

NAME:



OUNDLE

School

2020 Junior Entrance Examinations

Science Paper

Time allowed: 60 **minutes**

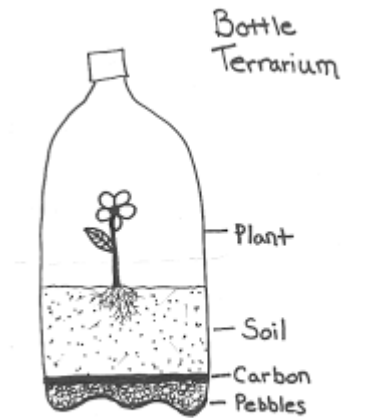
Instructions

- 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

Question 1 - Biology

This question is about **Life Processes**.

John uses an empty peanut butter jar to make a garden. He keeps it in a brightly lit room with a sealed lid on.



a. Complete the following sentences to explain what happens to the carbon dioxide and oxygen levels in the jar over a week.

i. The plant uses carbon dioxide in the process of...

.....
(1)

ii. This process produces...

.....
(1)

iii. The gas produced by the bacteria in the soil is...

.....
(1)

iv. This process is called...

.....
(1)

b. Plants cross-pollinate by transferring pollen from one plant to another. Give two reasons why this is more likely to happen in a normal outdoor garden than in the bottled garden.

Reason 1:

.....

Reason 2:

.....

(2)

c. John's sister, Judith, also sets up a garden but in a larger bottle. Judith decides to add some small flies to her bottled garden.

i. Explain why both bottles must be made of clear glass.

.....

.....

(1)

ii. How will the flies affect the concentrations of carbon dioxide and oxygen? Explain your answer

.....

.....

.....

.....

(3)

(Total 10 marks)

Question 2 – Biology

This question is about **Ecosystems**.

Read the following description of a garden ecosystem and answer the questions that follow

The Cabbage White butterfly feeds on brassica plants. It shares this food source with slugs and snails but the slugs and snails will also eat lettuce. Small birds like blue tits and thrushes eat the butterflies, slugs and snails. The birds are eaten by cats and birds of prey like sparrowhawks.

- a. Draw the food web being described in the space provided.

(3)

- b. Why is it harder to collect reliable data when working in the field than when working in the laboratory? Tick (✓) the box next to the correct answer.

It is hard to get a large enough sample

There are many variables that cannot be controlled when working in the field

Scientists cannot record their data properly when working outdoors

(1)

- c. Suggest a way that slugs and snails could be counted in a garden.

.....

.....

(1)

A gardener uses slug pellets to kills slugs and snails, to stop them eating his plants.

- d. Describe and explain the effect you would expect this to have on the number of blue tits in the garden.

.....
.....
.....
.....

(2)

Some pesticides are toxic to many different organisms.

Some pesticides are known to accumulate (build up and remain) in organisms, passing along a food chain and increasing in concentration at each trophic level.

This process is known as **bioaccumulation**.

- e. Explain why this may have an effect on the population of sparrowhawks.

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.....
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.....
.....

(3)

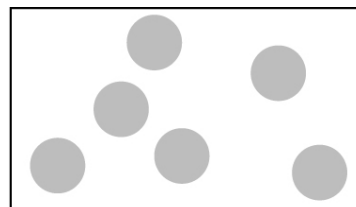
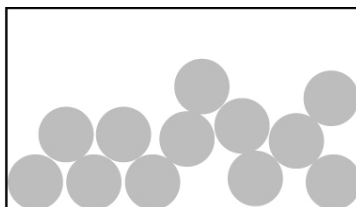
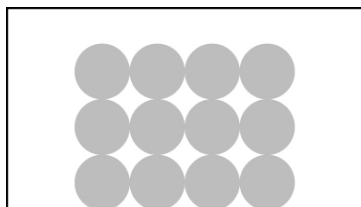
(Total 10 marks)

Question 3 – Chemistry

This question is about **States of Matter**.

