METHODIST GIRLS' SCHOOL

Founded in 1887

MID-YEAR EXAMINATION 2022
PRIMARY 6
SCIENCE

BOOKLET A

Total Time for Booklets A and B: 1 hour 45 minutes

INSTRUCTIONS TO CANDIDATES

Do not turn over this page until you are told to do so.
Follow all instructions carefully.
Answer all questions.
Shade your answers in the Optical Answer Sheet (OAS) provided.

Name: _____ ( )

Class: Primary 6._____

Date: 10 May 2022

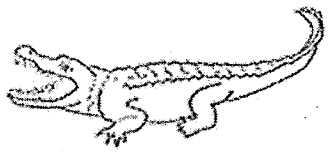
Booklet A	56
Booklet B	44
Total	100
Parent's Signature	

This booklet consists of 20 printed pages including this page.

For each question from 1 to 28, four options are given. One of them is the correct answer.
Make your choice (1, 2, 3 or 4). Shade the correct oval on the Optical Answer Sheet (OAS).

[56 marks]

1 The three animals, A, B and C, belong to three different groups of animals.



A

B

C

Which of the following characteristics can be used to differentiate and identify the animal groups above?

(1) how they move
(2) presence of gills
(3) type of body covering
(4) method of reproduction

2 Enxi observed the life cycles of Insects A and B over a period as shown below.

Insect A		Insect B	
			
Young	Adult	Young	Adult

She recorded the day on which a new stage of the life cycle began for each insect, as shown in the table below. Stage 1 refers to the stage where the eggs were being laid.

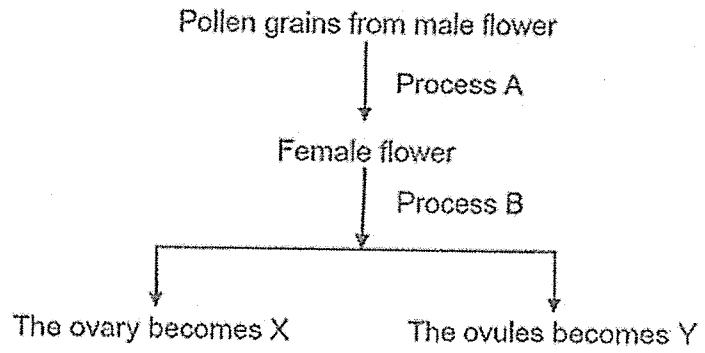
Stage of Life Cycle	Day on which new stage of life cycle began	
	Insect A	Insect B
Stage 1	Day 1	Day 1
Stage 2	Day 5	Day 6
Stage 3	Day 18	Day 17

On which day would Enxi observe both a pupa and a nymph?

(1) Day 5
(2) Day 6
(3) Day 17
(4) Day 18

(Go on to the next page)

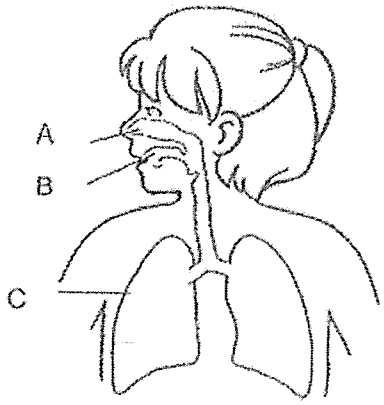
3 Study the diagram below.



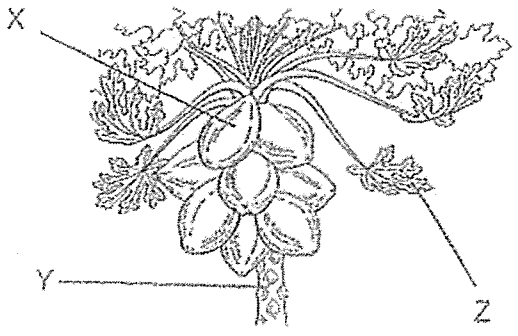
Which one of the following correctly identifies A, B, X and Y?

	Processes		Parts of a plant	
	A	B	X	Y
(1)	Fertilisation	Pollination	Seed	Fruit
(2)	Pollination	Fertilisation	Fruit	Seed
(3)	Pollination	Fertilisation	Seed	Fruit
(4)	Fertilisation	Pollination	Fruit	Seed

4 The diagrams below show a human respiratory system and a plant.



Human respiratory system



Plant

Which parts of the human respiratory system and plant allow the exchange of gases to take place?

