KING'S COLLEGE JUNIOR SCHOOL
WIMBLEDON

King's College School

Transfer Paper

Specimen

PHYSICS

This exam is 40 minutes long.

Answers should be written on the question paper.

Answer **all** questions.

Please fill in the following details

Name:……..

Form:……

Please answer all questions.

1. Underline the word, phrase or number which best completes each of the following sentences.

(a) When they are brought close together, a north-seeking pole and a south-seeking pole will

attract **have no effect** **make a stronger pole** **repel**

(b) The most likely mass of a car is

10Kg **100Kg** **1000Kg** **10 000Kg**

(c) On earth, the force of gravity on one kilogram is nearest

1N **10N** **100N** **1000N**

(d) A unit of energy is the

Ampere **joule** **newton** **ohm**

(e) An astronaut with a mass of 120Kg would have a weight of 96N if he were standing on Pluto. This means that Pluto's gravitational pull on each Kg is

0N **0.8N** **1.25N** **10N**

(f) A tuning fork is struck and sounds like middle C. Another tuning fork, when struck, sounds a note of higher pitch. Compared with the first tuning fork the vibrations of the second tuning fork must be

bigger **of higher frequency** **of lower frequency** **smaller**

(g) A car took 20 minutes to travel 16 Km. Its speed was

0.8Km/h **48Km/h** **80Km/h** **4800Km/h**

(h) The frequency of sound is measured in

cm/s **decibels** **hertz** **pascals**

(i) A spring stretches 8 cm when a 400g mass is hung from it. Three springs which are identical to the first one are joined in series and a 200g mass is hung from the bottom one. The total stretch in cm of this combination of three springs will be

4 **12** **24** **48**

(j) Thermal energy is transferred by convection

in gases and liquids **in gases only** **in liquids only** **in solids only**

Maximum 10 marks

2. A rocket was fired above a seaside town to call out the lifeboat crew.
The rocket exploded, giving out light and sound at the same time.

(a) Lisa was outside the town. She saw the flash of the rocket exploding and heard the bang.

(i) Which sentence is true?
Tick the correct box.

She heard the bang first. ☐

She saw the flash first. ☐

She heard the bang and saw the flash at the same time. ☐

1 mark

(ii) Give the reason for your answer.

.....

.....

1 mark

(b) Some people were nearer to the rocket than Lisa. How did the sound seem to them?

Tick the correct box.

