Name_____ **Teacher**_____

Aldenham School

Science Department

13+ Exam - Physics

SAMPLE PAPER

20 Minutes

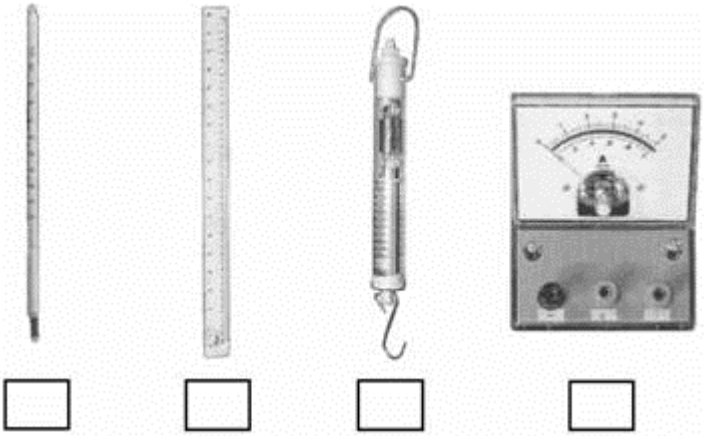
30 Marks

Q1. Lee blew across the top of paper tubes to make sounds.

He investigated how changing the length of a tube affects the pitch of the sound.

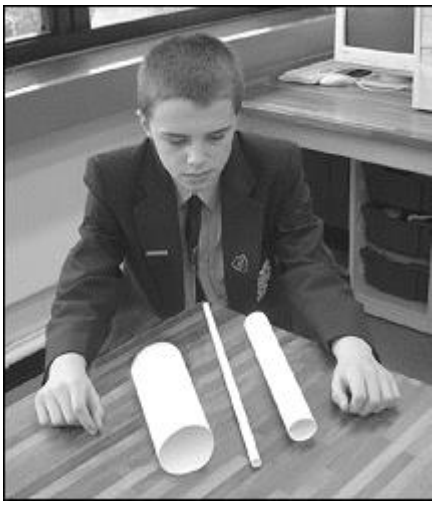
(a) What equipment could he use to measure the length of the tubes?

Tick the correct box.



1 mark

(b) The photograph below shows the different lengths of tubes Lee used.



Suggest **one** way his test might **not** have been fair.

.....

.....

1 mark

(c) Lee made a prediction.

Which of these statements is a prediction?
Tick the correct box.

The tubes were made of paper. ☐

The pitch of the sound is how high or low it is. ☐

The longer tube will make a lower sound. ☐

The sound is caused by the vibration of air. ☐

1 mark

(d) Lee blew across the ends of 3 different lengths of tube and compared the pitch of the sound produced.

His results5 are shown below.

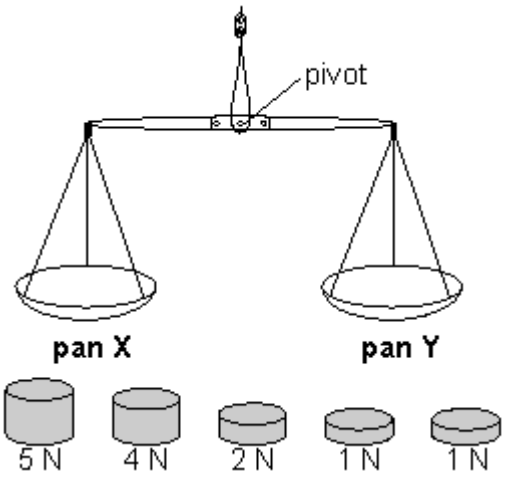
Length of the tube, in cm	*pitch of the sound*
5	*high*
25	*medium*
50	*low*

Which length of tube made the sound with the highest pitch?

..... cm

1 mark
Maximum 4 marks

Q2. Ellie has a set of scales and some weights as shown below.



Ellie puts two weights in pan X and one weight in pan Y. The scales balance.

(a) Which weights could be in pans X and Y?

pan X: ..... and .....

pan Y: .....

