| NAME: |
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OUNDLE
School

2021 Junior Entrance Examinations

# Science Paper

Time allowed: 60 **minutes**

## Instructions

- You have **5 minutes reading time**. In this time, you should look at the questions in the paper and choose which to do.
- **Answer only 3** of the 5 questions in the paper, the choice is totally up to you.
- You have 55 **minutes to answer your 3 questions.**
- You will need a pen, pencil, ruler and calculator

## 1. This question is about the parts of the body.

There are **four** parts to this question; a,b,c and d. You should **answer all parts** of the question.

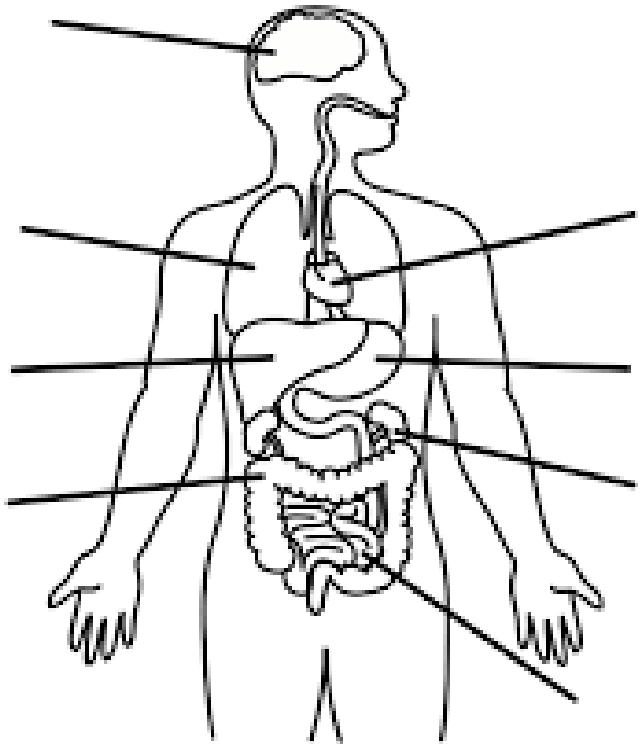
a. Look at this picture of the human body.

i. Write the letter **S** on the label pointing at the stomach (1)

ii. Write the letter **H** on the label pointing at the heart (1)

iii. Write the letter **A** on the label where food is absorbed (1)

iv. Write the letter **E** on the label where gas exchange takes place (1)



b. The heart pumps blood around the body. State why the blood must travel to the:

i. Lungs

_____

_____

(1)

ii. The intestines

_____

_____

(1)

c. Explain why cells need a good blood supply

_____

_____

(2)

d. Suggest why the heart beats faster when you go running

_____

_____

(2)

**Total: 10 marks**

## 2. This question is about categorisation of animals

There are **four** parts to this question; a,b,c and d. You should **answer all parts** of the question.

a. Using straight lines, join the description to the most appropriate animal group

(4)

| | |
|---|---|
| Segmented legs | • Fish |
| Breathes through gills | • Insects |
| Soft body | • Reptiles |
| | • Mammals |
| Segmented, soft body | • Amphibians |
| | • Worms |
| Waterproof outer skin | • Spiders |
| Has eight legs | • Snails |

b. How would you tell an alien the difference between a mammal and a bird?

_____

_____

(2)

c. Explain why not all animals are mammals

_____

_____

(2)

d. Suggest two features of mammals that enable them to live in very cold environments

_____

_____

(2)

**Total: 10 marks**

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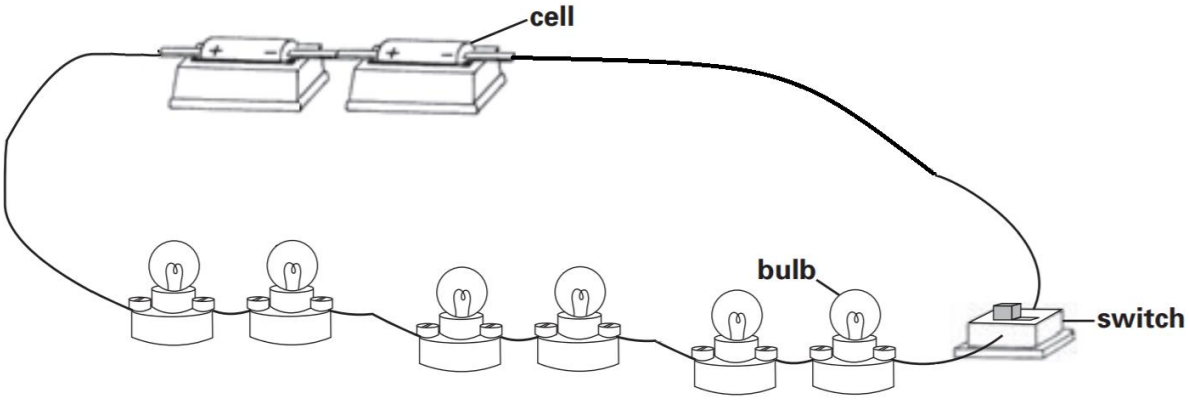
## 3. This question is about circuits and sound waves

