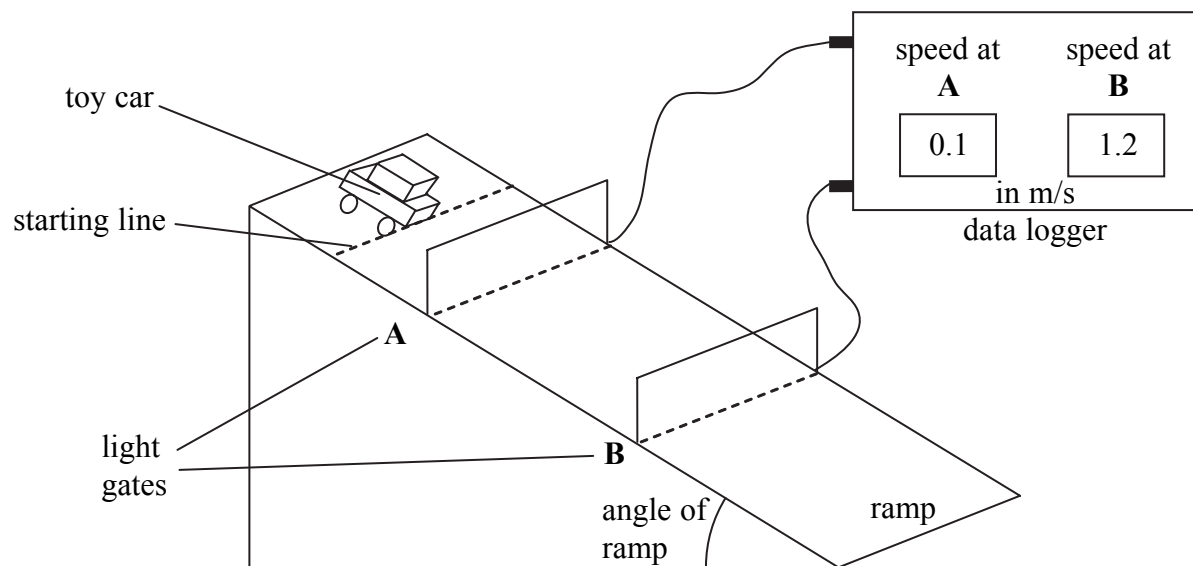


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Answer ALL the questions. Write your answers in the spaces provided.

1. Anne is investigating how a toy car rolls down a slope. She uses the equipment shown below.



- (a) Anne has made some predictions. Put a tick in the box next to each prediction that is correct. One has been done for you.

prediction	correct (✓)
the car will go faster as it rolls down the slope	
when the angle of the ramp is bigger, the car is slower at B than at A	
when the car is made heavier, it will be harder to stop	✓
polishing the slope makes the car go slower	
if B is moved down the ramp, the car's speed at B will be faster than 1.2 m/s	

(2)