2. Particle diagrams can be used to represent the properties of a substance in its three states.

a. Label the particle diagrams below to show the state of matter represented.



.....
(2)

b. Draw a line from each change of state to the correct name.

Change of State

Solid to liquid

Liquid to gas

Gas to liquid

Liquid to solid

Name

Evaporating

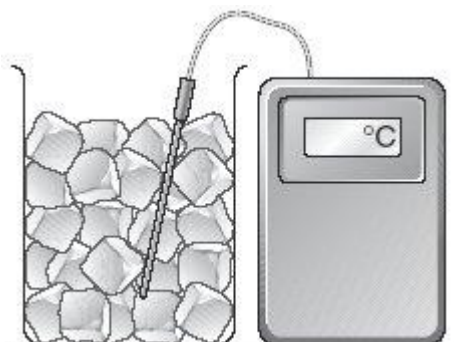
Melting

Condensing

Freezing

(3)

c. Kate made some ice cubes from pure water.
She used a sensor to measure the temperature of the ice.



What temperature will the sensor show when the ice is melting?

.....°C
(1)

- d. This question is about experimental investigations on change of state. Look at the data in the table below.

Substance	Melting Point (°C)
gallium	30
gold	1063
oxygen	-218
water	0

- i. Identify a substance that will be a solid at 25 °C.

.....
(1)

- ii. Suggest which substance will be a gas at 25 °C

.....
(1)

- iii. Which substance will change state during a very cold day in the winter?

.....
(1)

- iv. Which substance will change state (by boiling) during a very hot day in the summer?

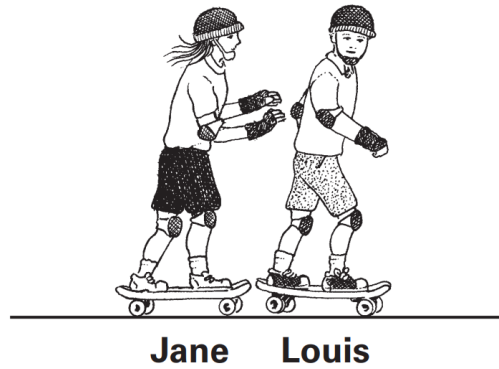
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(1)

(Total 10 marks)

Question 4 – Physics

This question is about **Forces**.

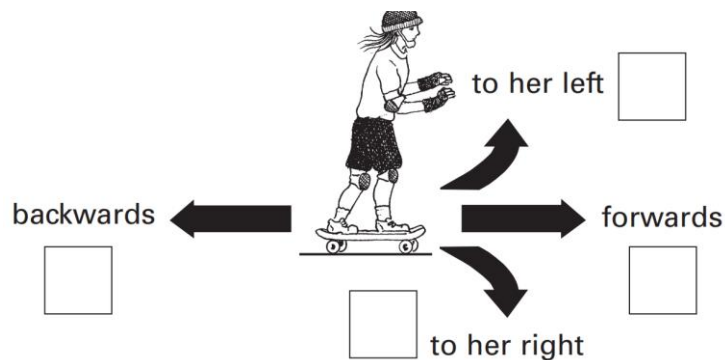
3. Two children are riding skateboards.



Jane and Louis are facing in the same direction. They are on level ground and they are not moving.

Jane gently pushes Louis on his skateboard. He moves forwards. As Louis moves, Jane also moves.

- a. In which direction do Jane and her skateboard move when she pushes Louis? Tick the correct box in the image below.



(1)

Jane and Louis go back to the same starting places. Jane gives Louis a bigger push on his skateboard. They both move faster this time.

- b. What happens to the distance that Louis travels on this second push compared to the first push?

.....
.....

(1)

- c. What happens to the distance that Jane travels on the second push compared to the first push?

.....
.....

(1)

Oli goes over a jump on his skateboard. When he jumps he stays in the air for a short time.



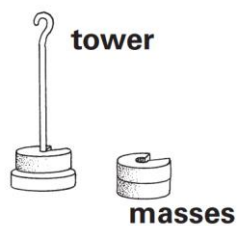
- d. What force makes him return to the ground?