	Human	Plant
(1)	A	X
(2)	B	Y
(3)	C	Z
(4)	A	Z

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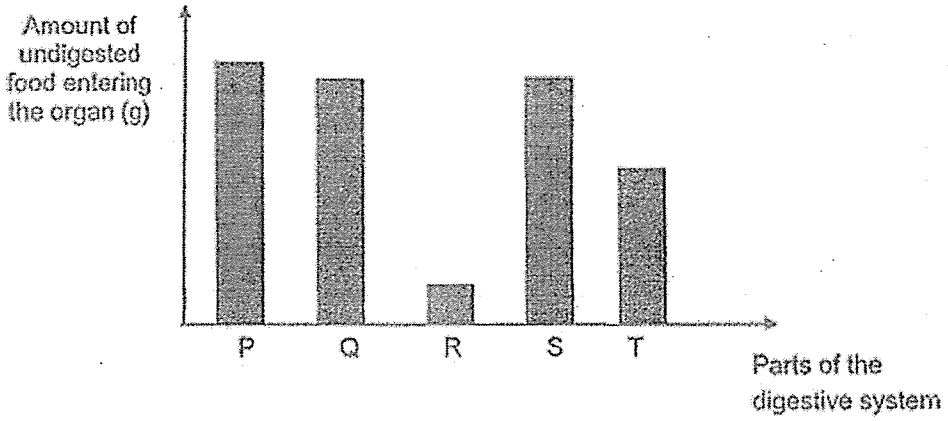
5 P, Q, R, S and T are organs in the digestive system. The graph below shows the amount of undigested food entering each organ after a meal.

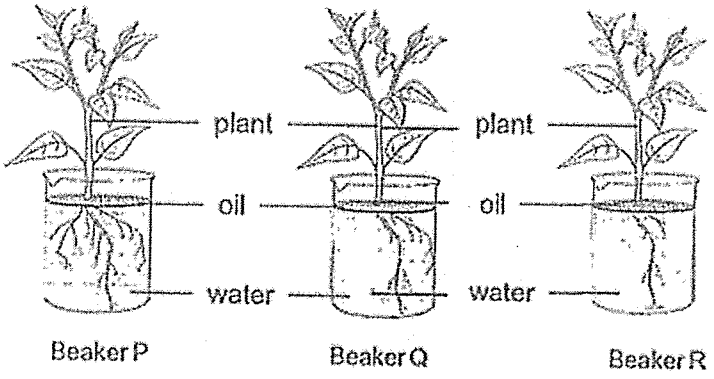


Which of the following is correct?

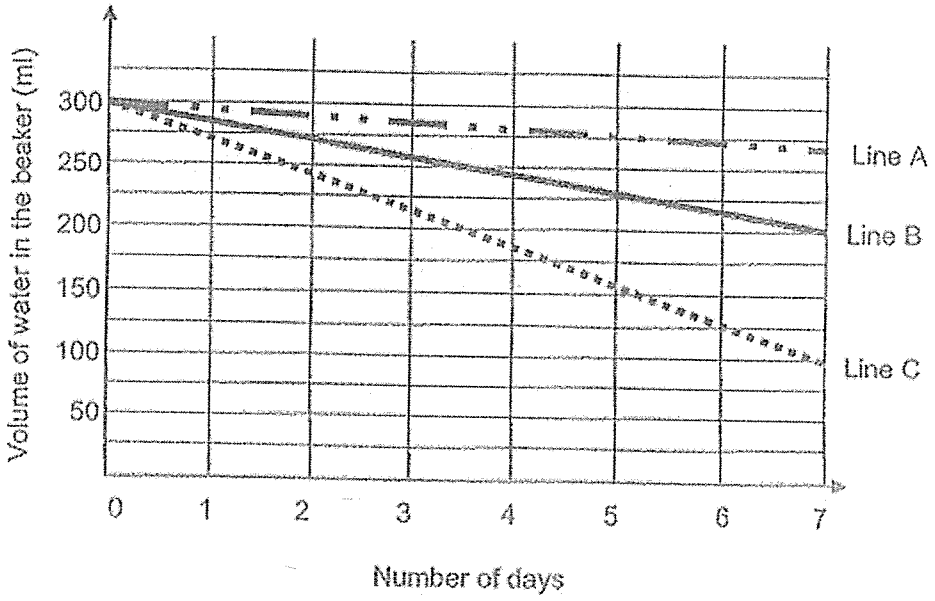
	P	Q	R	S	T
(1)	Mouth	Gullet	Small intestine	Large intestine	Stomach
(2)	Mouth	Gullet	Large intestine	Stomach	Small intestine
(3)	Stomach	Mouth	Large intestine	Gullet	Small intestine
(4)	Large intestine	Small intestine	Mouth	Stomach	Gullet