QUESTION 1 CONTINUES OVERLEAF

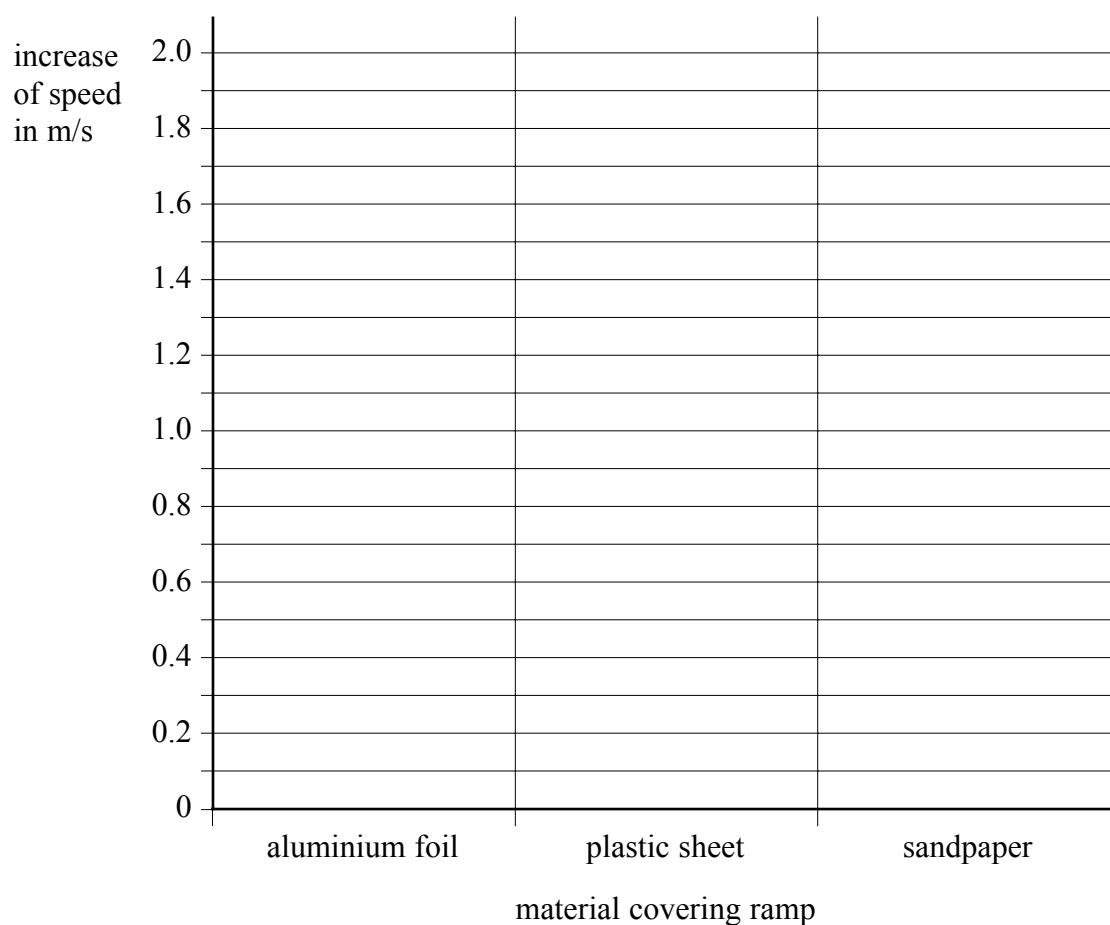


- (b) (i) Anne decides to change the material covering the ramp. These are Anne's results. Fill in the missing increase in speed between **A** and **B**.

material covering ramp	speed at A (m/s)	speed at B (m/s)	increase in speed between A and B (m/s)
none	0.1	1.2	
aluminium foil	0.3	1.9	1.6
plastic sheet	0.5	2.5	2.0
sandpaper	0.1	1.1	1.0

(1)

- (ii) Complete the bar graph to show the car's increase in speed for each material. Use this grid.



(2)



(iii) Mark a cross (☒) next to the correct words to complete Anne's conclusion for her experiment.

aluminium foil ☒

The car's speed increased the most when the surface was **plastic sheet** ☒

sand paper ☒

friction ☒

The force that pulled the car down the ramp was **gravity** ☒

lift ☒

accelerate ☒

On the ramp, there was an unbalanced force that made the car **slow down** ☒

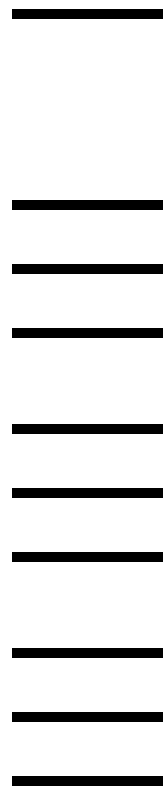
stay at the same speed ☒

(3)