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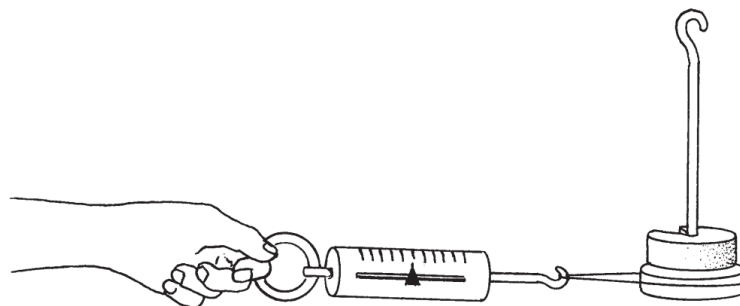
(1)

Back in the classroom Oli decides to investigate friction.

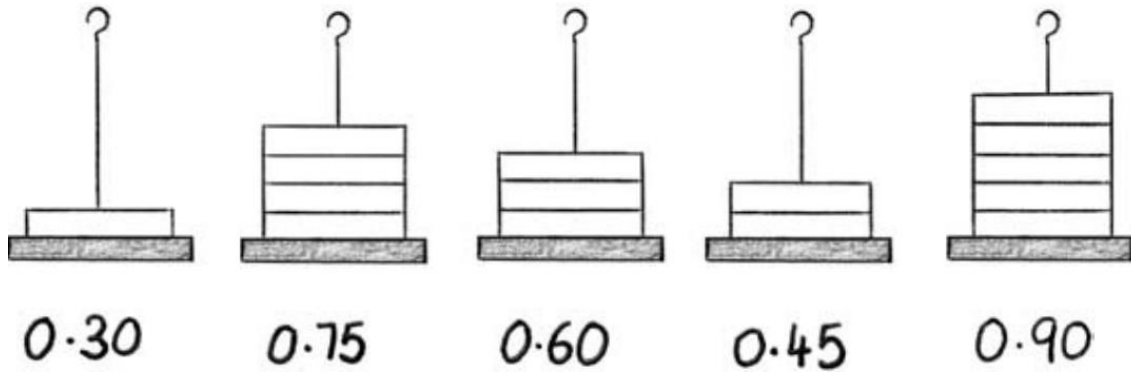
He has some stacking masses. He puts one mass on the stacking tower. He uses a force meter to pull the tower.



There is a force on the tower from the force meter.



He measures the force needed to pull the tower. He notes the force meter reading each time he adds a mass to the tower.

