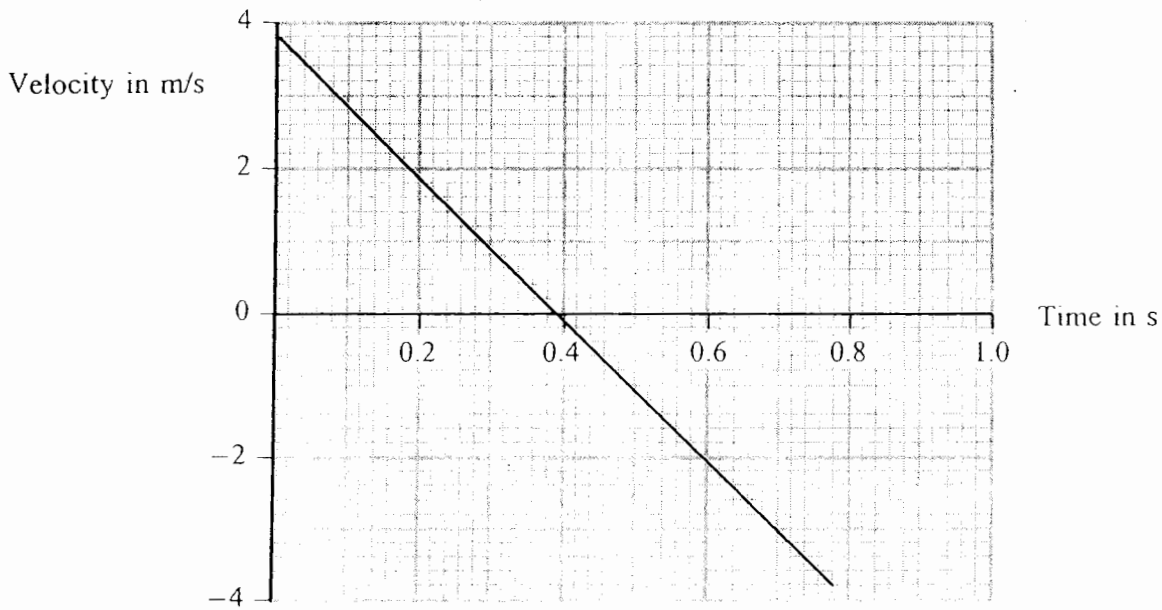
.....

[1]

(Total 5 marks)

5. The graph shows how the upwards velocity of an athlete changes after leaving the ground.

Leave
blank



- (a) After what time does the athlete reach his maximum height?

..... (1)

- (b) What height does the athlete reach?

.....
.....
..... (3)

- (c) (i) Calculate the acceleration of the athlete and state the unit in which it is measured.

.....
.....
..... (4)

- (ii) What is the direction of the acceleration?
Explain how you can tell from the graph.

.....
..... (2)

- (d) Describe the force that causes the athlete's acceleration.

..... (1)

END

(Total 11 marks)