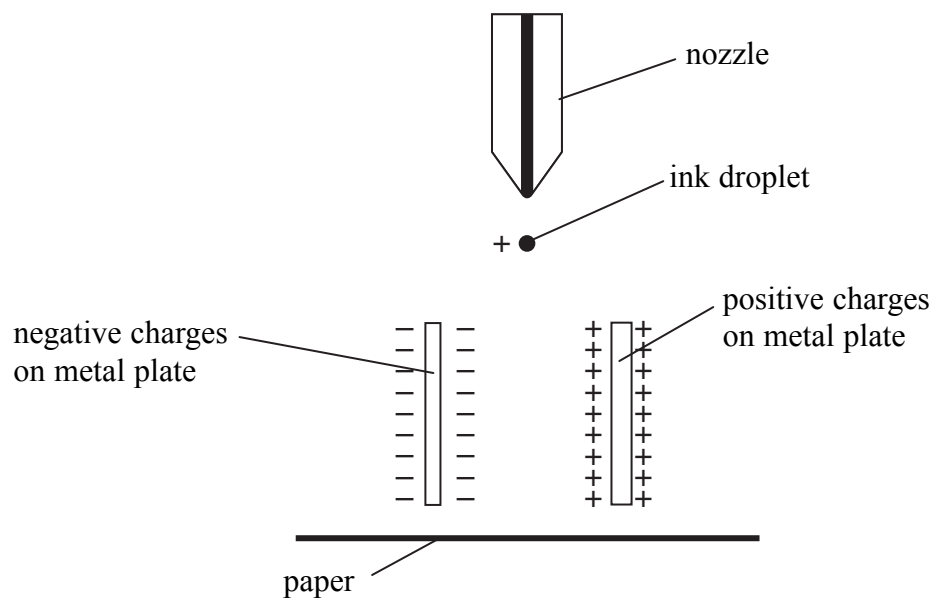
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Q1

(Total 8 marks)



2. (a) The diagram shows a droplet of ink leaving a nozzle in an inkjet printer. The droplet has a positive charge. It will fall between two charged metal plates.

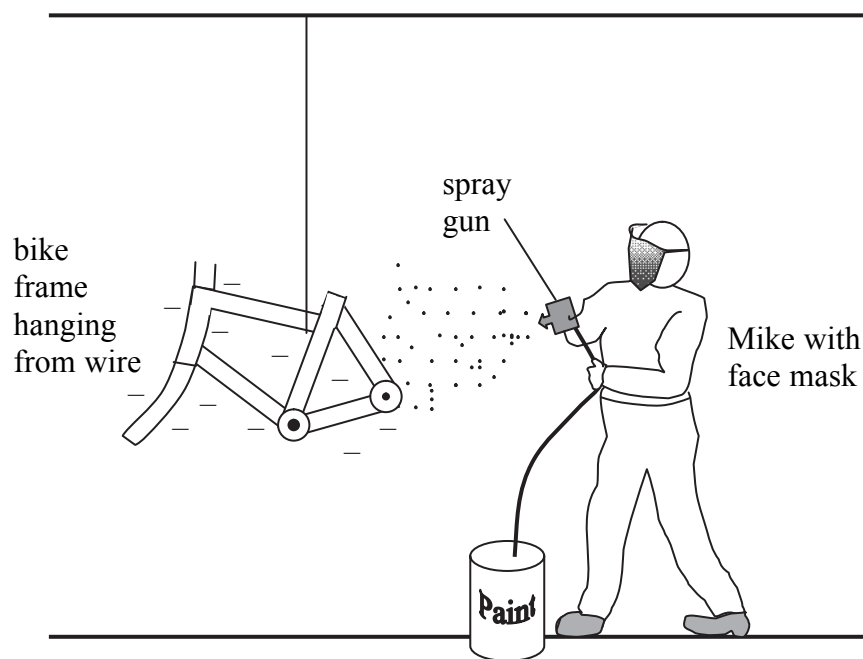


- (i) Complete the diagram to show the path of the ink droplet. (1)

- (ii) Explain why the charges on the plates affect the droplet.
-
- (1)



- (b) Mike paints a bike frame.
The bike frame is given a negative charge.
The paint gains a positive charge as it leaves the spray gun.



