

Name _____

Aldenham School



Science Department 13+ Exam - Physics **SAMPLE PAPER**

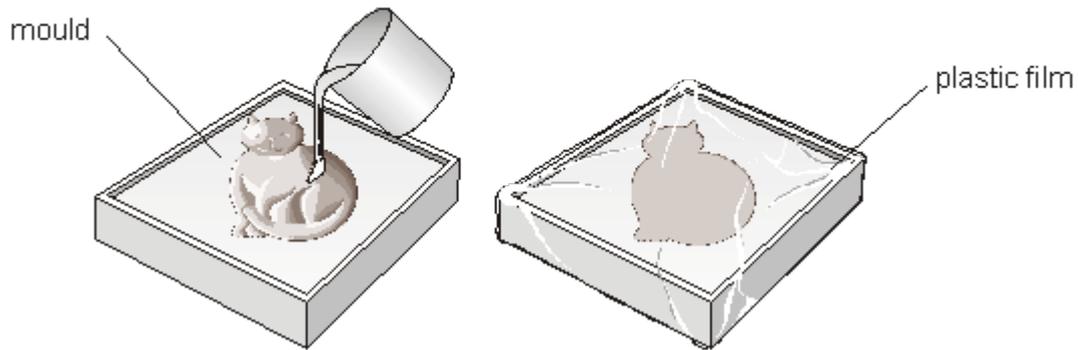
20 minutes

Q1. Sam made a model cat.

He mixed modelling powder with water.

He poured all of the mixture into a mould.

He covered the mould with plastic film so that water could **not** evaporate.



(a) (i) After 10 minutes, Sam removed the model cat from the mould.



Sam had mixed 40 g of modelling powder with 12 g of water.
What was the mass of the model cat?

..... g

(ii) Complete the sentence below using words from the list.

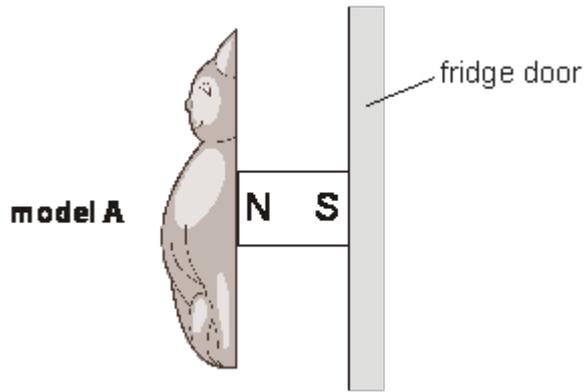
gas liquid solid vapour

After 10 minutes, the mixture in the mould changed from a

..... into a

2 marks

(b) Sam attached a small magnet to the model cat. The magnet was attracted to the fridge door.



What metal are magnets made from?

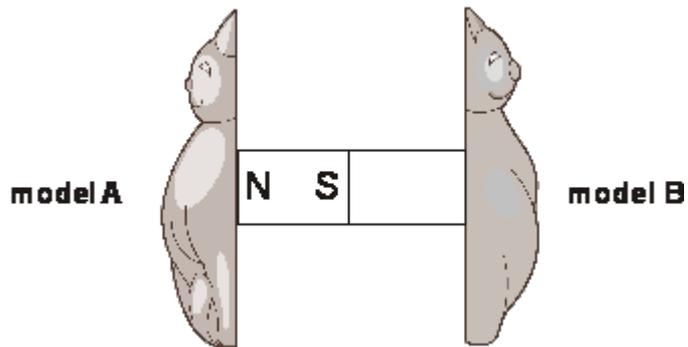
.....

1 mark

(c) Sam made another model, B. He attached a small magnet to model B.

(i) Sam placed model A next to model B. The magnets attracted each other.

Label the poles on the magnet on model B
Use the letters N and S.