(Go on to the next page)

6 Anthony poured 300 ml of water into three similar beakers P, Q and R as shown in the diagram below. All beakers have a layer of oil. He placed the set-ups next to a bright open window.



He recorded the volume of the water in the three beakers over seven days and recorded the results in the graph as shown below.



Which of the following shows the lines on the graph correctly matched to the beakers?

	Line		
	A	B	C
(1)	P	Q	R
(2)	Q	R	P
(3)	R	P	Q
(4)	R	Q	P

(Go on to the next page)

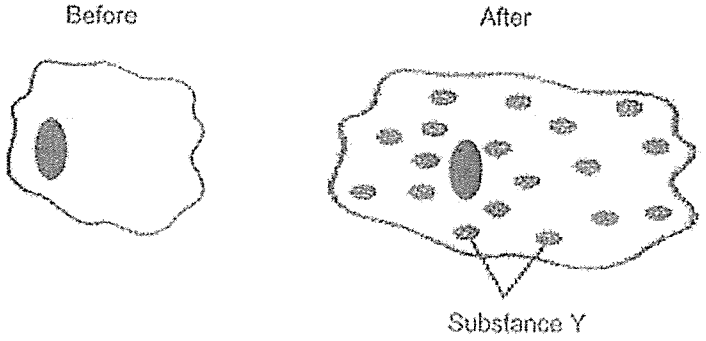
7 The following relationships were observed among five organisms A, B, C, D and E in a food web.

> A feeds on E and C.
> Both B and C eat D.
> B is eaten by C and E.

Which of the following classifications is correct?

	prey	prey and predator	predator
(1)	A	B, C and E	D
(2)	B	A	C and E
(3)	B	C and E	A
(4)	D	B, C and E	A

8 Mr Tan observed some animal cells under a microscope before and after placing them inside a liquid containing substance Y. He drew his observations of a cell as shown below.



What can he conclude from the observations made above?

(1) The cytoplasm can make food for the cell.
(2) The nucleus controls the activities of the cell.
(3) The cell membrane allows movement of substance Y into the cell.
(4) The chloroplast helps trap light to make food for the cell during photosynthesis.

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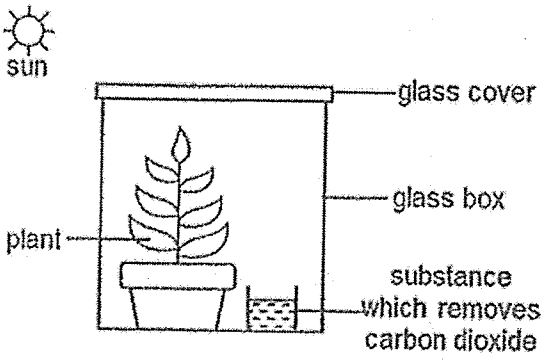
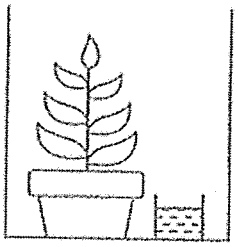
9 Alice wanted to find out if carbon dioxide is needed for photosynthesis and set up the following as shown.

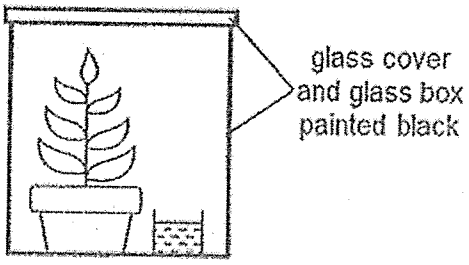


Which one of the following should Alice use as the control set-up?