Suggest **two** reasons why this method of painting bike frames is better than using a paint brush.

.....
.....
.....
.....

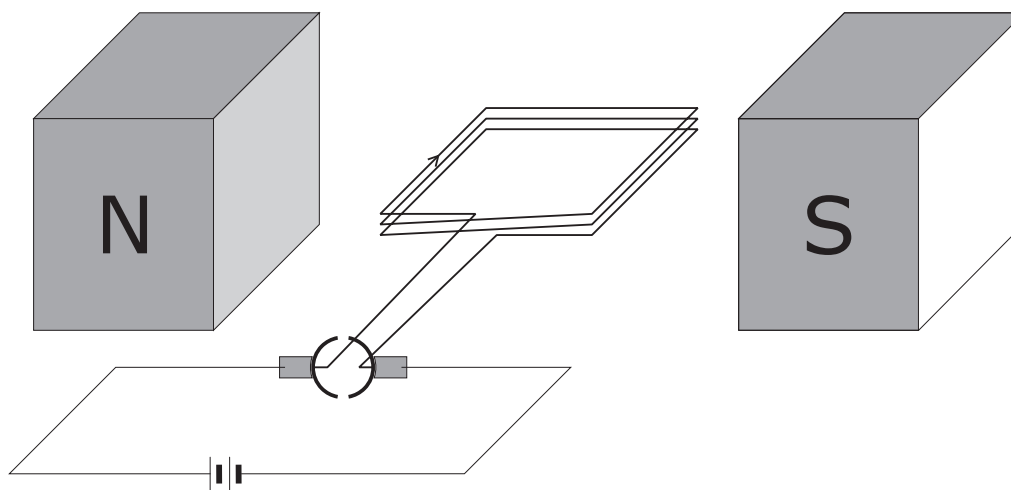
(2)

Q2

(Total 4 marks)



3. The diagram shows part of an electric motor connected to a battery.



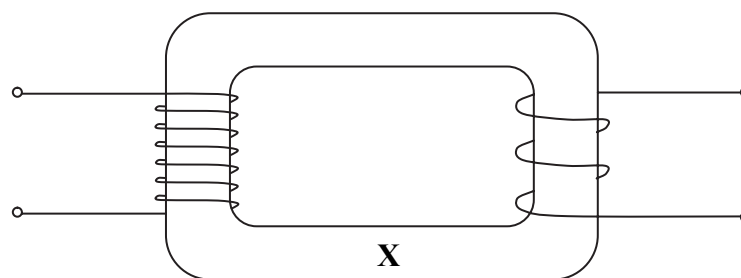
Some changes to the equipment would make the motor turn more quickly.
Put a tick in the box next to **two** changes that would make the motor turn more quickly.

change	makes motor turn faster
use stronger magnets	
change the poles N and S around	
have fewer turns on the coil	
move the magnets further apart	
increase the current	

(Total 2 marks)

Q3

4. (a) The diagram shows a simple transformer.



(i) Name part X.

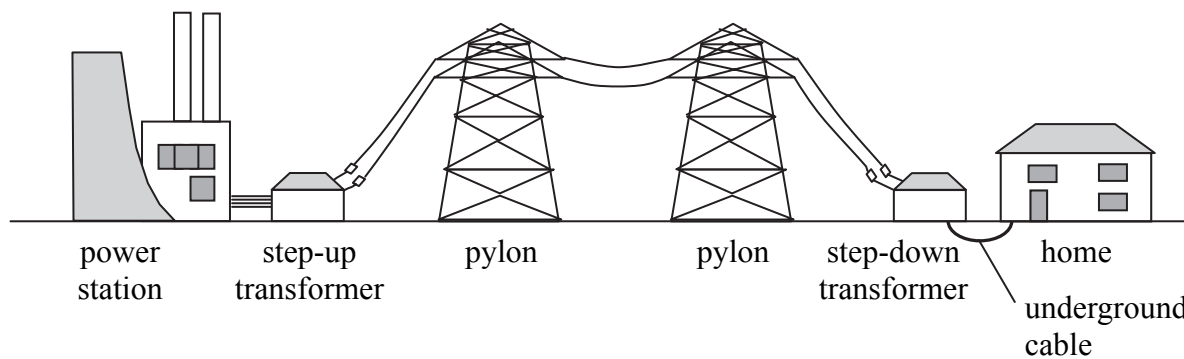
..... (1)