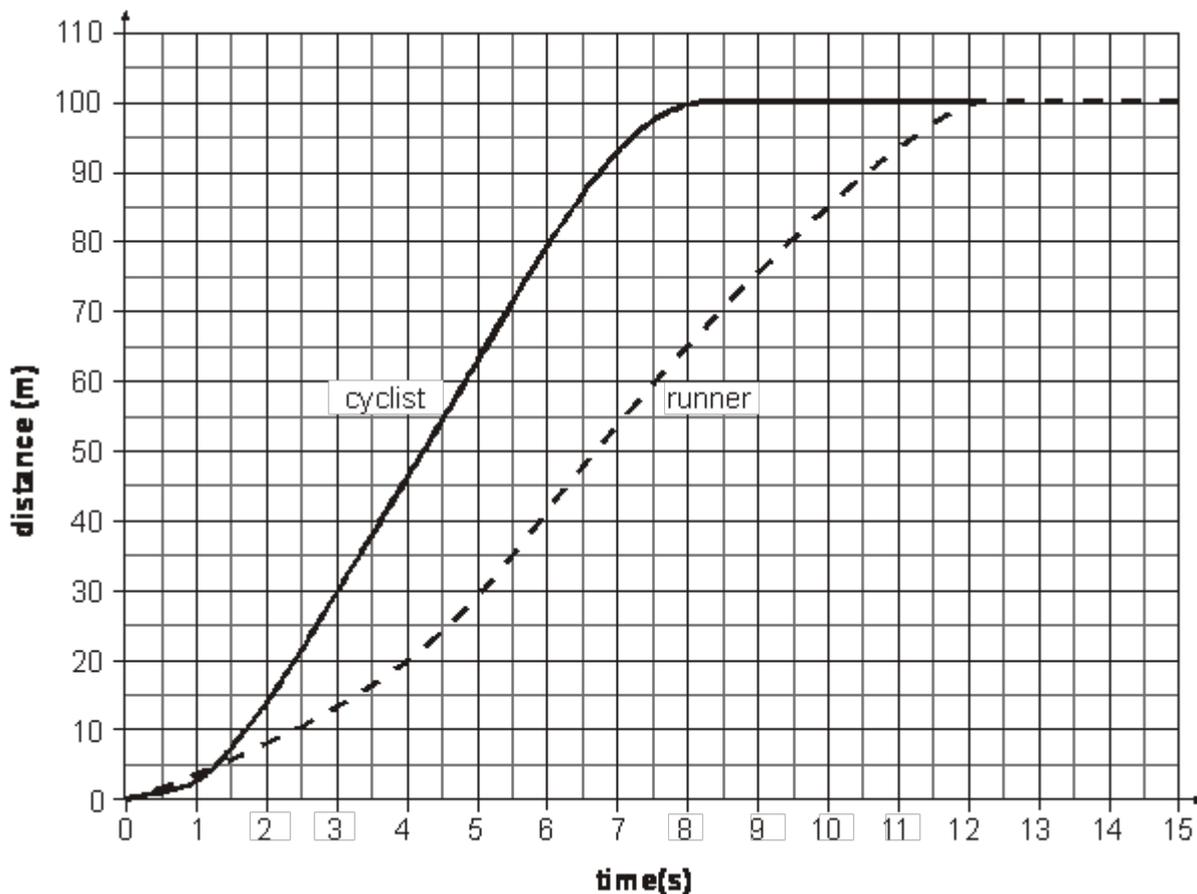


(ii) Sam then turned the magnet on model A around.
What would happen to model B?

.....

2 marks
maximum 5 marks

Q2. A cyclist and a runner have a race. The distance-time graph for the race is shown below.



Use the graph to answer the following questions.

- (a) (i) How much time did it take the cyclist to travel 100 m?
 s 1 mark

- (ii) When the cyclist finished the race how far behind was the runner?
 m 1 mark

- (iii) How much more time did the runner take compared with the cyclist to complete the race?
 s 1 mark

- (b) The cyclist is travelling at a constant speed between 3 seconds and 6 seconds.
 How does the graph show this?

1 mark

(c) (i) When the race started, a walker set off at a steady speed of 2m/s.

Draw a line on the graph on the opposite page to show the distance covered by the walker in the first 15 seconds. Use a ruler.

1 mark

(ii) Calculate how much time it will take for the walker to walk 100m.

.....
..... S

1 mark
maximum 6 marks

Q3. Some pupils made an electric cell using two different metals and a lemon. They put strips of copper and zinc into a lemon and connected them to the terminals of an electric clock.