It was quieter. ☐

It was louder. ☐

It was higher pitched. ☐

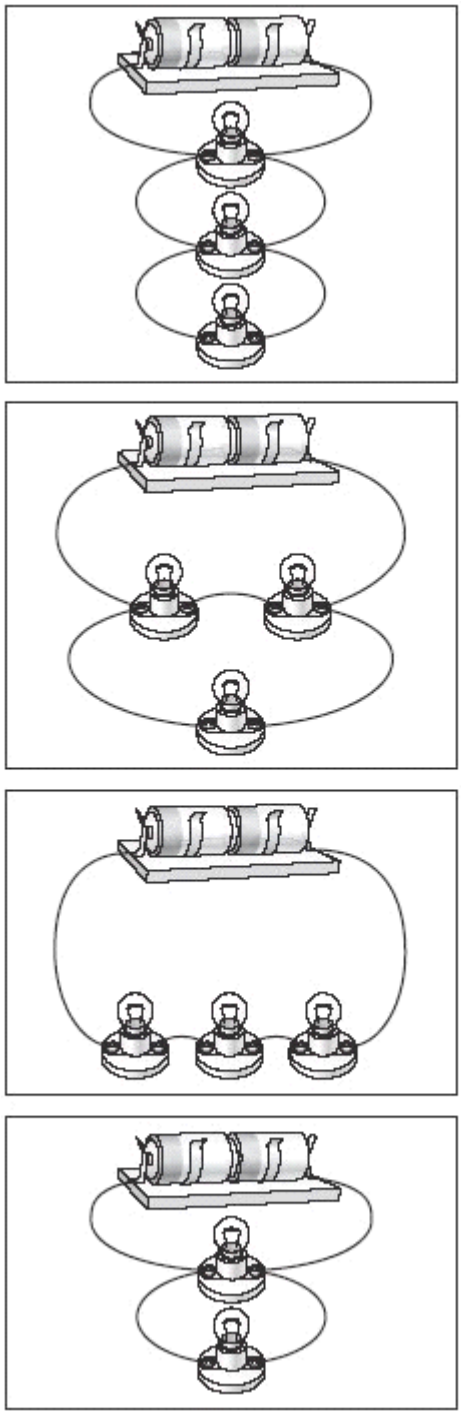
It was lower pitched. ☐

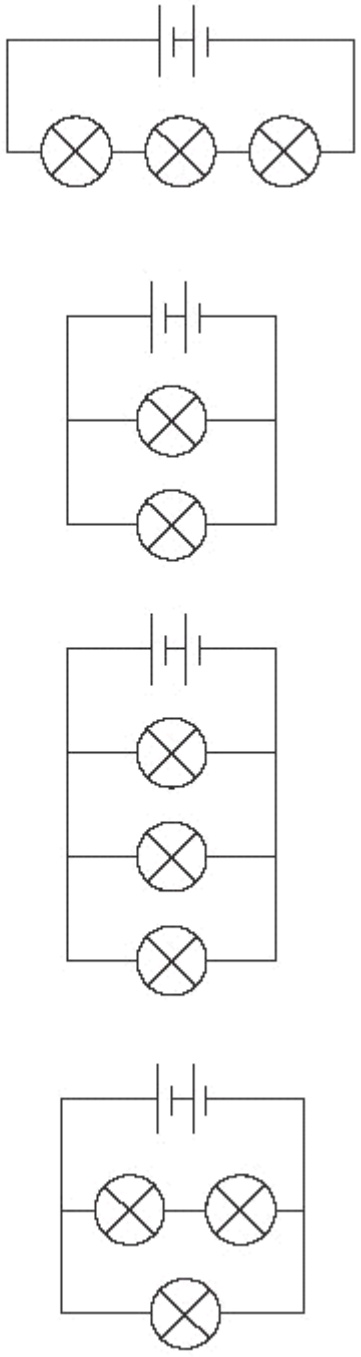
1 mark

Maximum 3 marks

3. (a) Draw a line from each electrical circuit to the correct circuit diagram.
Draw only **four** lines.

electrical circuit **circuit diagram**

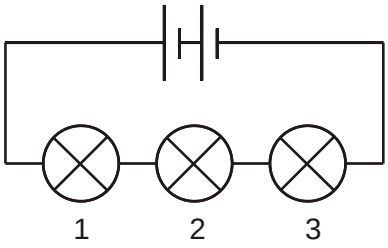




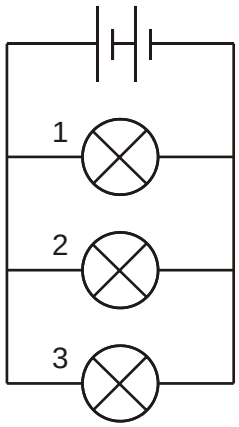
2 marks

(b) In each circuit below, **bulb 1 breaks** and goes off.

Under each circuit diagram below, tick the correct boxes to show if bulb 2 and bulb 3 are **on** or **off**.



circuit A



circuit B

	on	off
bulb 1 breaks		✓
bulb 2		
bulb 3		

	on	off
bulb 1 breaks		✓
bulb 2		
bulb 3		

2 marks

(c) Give the name of the part that provides energy for each circuit.

.....

1 mark

(d) Why is copper used for wires in a circuit?
Tick the correct box.