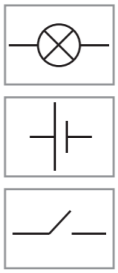
Sam is in a school play. He is dressed as a Christmas tree.

The costume has bulbs which light up. The picture below shows the circuit that makes the Christmas tree light up.




a. Draw a circuit diagram of the Christmas tree's circuit in the space below.

Use these symbols in your circuit diagram. You can use each symbol more than once if you need to.



[2]

b. Sam wants the lights to shine more brightly. He has some ideas about how he can do this.

Write **yes** or **no** next to each idea to show if he will see the lights shine more brightly.

| Idea | Will the star shine more brightly? Yes or no? |
|---|---|
| add another bulb | |
| add another cell | |
| use longer wire | |

[1]

c. Sam's mum is in the front row at the play

Draw ONE arrow on the diagram below to show the direction light travels for his mum to see the lights on the Christmas tree.

[1]

d. Each time Sam appears on stage, Lucy hits a triangle

i. What happens to the triangle for it to make a noise when it is hit?

_____

[1]

ii. What does the sound travel through to reach Sam's mum's ears?

_____

[1]

e. There are lots of people watching the play. Some people are close to the stage. Some people are further away

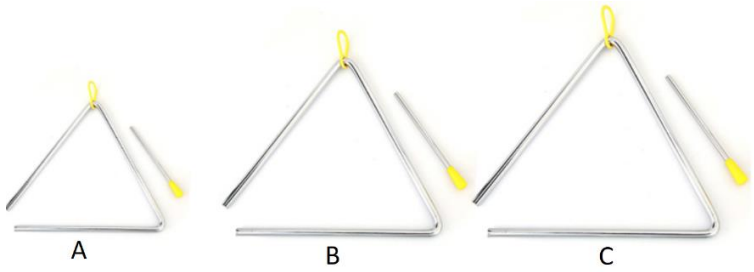
Describe how the distance the people are from the triangle affects the volume of the sound they hear.

_____

_____

[2]

f. Lucy changes from triangle A to triangle C at the half time interval.




Describe what effect this has on the sound produced when Lucy hit the triangle?

_____

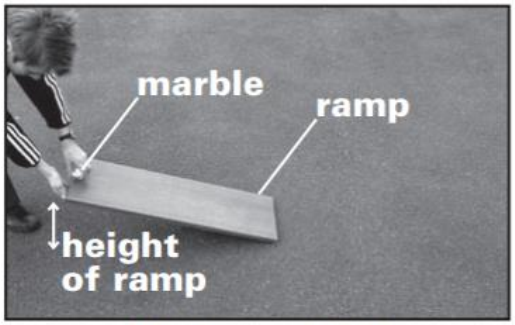
_____

[2]

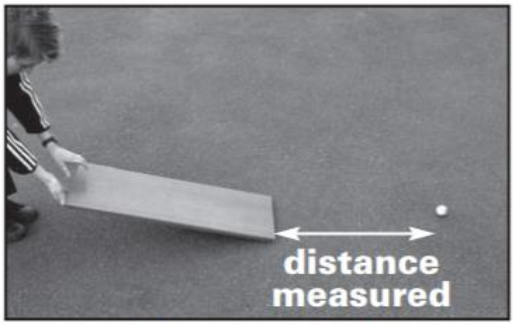
**Total: 10 marks**

## 4. This question is about motion

John and Emma are investigating a marble rolling down a ramp.




Photograph A




Photograph B

They change the height of the ramp. They measure how far the marble rolls from the bottom of the ramp.

They repeat their test with the ramp at different heights

a. What equipment could be used to measure the height of the ramp?