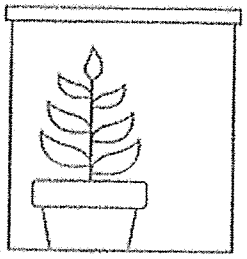
(1)



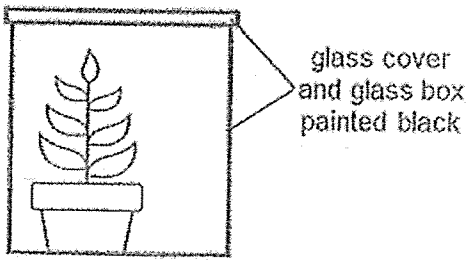
(2)



(3)



(4)



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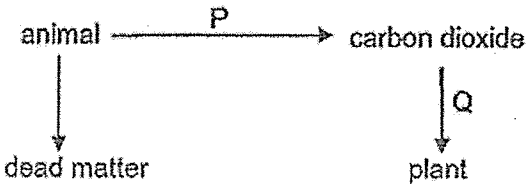
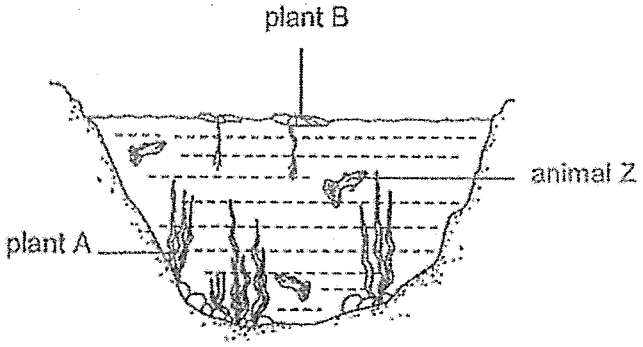
10 The arrows, P and Q, in the diagram below represent different processes.



Which of the following represents P and Q?

	P	Q
(1)	breathing	decomposition
(2)	breathing	photosynthesis
(3)	photosynthesis	breathing
(4)	photosynthesis	decomposition

11 The diagram below shows a habitat with some living things.



Based on the diagram above, which one of the following statements is correct?

(1) Animal Z forms three populations.
(2) The group of fish form one community.
(3) The group of plants forms one community.
(4) There is one community with three populations.

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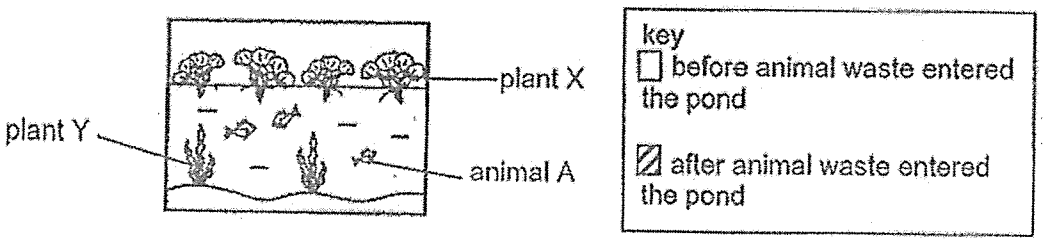
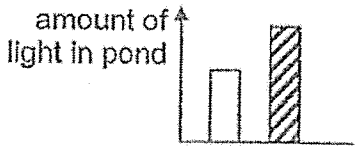
12 A huge amount of animal waste flowed into a pond below.

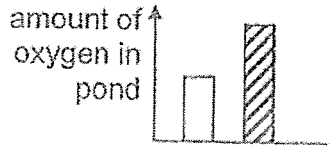


After some time, the population of plant Y decreased.
Which graph below represents the effect of animal waste entering the pond?

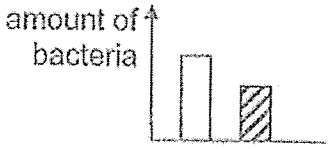
(1)



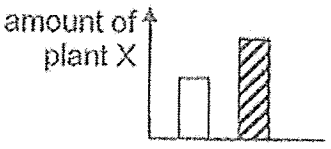
(2)



(3)