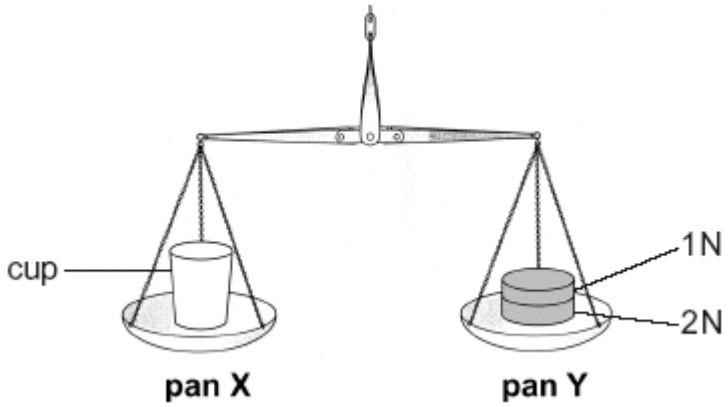
1 mark

(b) Ellie removes all the weights from the scales.
She then puts a cup on pan X.
In which direction will pan Y move?

.....

1 mark

(c) She puts weights into pan Y so the scales balance.

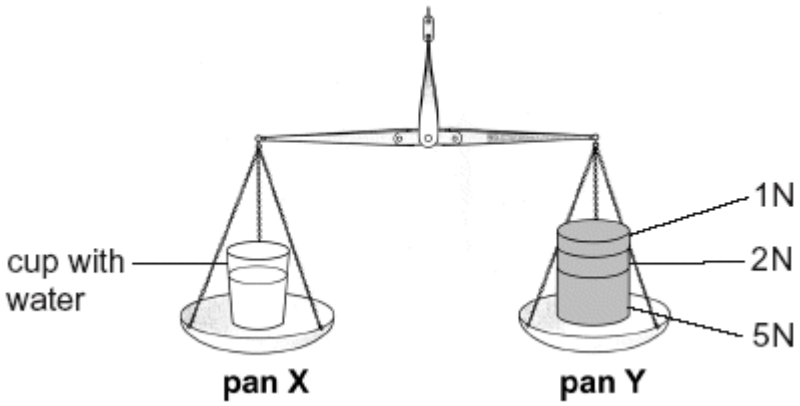


How much does the cup weigh?

..... N

1 mark

(d) Ellie puts some water in the cup.
She then adds some more weights to pan Y to make the scales balance.



(i) How much do the cup **and** water weigh?

..... N

1 mark

(ii) How much does the water weigh?

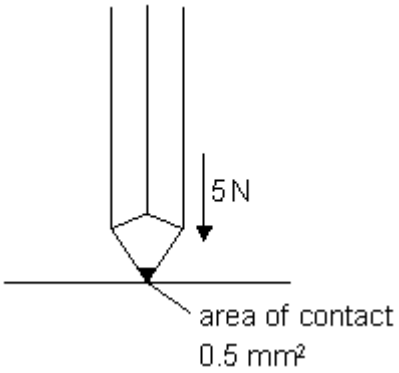
..... N

1 mark

maximum 5 marks

Q3. Jenny is doing her homework.

(a) When Jenny writes, the pencil exerts a force of 5N on the paper.



not to scale

The area of the pencil in contact with the paper is 0.5 mm^2.

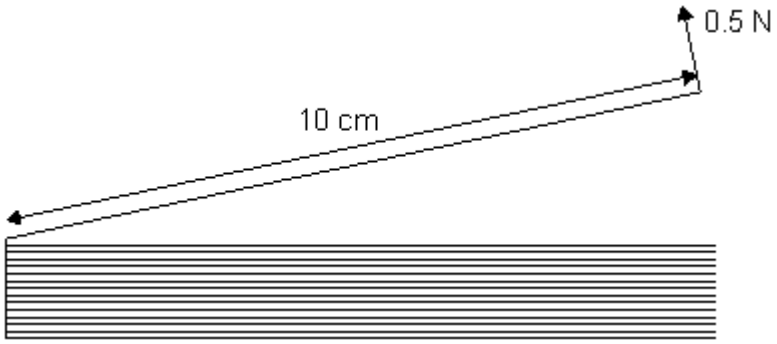
Calculate the pressure of the pencil on the paper.
Give the unit.

.....

.....

2 marks

(b) Jenny puts a book on her desk.
She lifts the cover up with her finger, using a force of 0.5 N.
The cover is 10 cm wide.



Calculate the turning moment on the cover of the book.
Give the unit.

.....

.....

2 marks

(c) Jenny's book has an area of 200 cm^2.
It exerts a pressure of 0.05 N/cm^2 on the desk.

What is the weight of the book?
Use the space below to show your working.