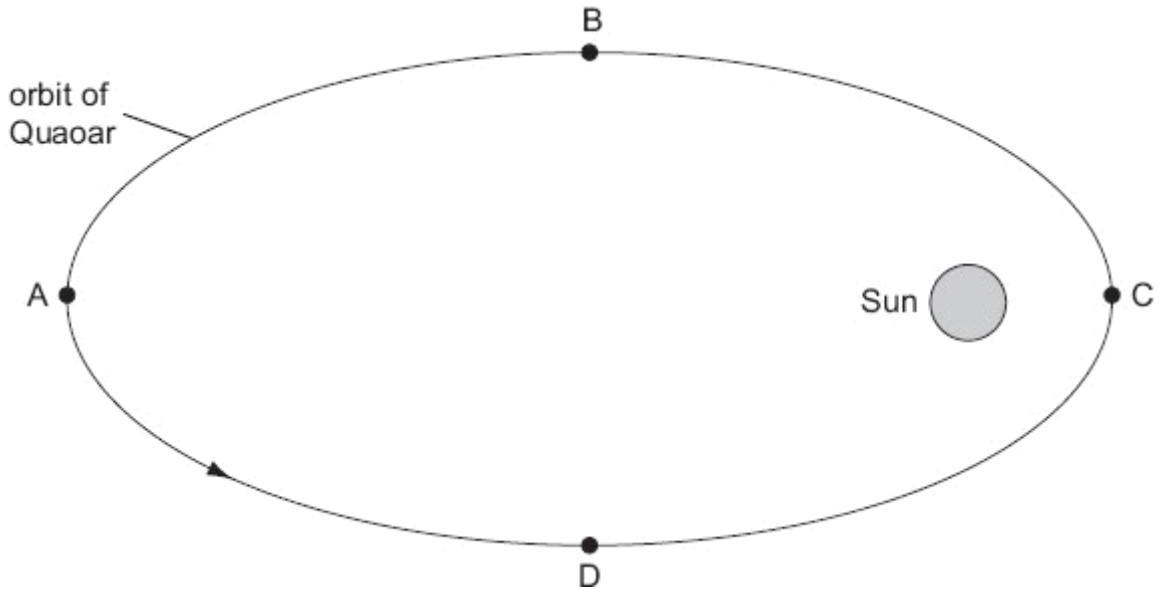
Copper does **not** stick to a magnet.	☐	Copper is a good conductor of electricity.	☐
Copper is a brown metal.	☐	Copper is a good conductor of heat.	☐

1 mark

maximum 6 marks

4. (a) In 2002 a large asteroid was discovered orbiting the Sun.
It was named Quaoar.

The diagram below shows Quaoar in four positions in its orbit.



not to scale

(i) In which of the four positions, A, B, C or D, is the effect of the Sun's gravity on Quaoar the greatest?

.....

Explain your answer.

.....

.....

1 mark

(ii) **On the diagram above**, draw arrows to show the direction of the Sun's gravity on Quaoar in each of the positions A, B, C and D.

1 mark

(iii) At which position, A, B, C or D, is Quaoar travelling most slowly?

.....

Explain your answer.

.....

.....

1 mark

(b) The table below gives information about three of the planets in our solar system.

planet	average distance from Sun (millions of km)	time for one orbit (Earth years)	Average surface temperature of planet (^{o}C)
Saturn	1427	30	–180
Uranus	2870	84	–210
Pluto	5900	248	–230

(i) The time for one orbit of the planet Neptune is 165 Earth years.

Estimate the average distance of Neptune from the Sun.
Use information in the table to help you.

..... millions of km

1 mark

(ii) How does the surface temperature of these planets vary with distance from the Sun?
Use information in the table to help you.

.....

.....

1 mark

(iii) Explain why the temperature varies with distance from the Sun in this way.

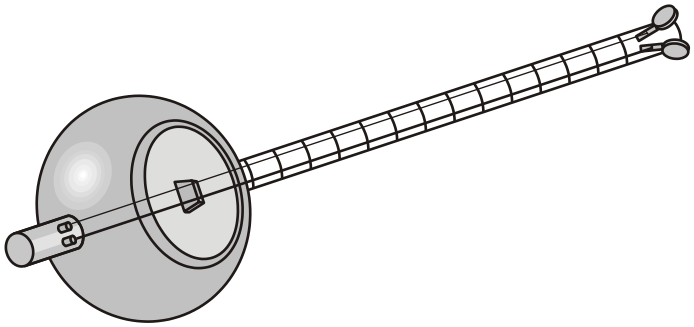
.....

.....

1 mark

maximum 6 marks

5. The dotar is a musical instrument with two strings.



(a) Aftal plays the dotar very quietly.

What must he do to the strings to make a louder sound?

.....

.....

1 mark

(b) Aftal makes the strings tighter so they vibrate more quickly.

How does this affect the sound produced by the strings?
Tick the correct box.

