NAME:

OUNDLE
School

2019 Junior Entrance Examinations

Science Paper

Time allowed: **60 minutes**

Instructions

- You have **10 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 **50 minutes to answer your 3 questions.**
- You will need a pen, pencil, ruler and calculator

Question 1

You are a young and aspiring student, and have a keen mind for the sciences – particularly Chemistry. Can you get through this morning routine?

You wake up in the morning to take a hot shower. When you step out of the shower, you notice that mirror has completely fogged up and you cannot see your reflection clearly.

a. What change of state best describes this observation?

..... **[1]**

b. As you are about to dry your hair, you decide to point the hair dryer at the mirror. You notice that the fog begins to clear, and you are able to see your reflection clearly now.
State and explain the physical process that is happening here.

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..... **[2]**

You are now making breakfast. You decide to treat yourself to a boiled egg and toast, with a nice cup of tea.

c. Identify whether the following reactions are reversible or irreversible (circle the correct answer):

Boiling an egg is reversible / irreversible

Toasting a piece of bread is reversible / irreversible

[1]

d. You like to have your tea with two sugars, but sometimes this leaves lumps that are not dissolved at the bottom of your teacup. Give two factors that would increase the rate at which sugar dissolves in tea.

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..... **[2]**

e. The teacup you drank from was made of porcelain (china, a ceramic material). Give a reason why porcelain is a more suitable material for teacups than metal.

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..... **[1]**

You are now walking to school. Along the way, you pass a crime scene. A thief is being detained for being under suspicion of smuggling diamonds in bags of salt. The police are stumped because they cannot distinguish between the two using the naked eye.

f. From your Chemistry lessons, you recall that salt is soluble in water, while diamonds are not. What does the term soluble mean?

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..... **[1]**

g. Using the answer to part (f) or otherwise, describe a procedure that you could use to separate the diamonds from the salt.
List all the apparatus required.
You may draw a labelled diagram to aid with your explanation.

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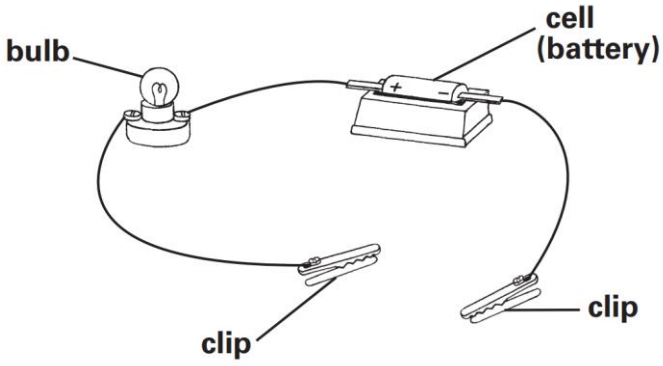
[2]

[Total: 10 marks]

Question 2

Simon is testing objects to see if they conduct electricity. He uses this circuit to test the objects.



a. He places the objects between the clips. How will he know if an object conducts electricity or not?

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..... **[1]**

b. Does each object conduct electricity? Circle the correct answer in each row of the table below.

Object	Does the object conduct electricity
wooden ruler	Yes / No
steel scissors	Yes / No
sheet of paper	Yes / No
rubber	Yes / No
brass pin	Yes / No
plastic drinking bottle	Yes / No

[2]

When Laura hits her drum set with wooden sticks the drums makes a sound.

c. What happens to the drums for her to hear a sound when they are hit?

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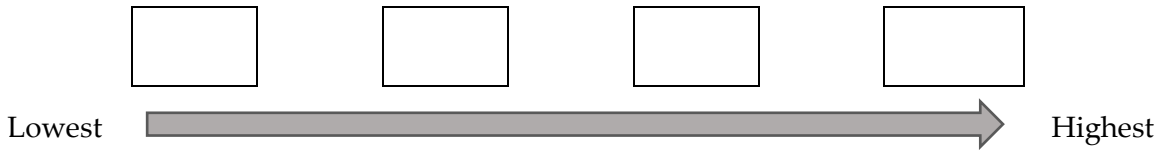
..... **[1]**

The size of a drum affects how high or low the sound is. These four boys below each have different sized drums.

d. Write the letters a, b, c, and d to order the sound the drums make from lowest to the highest.