_____ N

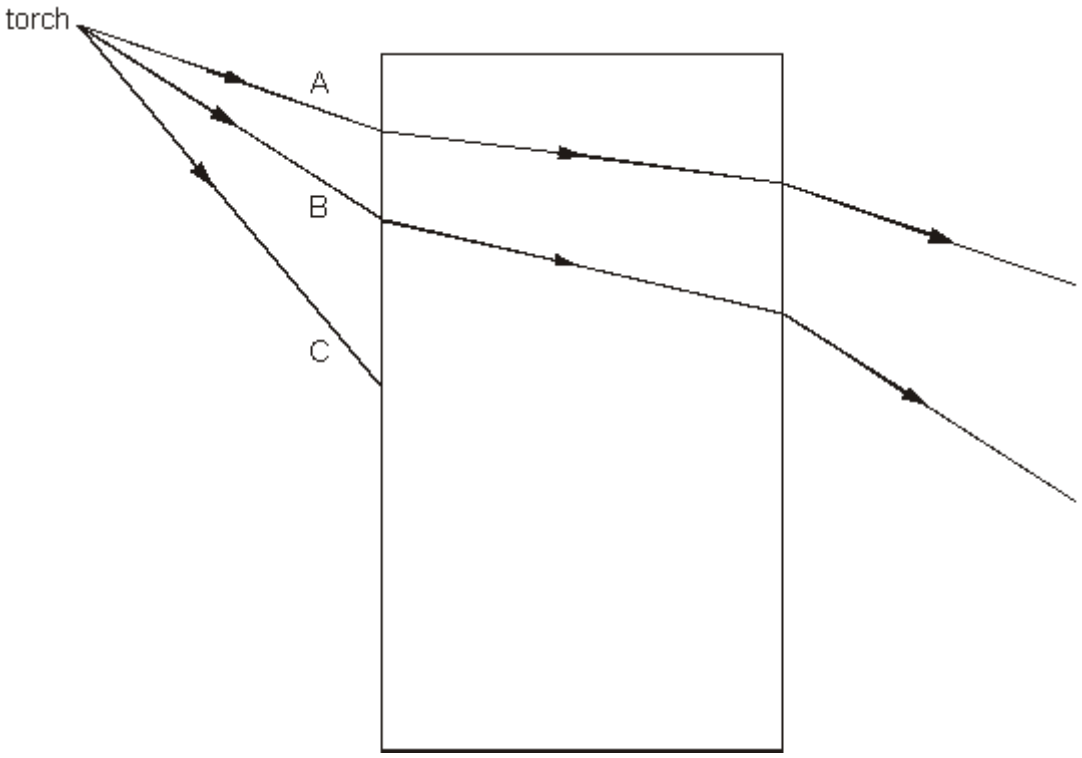
2 marks
maximum 6 marks

Q4. (a) When light travels from air to glass, it changes direction.
What is the name of this effect?

.....

1 mark

(b) The diagram below shows three rays of light A, B and C striking a glass block.



The paths of A and B have been drawn.

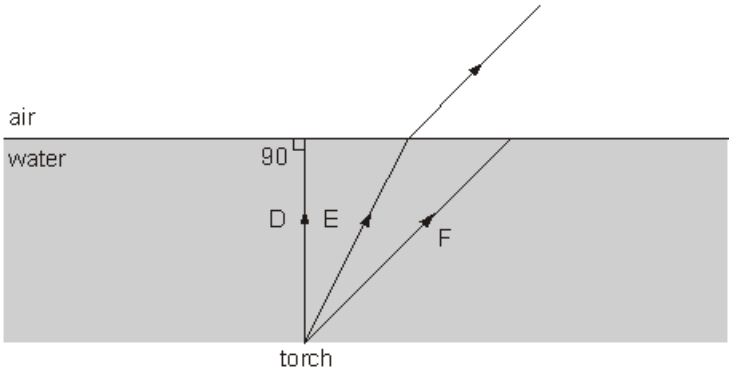
Continue ray C to show its path through the block and out the other side.
Use a ruler.

2 marks

(c) The diagram below shows three rays of light, D, E and F, from a torch placed under water.

The path of ray E is shown as it leaves the water and enters the air.

Continue the paths of D and F as they pass through the air.
Use a ruler.