(a) Look at the photograph.

What evidence is there that they have made an electric cell?

.....

1 mark

(b) The pupils had pieces of copper, zinc, iron and magnesium and some lemons. They wanted to find out which pair of metals made the cell with the biggest voltage.

What equipment should they use to measure the voltage of their cells?

.....

1 mark

(c) In their investigation they used different pairs of metals.

Give **one** factor that they should keep the same.

.....

1 mark

(d) The pupils measured the voltage produced by different pairs of metals. Their results are recorded below.

voltage produced by each pair of metals (volts)				
	magnesium	zinc	iron	copper
copper	1.7	0.9	0.8	0
iron	1.3	0.1	0	-
zinc	0.8	0	-	-
magnesium	0	-	-	-

Which pair of metals made the cell with the biggest voltage?

..... and

1 mark

(e) Look at the results in the table above.

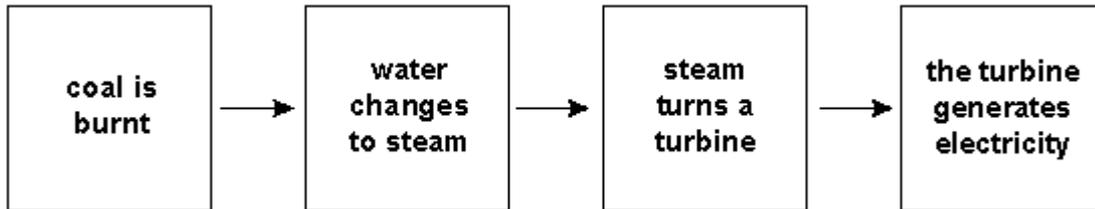
Why should the pupils **not** use pairs of the same type of metal for the clock?

.....

.....

1 mark
maximum 5 marks

Q4. In a power station, coal can be used to generate electricity.



(a) Use words from the box to answer the questions below.

chemical	electrical	gravitational potential	
kinetic	light	sound	thermal

1 mark

(i) What is the useful energy transfer when coal is burnt?

..... energy is transferred to energy

1 mark

(ii) Some of the energy stored in coal is wasted when it is burnt.

Give the name of **one** type of energy released that is **not** useful.

.....

1 mark

(b) Wind turbines are also used to generate electricity. The wind turns the turbine blades and the turbine blades turn a generator.



Use words from the **box opposite**. Complete the sentence to show the useful energy transfer in a wind turbine and generator.

..... energy is transferred to energy

1 mark

(c) Suggest **one** disadvantage of using wind to generate electricity.

.....
.....

1 mark

(d) Sugar cane is a plant.

The sugar from the cane is used to make alcohol.
Alcohol is a fuel.



(i) Which energy source do plants use to produce sugar?

.....

1 mark

(ii) Is sugar cane a renewable **or** non-renewable source of energy?
Tick one box.

renewable source non-renewable source

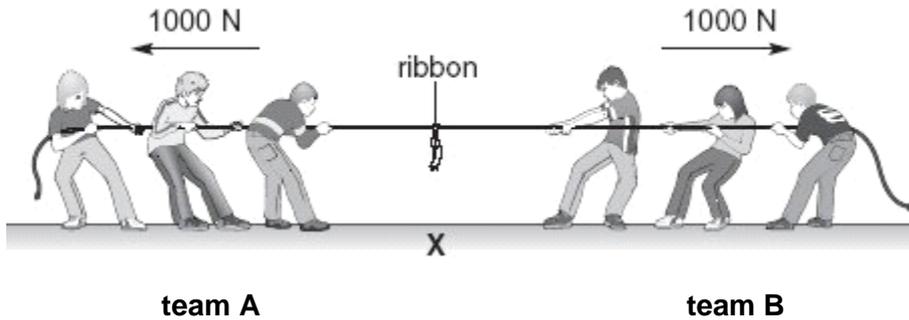
Give a reason for your answer.

.....

1 mark
maximum 7 marks

Q5. The drawings in parts (a), (b) and (c) show two teams of pupils in a tug-of-war. There is a ribbon tied to the middle of the rope.