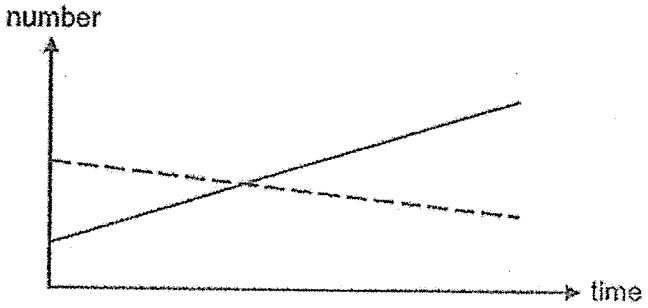
(4)



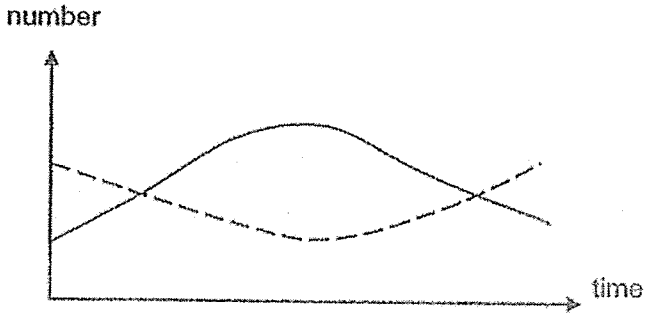
13 Organism Q only feeds on plant P.
Which of the following graphs shows the correct change in the population of organism Q and plant P over a period of time?

key
– – – – organism Q ——— plant P

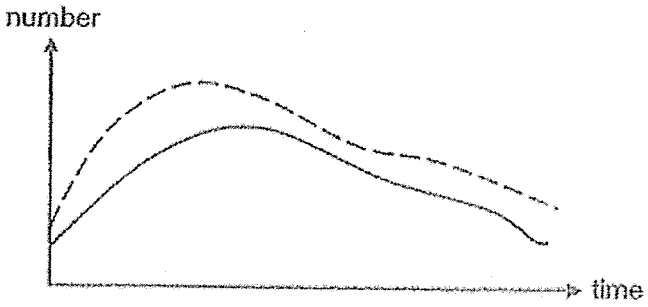
(1)



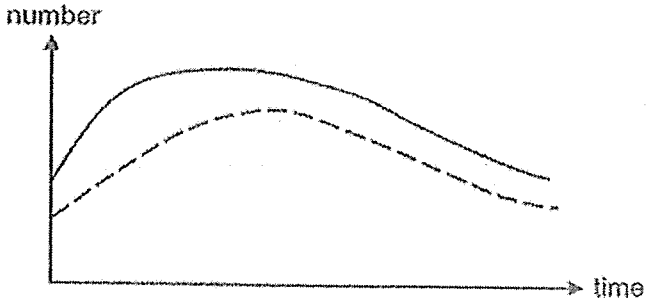
(2)



(3)



(4)



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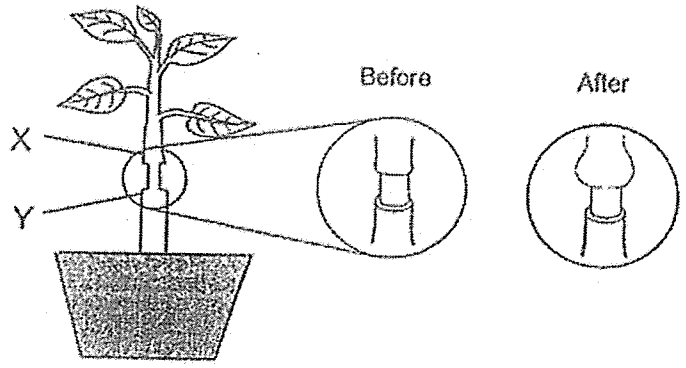
14 May removed an outer ring of the stem between positions X and Y of a plant as shown in the diagram below.



Based on the results, which of the following conclusions is most likely correct?

(1) Only the food-carrying tubes were removed.
(2) Only the water-carrying tubes were removed.
(3) Both the water and food-carrying tubes were removed.
(4) Both the water and food-carrying tubes were not removed.

15 The melting and boiling points of four substances, A, B, C and D, are as shown below.

Substance	Melting point (°C)	Boiling point (°C)
A	0	59
B	55	66
C	65	83
D	70	130

Which substance(s), A, B, C and/or D, would have a definite volume but no definite shape at 60 °C?