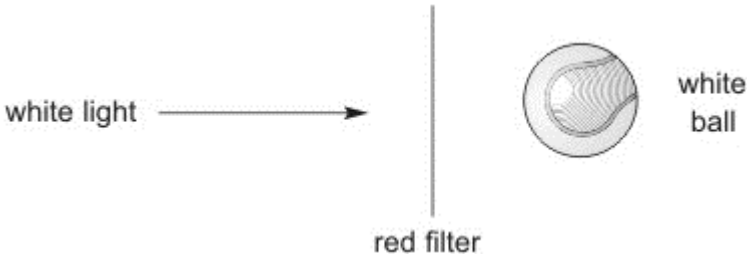


2 marks
maximum 5 marks

Q5. (a) Peter had two different coloured tennis balls as shown below.

He shone white light through a red filter onto each ball.

(i) **experiment 1**



The white ball appeared red.
Explain why this ball appeared red.

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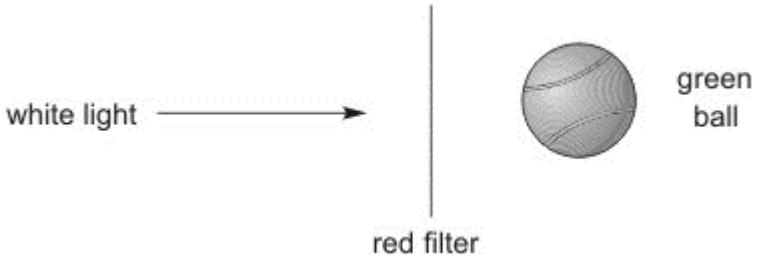
.....

.....

2 marks

(ii) **experiment 2**



What colour did this ball appear?

.....

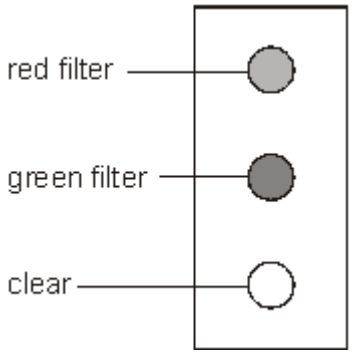
Explain your answer.

.....

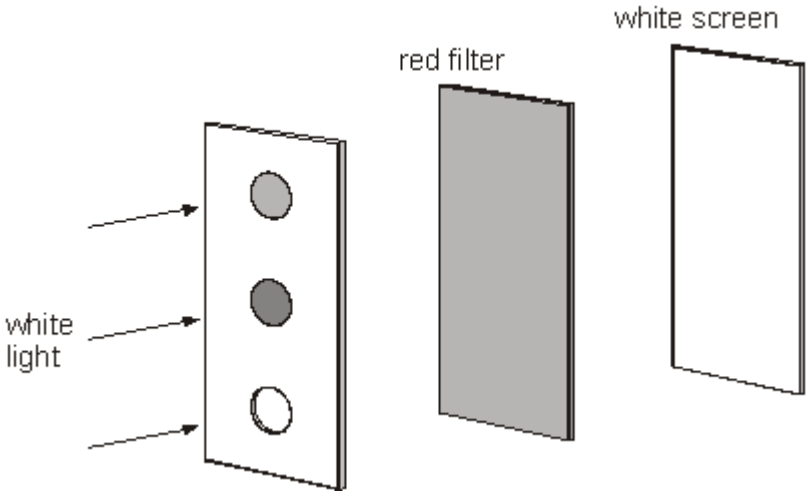
.....

2 marks

(b) Peter set up a different experiment.
He cut three holes in a piece of card.
Two of the holes were covered by coloured filters as shown below.



Peter placed a red filter between the piece of card and a white screen.
He shone white light at the piece of card with three holes in it.



What would Peter see on the screen?

.....

.....

1 mark
maximum 5 marks

Q6. (a) Debbie put a paper cup into a glass beaker.
She glued a magnet in the bottom of the paper cup.
She glued another magnet in the bottom of the beaker.
The magnets repelled.

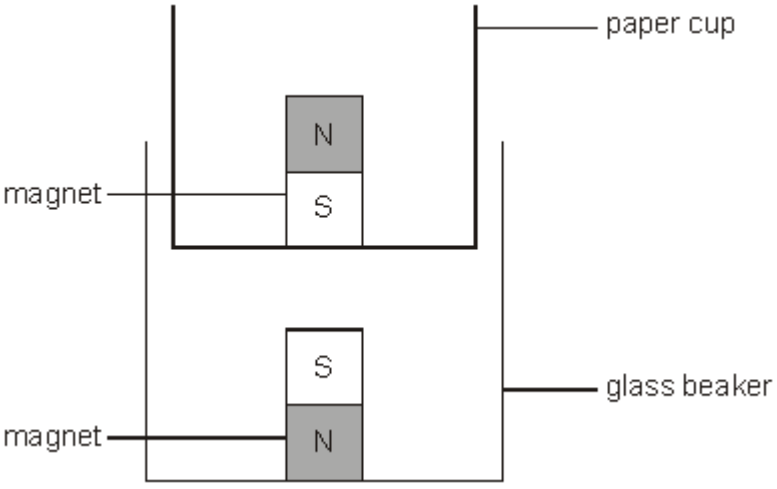


diagram A

not to scale

What **two** forces act on the paper cup and its contents to keep it in this position?