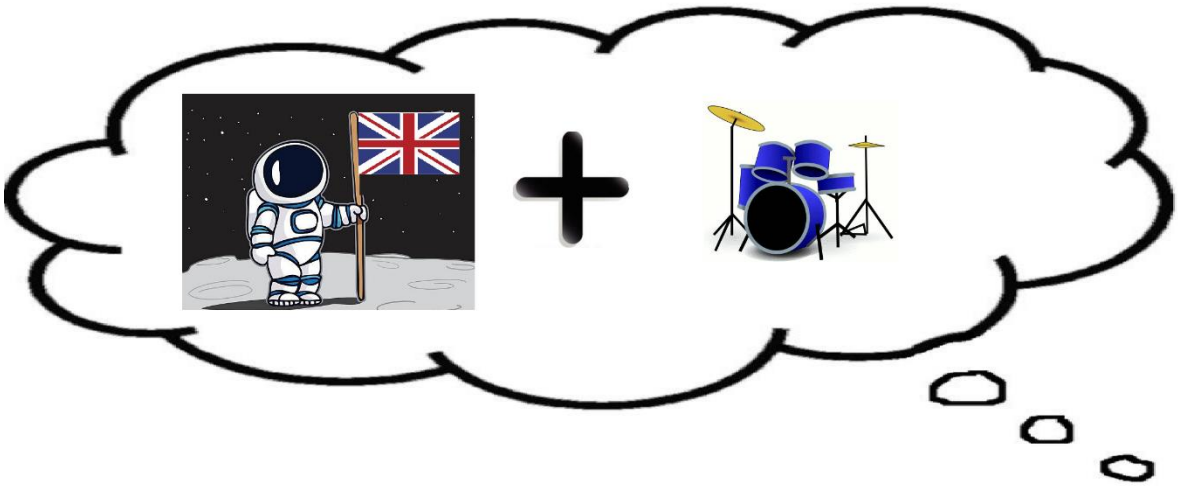


[1]

e. What scientific term is used to describe how high or low a sound is?

..... **[1]**

Laura's favourite subjects at schools are Music and Science and one day she was dreaming about her future and thought that it would be really cool if she could play her drums on the moon.



f. Using your understanding of sound describe the problems with Laura's plan to play the drums on the moon.

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..... **[2]**

g. The Moon and the Earth are part of the solar system. Describer the motion of the Earth and Moon in the solar system.

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..... **[2]**

[Total: 10 marks]

Question 3

Some children found out how high a tennis ball bounces on different surfaces. They dropped a tennis ball from a height of 100 cm.

a. What equipment did they use to measure how high the ball bounces?

..... **[1]**

They measured how high the ball bounced and recorded their results like this.

Surface	**How high the ball bounces (cm)**
Grass	39
Tarmac	50
Concrete	62
Clay	46

b. How did the children present their results?

..... **[1]**

c. Why did they drop the ball from the same height each time?

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..... **[2]**

d. State another factor they **kept the same** as they carried out their investigation?

..... **[1]**

They carried out a second investigation.

They recorded the height the **same** ball bounced when dropped from **different** heights onto the **same** surface.

Height of drop (cm)	**Height of bounce (cm)**
50	32
100	62
150	88
200	115

e. Use the evidence from their two investigations to suggest which surface they used for their second investigation.

..... **[1]**

f. Describe the relationship between the height of the drop and the height of the bounce.

.....

.....

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..... **[1]**

Next lesson their teachers tells them that they are going to design an investigation into how the temperature of the ball affects the height of the bounce.

g. Describe, in detail, how you would perform this investigation. In your answer you should include:
   - any equipment used
   - any measurement you would take
   - how you would improve on the previous investigations to make sure you got good results
   - the method of taking results and recording the results

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..... **[2]**

Before the investigation starts their teachers asks them to make a prediction.

h. Predict what affect temperature will have on the height the ball bounces.

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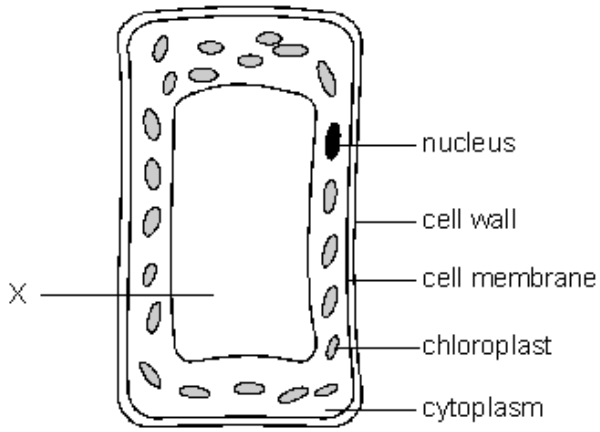
..... **[1]**

[Total: 10 marks]

Question 4

The diagram shows a plant cell. Some parts of the cell are named.



a. Which two named parts are present in plant cells but not animal cells?