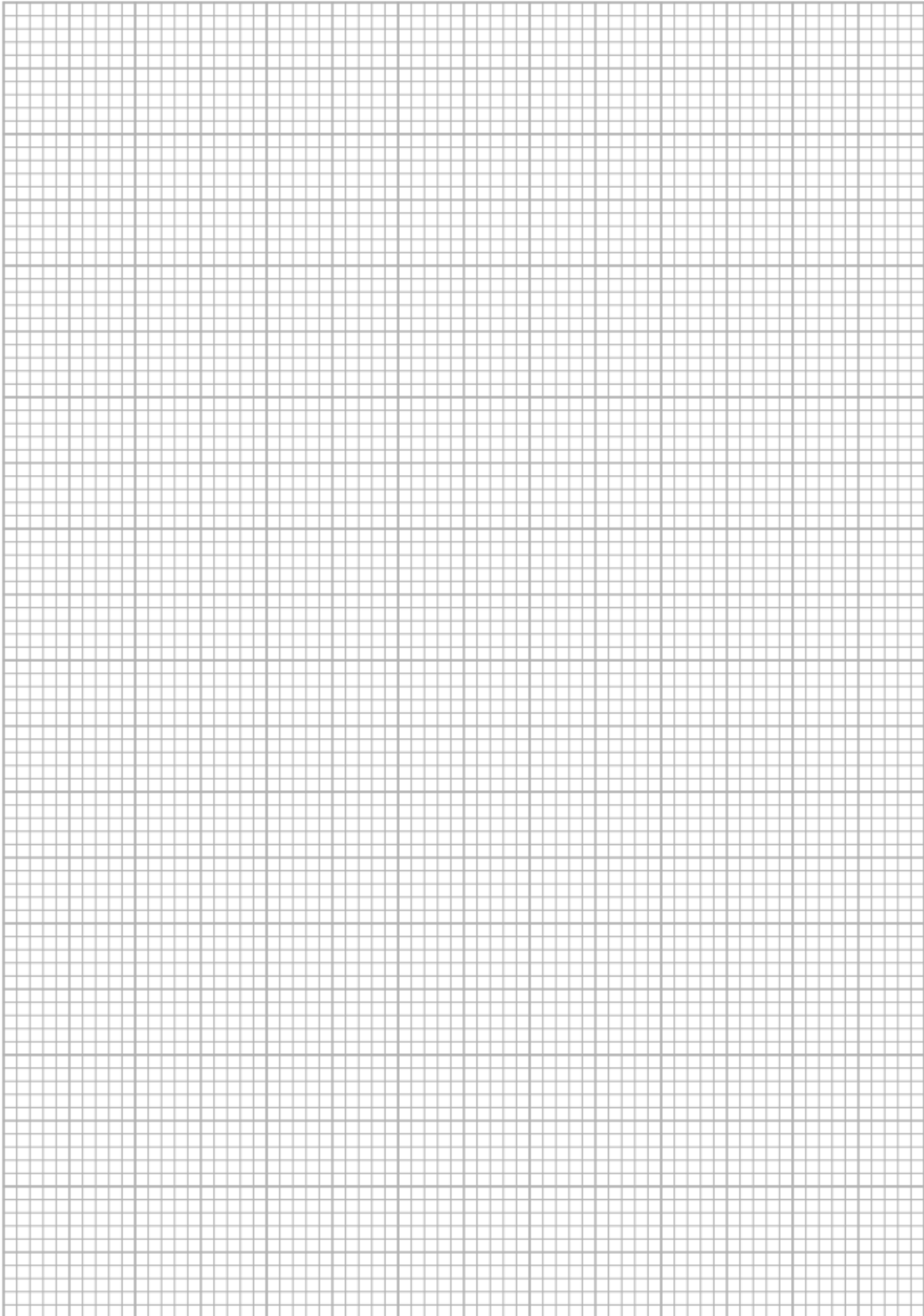


e. Complete the results table below.

Number of Weights	Force Needed (N)

(1)

- f. Draw a graph to show the relationship between the number of weights and the force needed to make them move.



g. Explain what the graph shows you about how the weight of the object affects the friction between objects.

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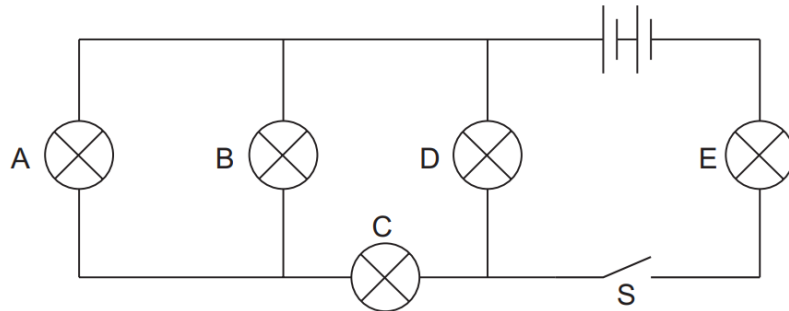
(2)

(Total 10 marks)

Question 5 – Physics

This question is about **Circuits**.