The sound has a lower pitch.	☐
The sound is louder.	☐
The sound has a higher pitch.	☐
The sound is quieter.	☐

1 mark

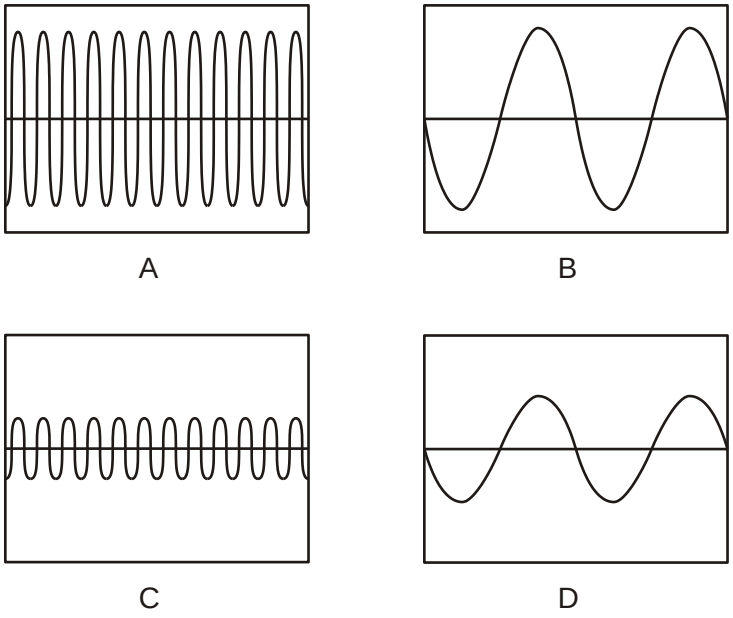
(c) One of the strings is thicker than the other, so it vibrates more slowly.

In what way is the sound made by the thicker string different from the sound made by the thinner string?

.....

1 mark

(d) Aftal played the dotar near a microphone connected to an oscilloscope.
The diagrams below show the patterns made by four sounds.



(i) How does the sound shown in trace A differ from the sound in trace B?

.....

.....

1 mark

(ii) How does the sound shown in trace A differ from the sound in trace C?

.....

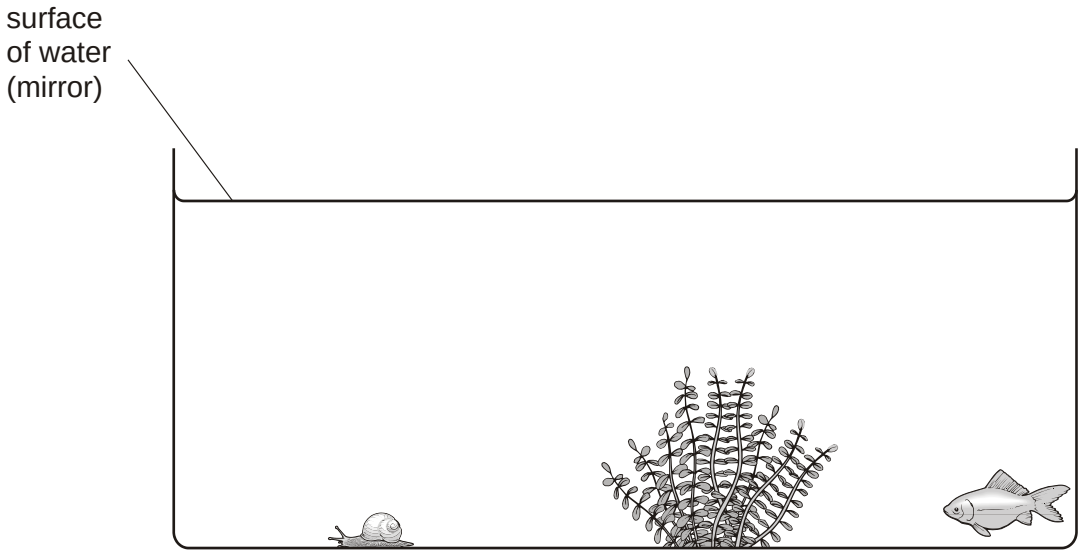
.....

1 mark

maximum 5 marks

6. (a) The diagram below shows a fish tank.

The surface of the water acts like a mirror.
The fish can see the snail reflected in the surface of the water.