1. .....

2. ..... **[2]**

b. Which named part contains the genetic information?

..... **[1]**

c. Which named part absorbs light energy for photosynthesis?

..... **[1]**

d. Name the part labelled X on the drawing.

..... **[1]**

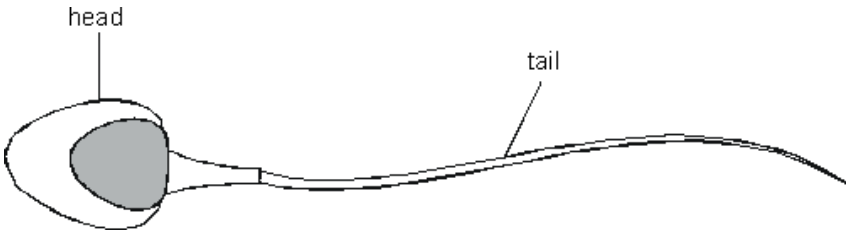
e. Where in a plant would you find a cell like the one in the diagram?

Tick the correct box.

In the centre of a root	☐	In the lower surface of a leaf	☐
Near the upper surface of a leaf	☐	Near the surface of a root	☐

[1]

The diagram shows a sperm cell.



f. What is the function of each of the following structures in a sperm cell?

Tail .....

.....

Head .....

..... **[2]**

g. A chemical called a hormone, which changes a boy's body, is produced from adolescence onwards.

i. Where is this hormone produced?

..... **[1]**

ii. Describe one change caused by this hormone.

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..... **[1]**

[Total: 10 marks]

Question 5

Each of the animals in the drawings below belongs to a different group.

a. On the line beneath each drawing, write the name of the group the animal belongs to.
Choose names from the list below.

amphibians crustaceans insects mammals molluscs reptiles

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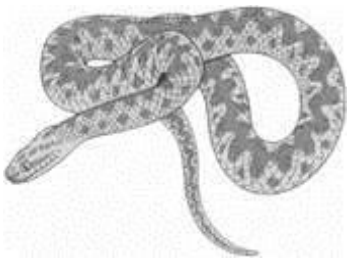
A

.....

B

.....

C



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D

[2]

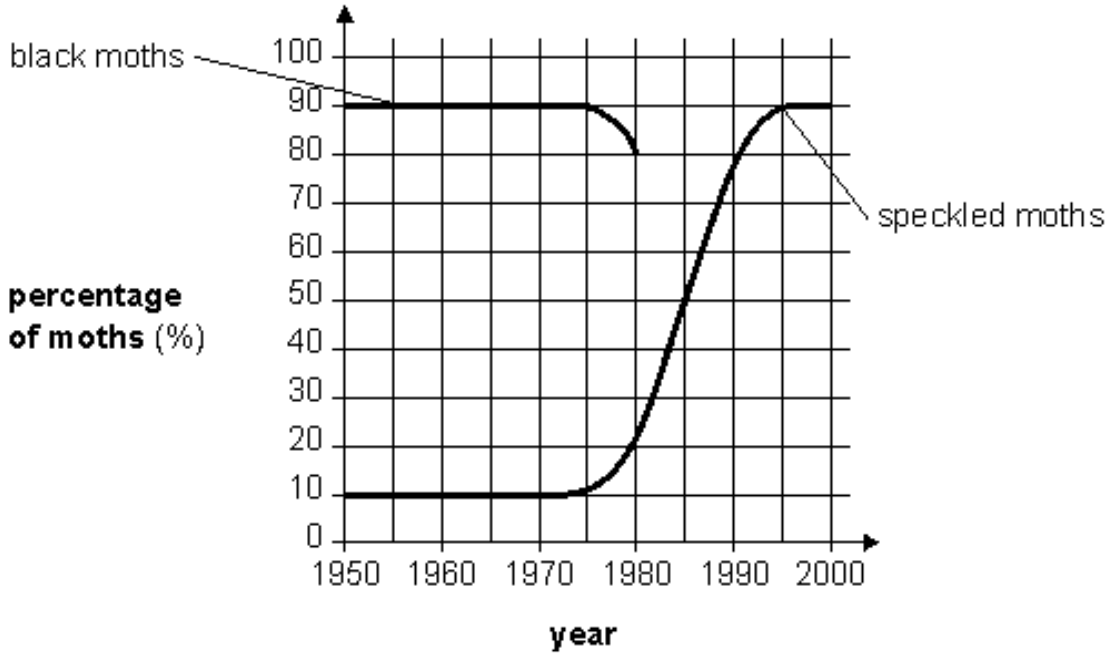
b. Which of the animals drawn above are invertebrates?