4. Max built circuit 1 as shown below.



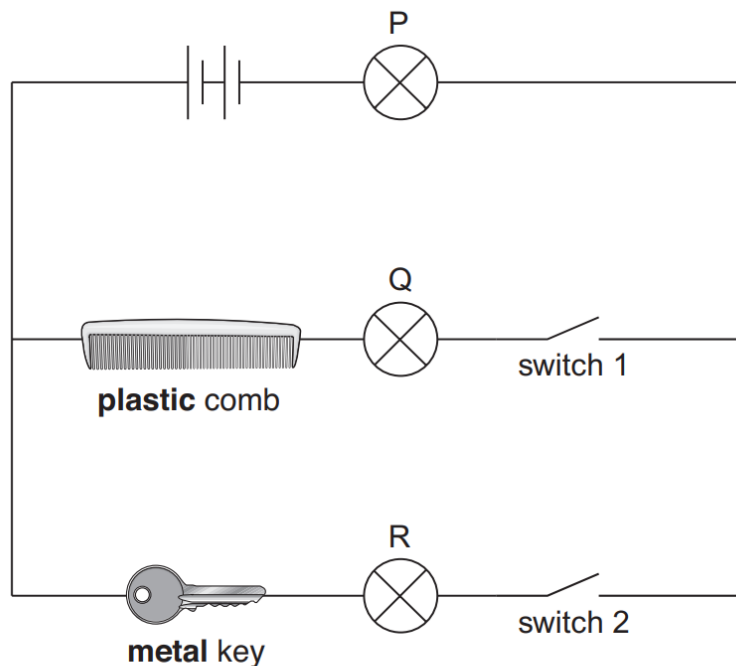
circuit 1

He closed the switch, S, and all the bulbs came on. One of the bulbs then broke and all the bulbs went off.

a. Which bulb must have broken? Tick the correct box.

A B C D E (1)

Max built circuit 2 as shown below. He connected a plastic comb and a metal key in different parts of the circuit.



circuit 2

- b. Look carefully at circuit 2. Complete the table below to show which bulbs in circuit 2 will be on or off when different switches are open or closed. Write on or off in the boxes below.

switch 1	switch 2	bulb P	bulb Q	bulb R
open	open	off	off	off
open	closed			
closed	open			

(2)

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.



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

.....

.....

(1)

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.

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

.....
(1)

- e. In their investigation they used different pairs of metals. Give one factor that they should keep the same.

.....
(1)

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	-	-	-

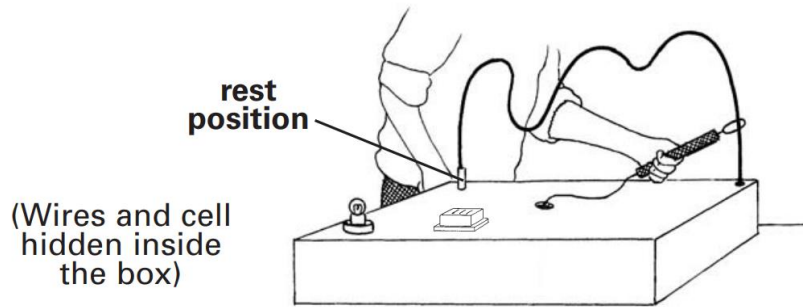
- f. Which pair of metals made the cell with the biggest voltage?

.....
(1)

- g. 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)

Simon has made a game. In his game, he has to move a metal ring along a piece of thick wire until it reaches the rest position. When he is moving it, the metal ring must not touch the wire. If it touches the wire, a bulb will light and a buzzer will make a noise.



The metal ring and the thick wire both let electricity through.

h. What is the scientific name for materials that let electricity through?

.....
(1)

Simon made the rest position by covering the wire with an insulating material. When he puts the metal ring down on the rest position, the bulb and buzzer cannot work.

i. Which materials might Simon have used to insulate the wire for the rest position?

Tick the three correct boxes.

Clear sticky tape	<input type="checkbox"/>	Copper wire	<input type="checkbox"/>
Plasticine	<input type="checkbox"/>	Newspaper	<input type="checkbox"/>
Steel wool	<input type="checkbox"/>	Aluminium foil	<input type="checkbox"/>

(1)

(Total 10 marks)