(1) A only
(2) B only
(3) A and B only
(4) C and D only

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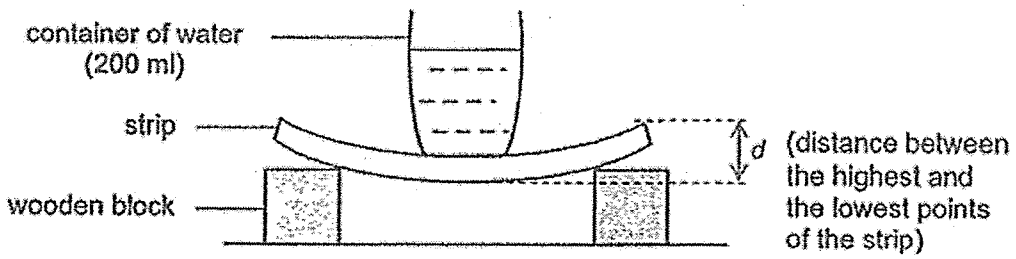
16 Johnny set up an experiment as shown below to compare a property of four strips, W, X, Y and Z, which are made of different materials.



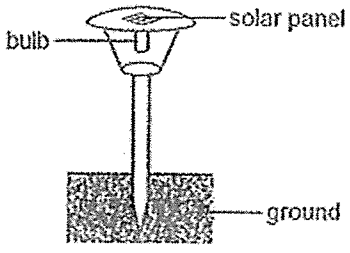
Johnny put the container of water onto each strip of material and measured the distance *d*. His results are shown in the table below.

Strip	*d* (mm)
W	25
X	10
Y	20
Z	3

Which strip, W, X, Y or Z is most suitable for making a food tray?

(1) W
(2) X
(3) Y
(4) Z

17 The diagram below shows a solar powered light used in a garden.



Which one of the following correctly shows the energy conversion when the light is switched on at night?

(1) Light energy → electrical energy → heat energy → light energy
(2) Light energy + heat energy → electrical energy → light energy + heat energy
(3) Potential energy → Electrical energy → light energy + heat energy
(4) Potential energy → light energy → heat energy

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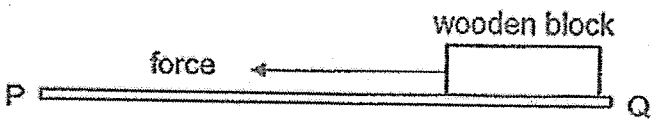
18 A wooden block was pulled along a flat plank PQ as shown in the diagram below.

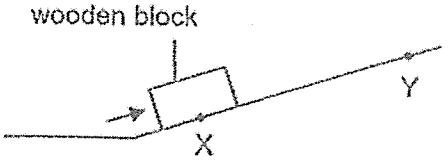


Which of the following would affect the amount of force needed to pull the wooden block?

A The material of plank
B When end Q of the plank is raised
C The mass of the person pulling the wooden block
D The surface area of the wooden block in contact with the plank

(1) A and B
(2) C and D
(3) A, B and D
(4) A, B, C and D

19 A wooden block was pushed up a slope as shown.



Which of the following correctly describes the forces acting on the wooden block as it moved from X to Y?

	Amount	Direction of forces	
	Gravitational force	Frictional force	Gravitational force
(1)	increased	→	→
(2)	remained the same	→	↓
(3)	increased	←	↓
(4)	remained the same	←	↓

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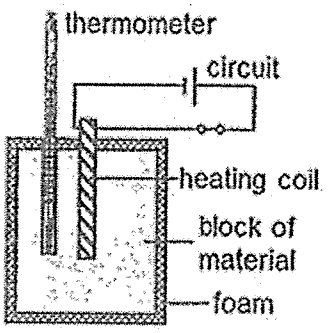
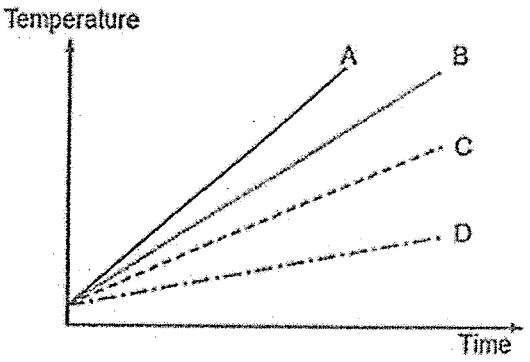
20 Four blocks were heated and the temperatures were recorded over a period of time. They are identical in size but made up of different materials, A, B, C and D. The graph below shows the results.