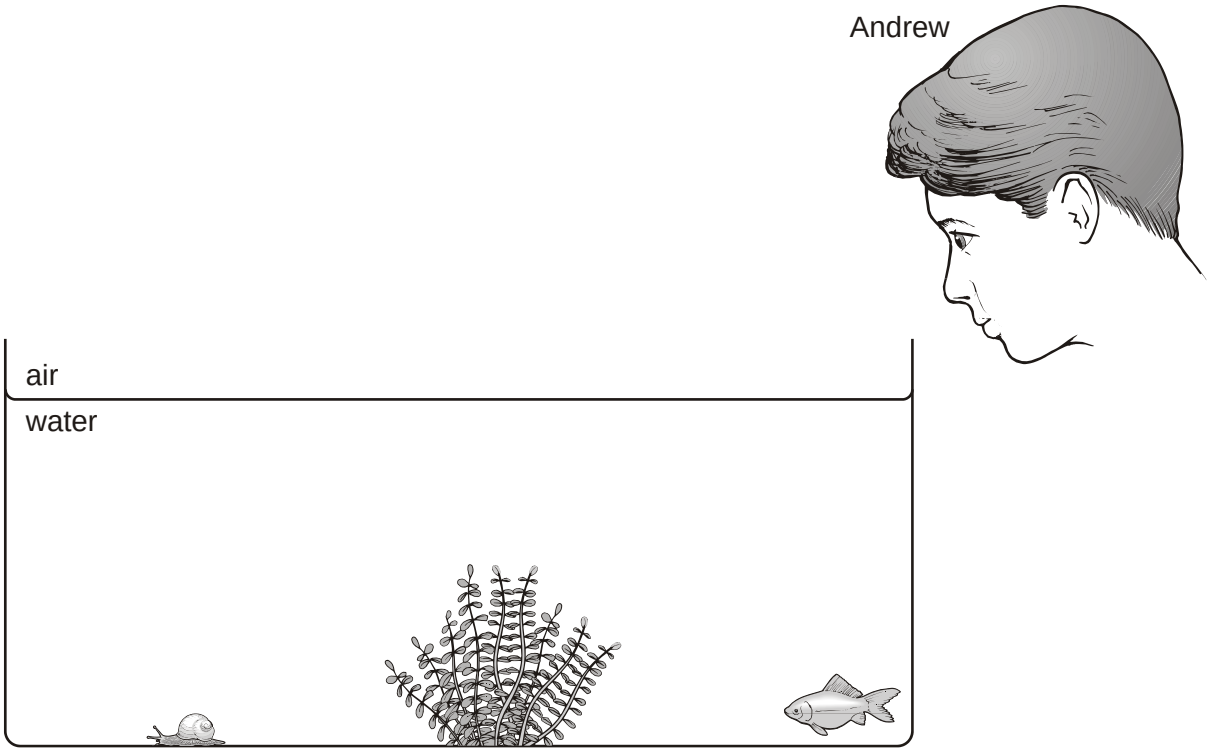


Draw a ray of light which passes from the snail, and reflects from the surface, to show how the fish can see the snail. Use a ruler.

Put arrows on the ray of light.

3 marks

(b) Andrew is looking at the snail.



When a ray of light passes from water to air it changes direction.

(i) Draw a ray of light from the snail to Andrew to show how Andrew can see the snail. Use a ruler.

Put arrows on the ray of light. 2 marks

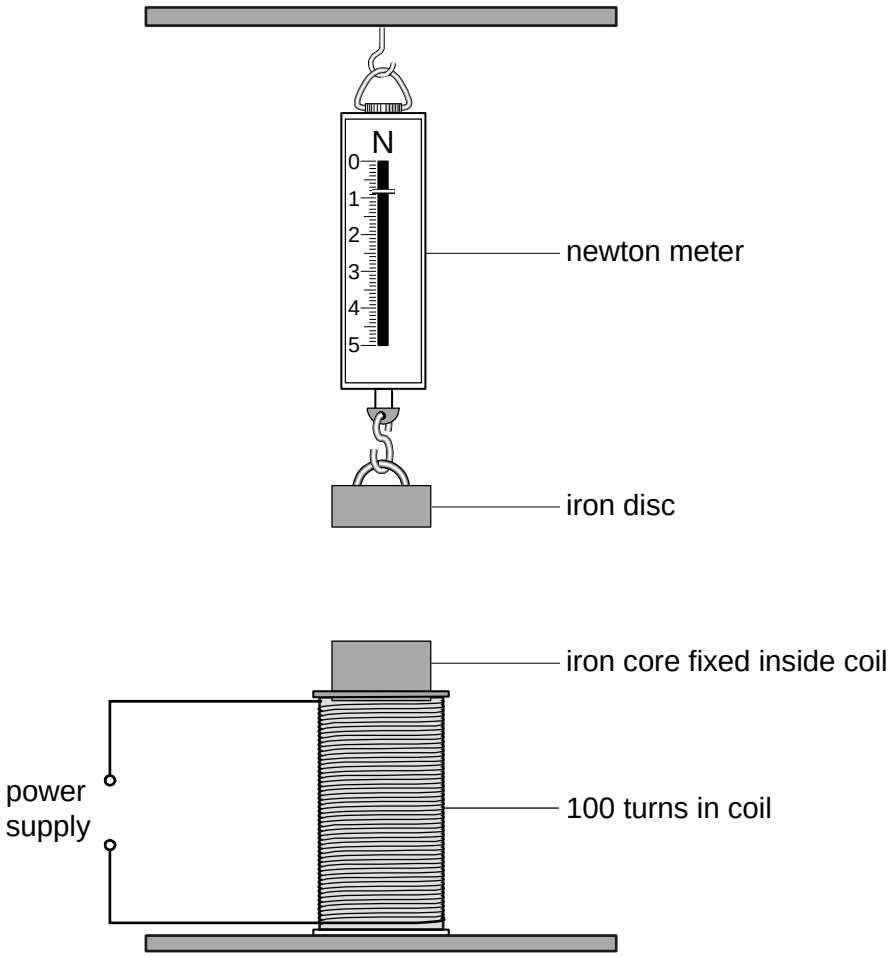
(ii) What is the name given to this change in the direction of a ray of light?