_____

[1]

b. Tick ONE box in each row of the table to show how they should do their investigation to make sure their test is fair.

| Variable | Must be the same | Must be different | Makes no difference |
|---|---|---|---|
| surface of the ramp | | | |
| height of the ramp | | | |
| size of the marble | | | |
| mass of the marble | | | |

[2]

c. John and Emma must decide what heights they should put the ramp at. Look at this photograph. John says, 'This ramp is too steep. It will not give good results.

**Photograph C**

Explain the problem with the ramp in photograph C.

_____

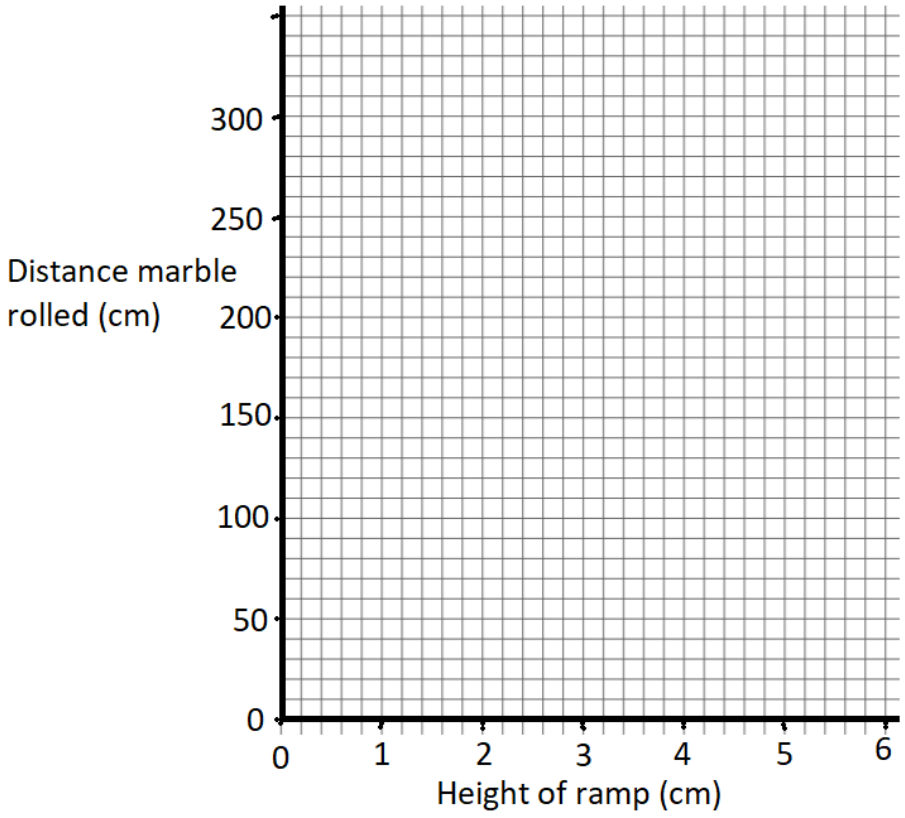
_____

[2]

d. Emma gets the following results

| Height of ramp (cm) | Distance marble rolled (cm) |
|---|---|
| 1 | 70 |
| 2 | 130 |
| 3 | 170 |
| 4 | 200 |
| 5 | 220 |

Plot a graph to show their results




[3]

e.

i. Explain how the height of the ramp affects the distance the marble rolls.

_____

[1]

ii. Use the graph to determine the distance the marble would roll if the height of the ramp was increased to 6cm

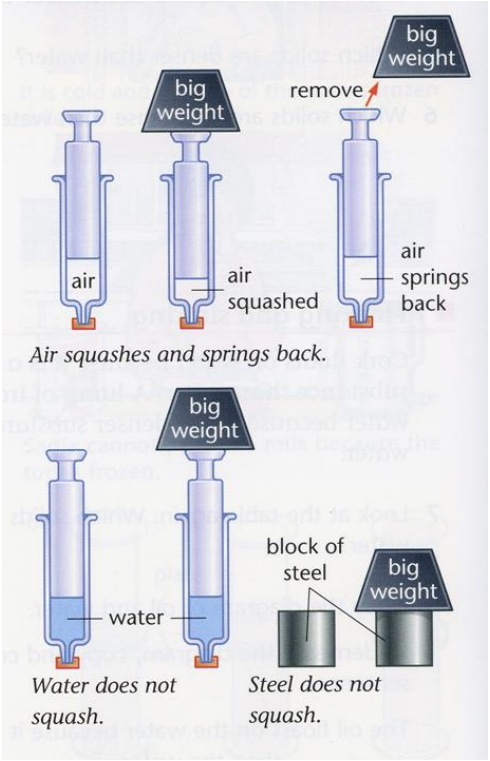
_____

[1]

**Total: 10 marks**

## 5. This question is about States of Matter

Look at the picture below.




a. Complete the table to identify the state of matter in each case:

| Substance | State |
|---|---|
| Air | |
| Water | |
| Steel | |

[1]

b. The air can be squashed.