1. .....

1 mark

2. .....

1 mark

(b) Debbie put 5 g of aluminium rivets into the paper cup.
It moved down a little as shown in diagram B.

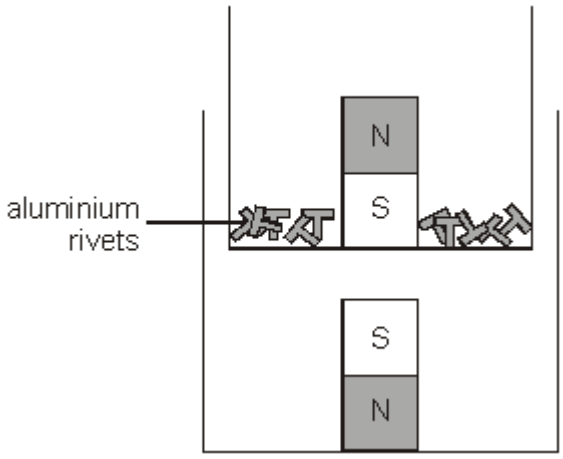
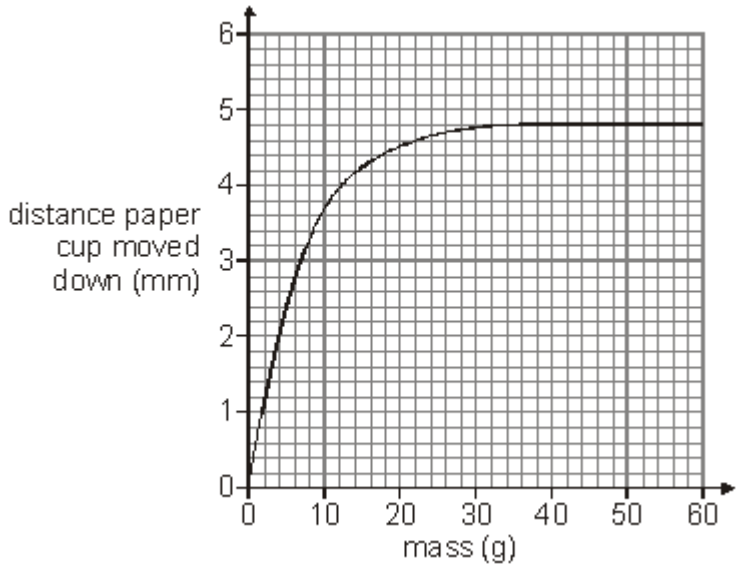


diagram B

not to scale

Debbie plotted a graph to show how the mass of aluminium rivets affected the distance the cup moved down.



(i) Use the graph to find the mass that made the cup move down 4 mm.

..... g

1 mark

(ii) Why did the graph stay flat with masses greater than 40 g?

.....

1 mark

(c) Debbie removed the 5 g of aluminium rivets and put 5 g of iron nails into the cup.

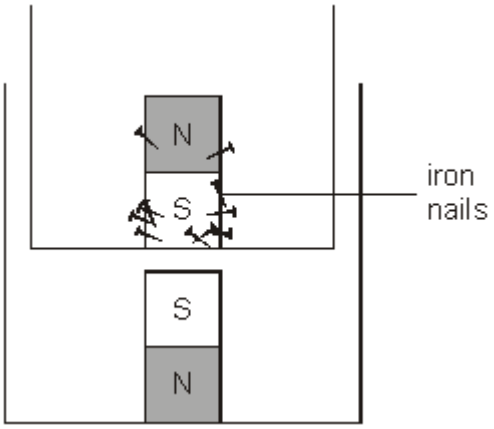


diagram C

not to scale

The paper cup moved down more with 5 g of iron nails than with 5 g of aluminium rivets as shown in diagram C.
Give the reason for this.

.....

.....

1 mark

maximum 5 marks