.....

1 mark

maximum 6 marks

7. Mary used the apparatus below to test the strength of an electromagnet.
She used the reading on the newton meter to measure the force of the magnet on the iron disc.



(a) Explain why the reading on the newton meter increases when a current passes through the coil.

.....

.....

.....

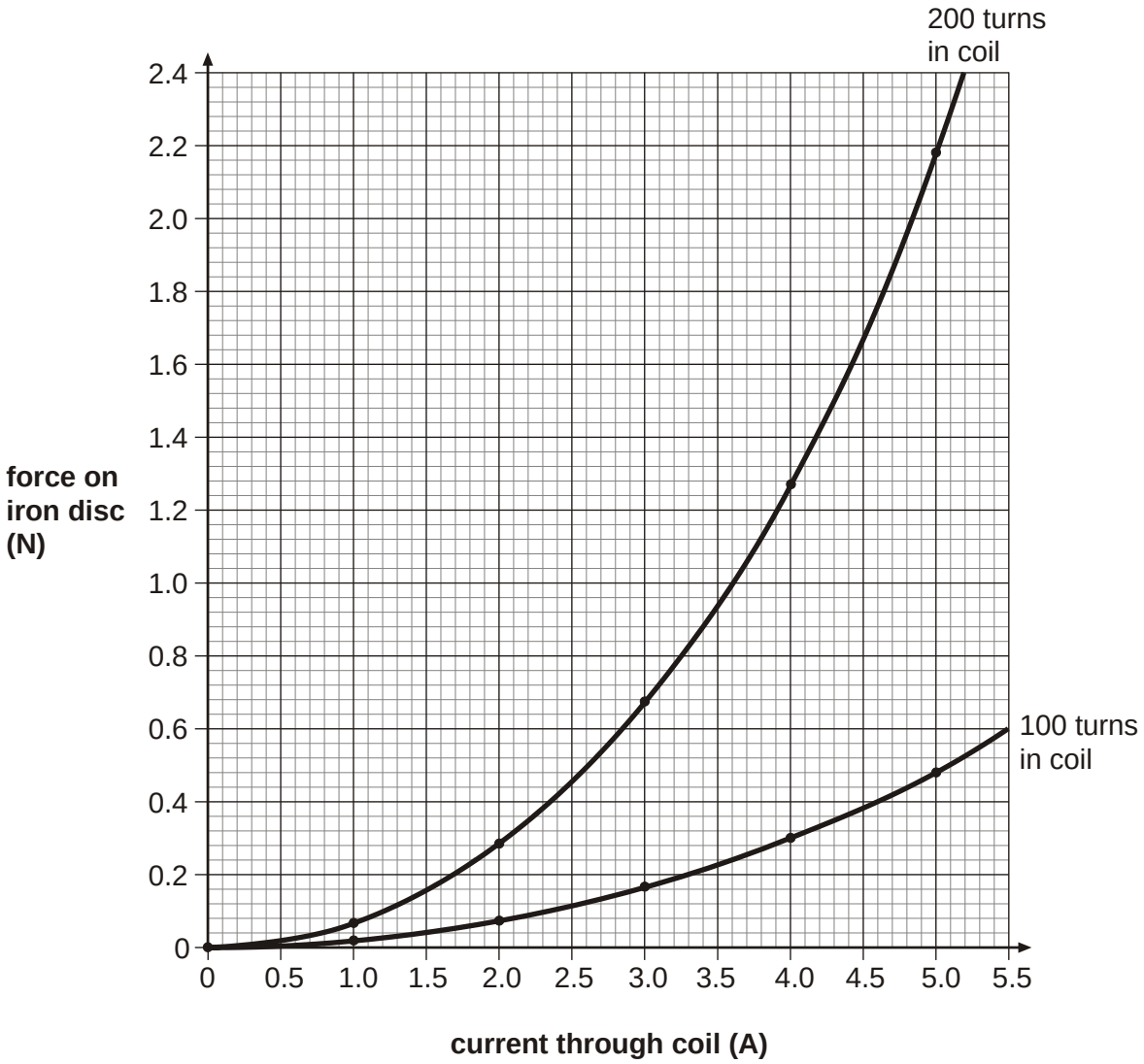
.....