(ii) Suggest a suitable material for part X.

..... (1)



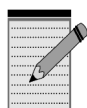
(b) The diagram shows two transformers in part of the National Grid.



(i) What is meant by a step-up transformer?

.....
.....
(1)

(ii) Explain why step-up transformers are used in the National Grid.



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

(c) High voltage power lines cause electrical and magnetic fields. Many people think that these electrical and magnetic fields are dangerous. Scientists studied the health of people who live near power lines. They concluded that there was no increase in cancer rates.

Suggest why people may not want to live near overhead power lines, even though they have been told it is safe.

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

(Total 8 marks)

Q4



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5. Adam is competing in a strong-man competition.



Source: www.ontariostrongman.ca

He pulls the truck at a steady speed with a force of 1200 N.

(a) What is the size and direction of the frictional force on the truck?

.....
(1)

(b) Calculate the work done by Adam when he pulls the truck 12 m. State the units in your answer.

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

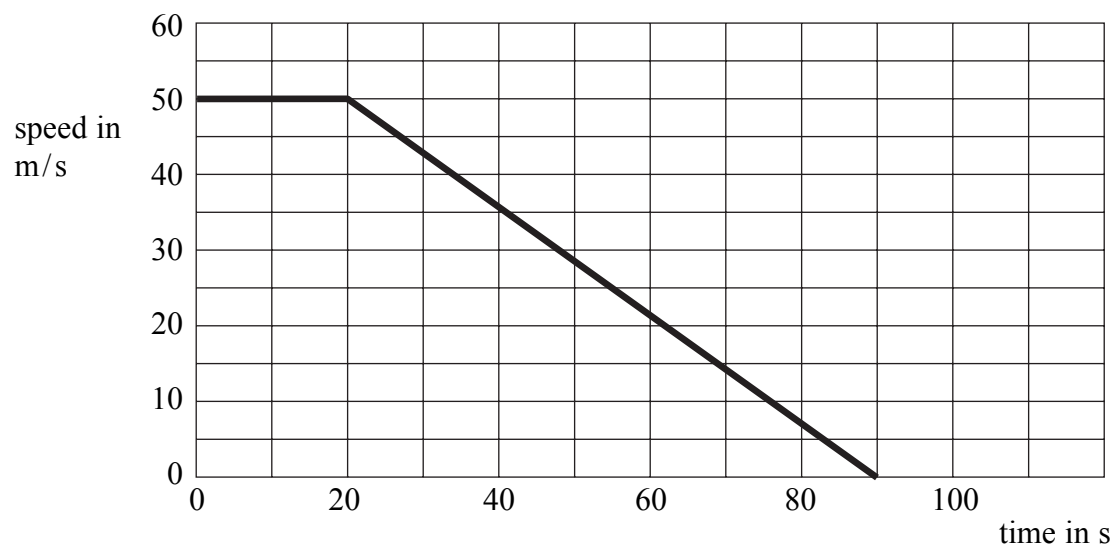
(Total 5 marks)

Q5



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6. The graph shows the speed of a train at different times.



Calculate the acceleration of the train while it is slowing down.

.....

.....

.....

..... m/s²

(Total 3 marks)

Q6

TOTAL FOR PAPER: 30 MARKS

END

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