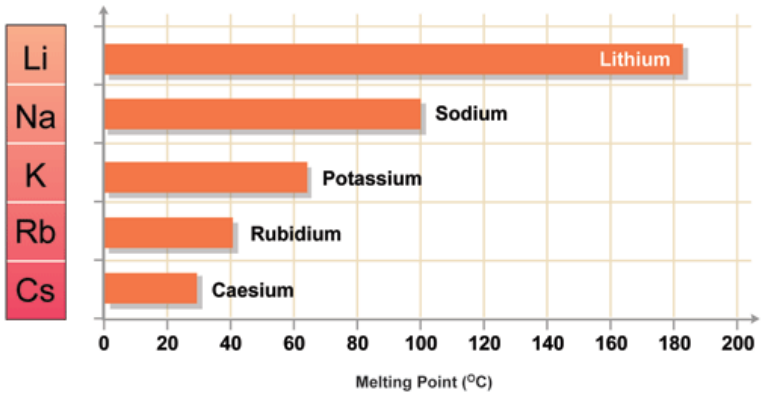
i. What does this tell you about the particles in air?

_____ [1]

ii. Draw a diagram in the space below to show the particles in water.
*You need not show more than 8-10 particles*

[2]

c. Steel is a metal alloy. The melting point of some steel is 1500 °C. This is very high compared to many other metals. Look at the graph below which shows the melting point of a group of metals known as the Alkali metals.




i. Name **ALL** of the metals which would be solid at 60°C

_____

[1]

ii. Use the graph to estimate the melting point of Caesium [1]

_____

[1]

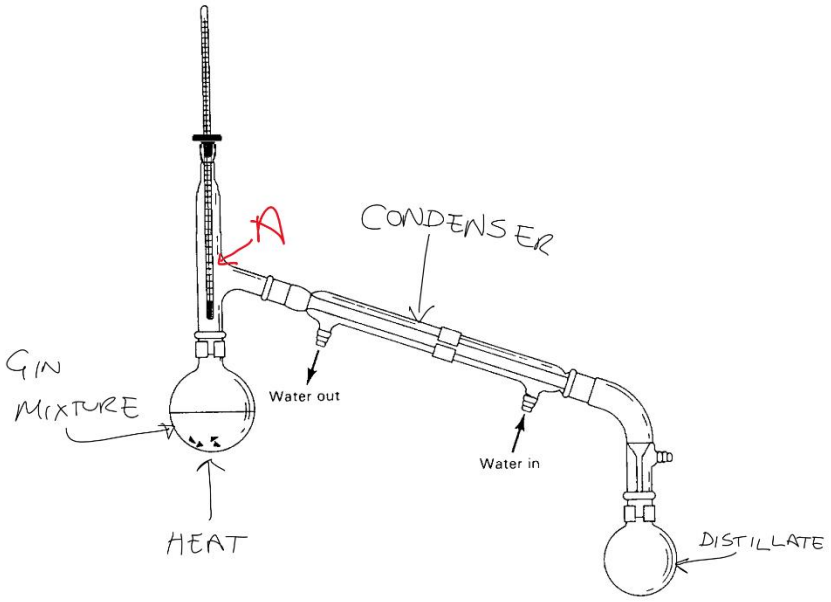
d. The Oundle Gin Distillery has been hit hard by the lockdown of 2020. The company has had to change direction and is now extracting the ethanol from its Gin for use in alcohol hand sanitisers.

Juniper berries have been added to flavour the gin. Suggest what technique you would use to separate this insoluble solid from the liquid. [1]

_____

[1]

e. The apparatus for distillation is shown below.




The condenser is designed to cool any gases back to their liquid state. The gin mixture contains herbs and berries for flavour, water and ethanol.

i. Give the name the change of state at point A as the process is carried out.

_____

[1]

Ethanol has a boiling point of 78.3°C.

ii. The mixture flask is heated to 80°C. What product would you expect to see collecting in the distillate flask?

_____

[1]

iii. What substances would be left in the mixture flask after heating to 80°C?

_____

[1]

**Total: 10 marks**