2 marks

(b) When a current passes through the coil, some of the electrical energy is changed to thermal energy.
What would happen to the coil if the current passing through it was too large?

..... 2 marks

(c) Mary made two electromagnets, one with 100 turns of wire in the coil and one with 200 turns.
She varied the current through the coil of each electromagnet.
She measured the force of each electromagnet on the iron disc.
The graph shows her results.



Write **two** conclusions that Mary could make from these results.

1. .....

.....

2. .....

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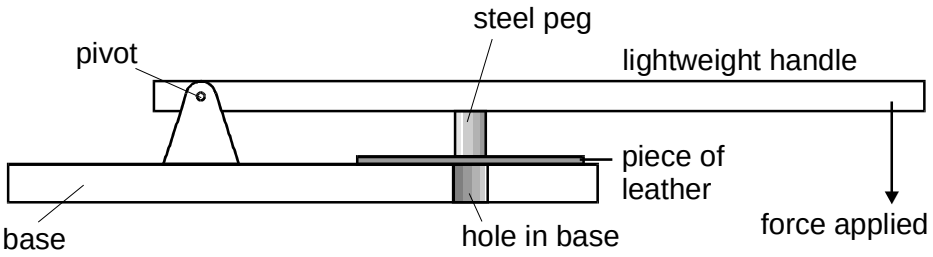
2 marks

maximum 6 marks

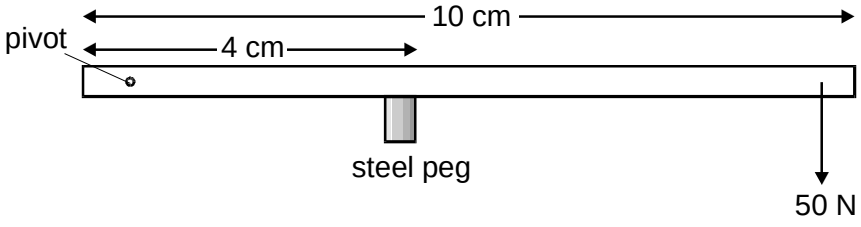
8. The diagram shows a simple tool for punching holes in a leather belt.



not to scale

When the handle is pressed down, the steel peg presses down on the piece of leather. If the force is large enough, the peg punches through the leather, making a hole.

The diagram below shows the force applied to the handle.



not to scale

(a) Calculate the moment (turning effect) of the 50 N force applied to the handle. Give the units.

.....

.....

2 marks

(b) This moment makes the steel peg press down on the leather. Calculate the force with which the steel peg presses down on the leather.

.....

.....

1 mark

(c) The next time the punch is used, the steel peg presses down on the leather with a force of 150 N.

(i) The area of the end of the steel peg is 0.1 cm^2.
What is the pressure of the steel peg on the leather?
Give the units.

.....

.....

1 mark

(ii) The pressure is too small, and the punch does not go through the leather. How could you change the design of the punch to make it work using the same force on the handle?

.....

.....

1 mark

Maximum 5 marks

9. Describe the difference between mass and weight, illustrating your description with an example.

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.....

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3 marks

Maximum 3 marks