Give the correct letters. ..... and .....

[1]

The diagram below shows the two different forms of the same moth.
All these moths are either speckled or black.

c. The graph below shows how the percentage of speckled moths changed between 1950 and 2000 in one city.



i. Complete the table below with the missing year and percentage.

Use the graph.

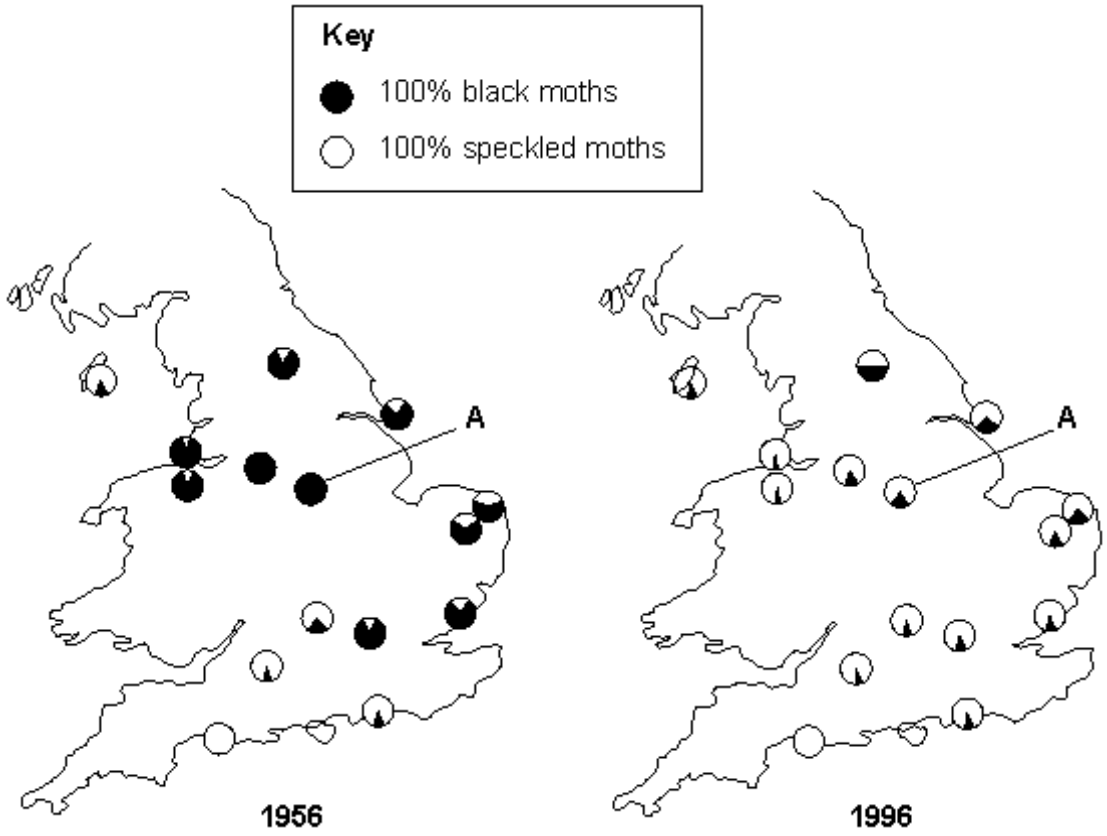
Year	Percentage of speckled moths (%)	Percentage of black moths (%)	Total percentage (%)
1970	10	90	100
.....	50	50	100
1990	78	.....	100

[2]

ii. The percentage of black moths from 1950 to 1980 is also shown on the graph. Continue the line on the graph above to show how the percentage of black moths changed between 1980 and 2000.

[2]

d. The maps below show the percentage of speckled moths and black moths at different places in Britain in 1956 and 1996.



How did the percentage of black moths change at place **A** between 1956 and 1996?

..... **[1]**

e. Describe one way in which the data shown in the graph is better than the data shown in the maps.

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..... **[1]**

f. Describe one way in which the data shown in the map is better than the data shown in the graph.

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..... **[1]**

[Total: 10 marks]