(a) The sizes and directions of the forces of each team are shown.



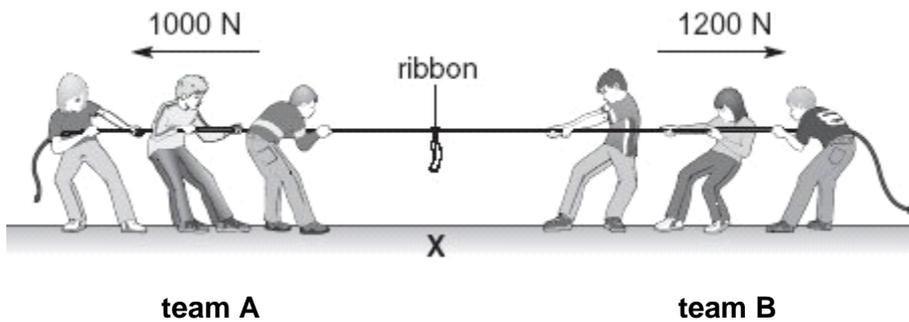
The ribbon stays above point X on the ground. Give the reason for this.

.....

.....

1 mark

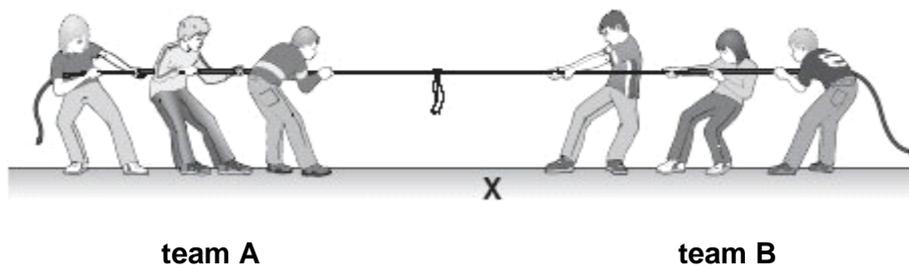
(b) The teams then pull with the forces shown below.



Draw an arrow on the rope to show the direction in which the ribbon will move.

1 mark

(c) Later, the ribbon was to the left of point X as shown below.



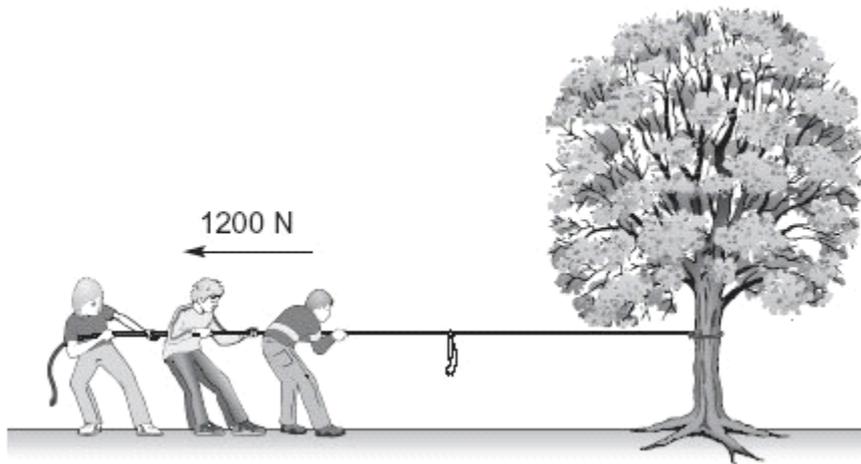
Why did the ribbon move towards the left?

.....

.....

1 mark

(d) Team A practises by pulling a rope tied to a tree.



The team pulls with a force of 1200 N but the tree does **not** move.

What is the force of the tree on the rope? Tick the correct box.

zero	<input type="checkbox"/>	less than 1200 N	<input type="checkbox"/>	1200 N	<input type="checkbox"/>	more than 1200 N	<input type="checkbox"/>
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1 mark

(e) The pupils do **not** slip because there is a force between their shoes and the ground. What is the name of this force?

.....

1 mark
maximum 5 marks