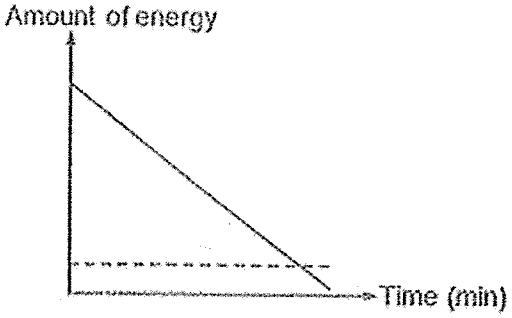


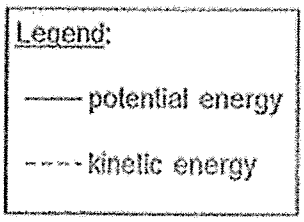


Based on the results, which material is the most suitable for constructing a container to keep food cold?

(1) A
(2) B
(3) C
(4) D

21 The graph below shows how the amount of energy possessed by an object changes.





Which one of the following correctly matches the energy changes in the graph?

(1) A bottle rolling downhill
(2) A ball being thrown upwards
(3) An athlete running on a treadmill
(4) A person taking an escalator down

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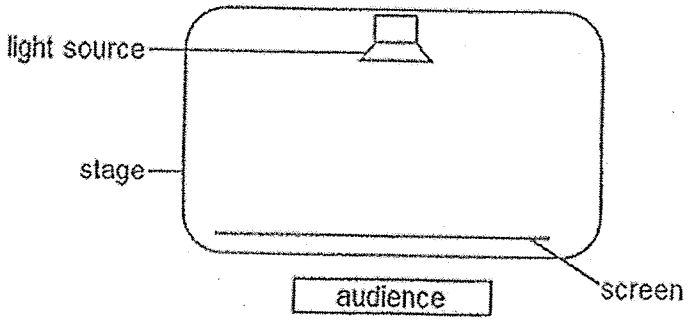
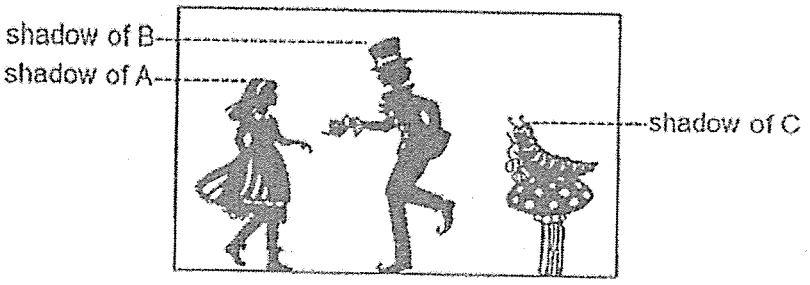
22 The diagram below shows the layout of the stage for a shadow puppet play.



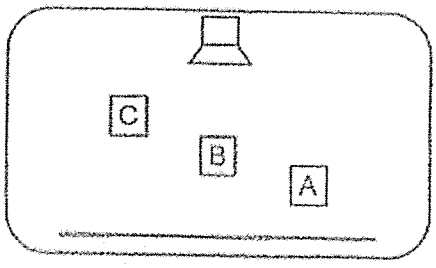
The theatre uses puppets of the same height.

The audience saw the shadows of three puppets, A, B and C on the screen as shown below.

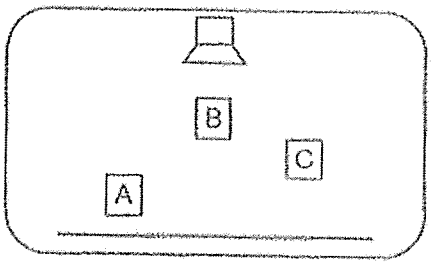


Which one of the following shows the distance of puppets from the screen?

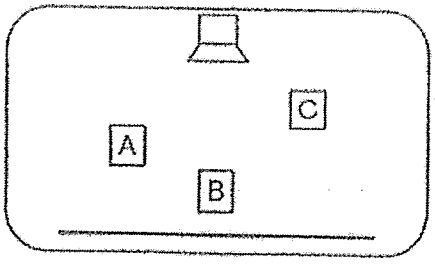
(1)



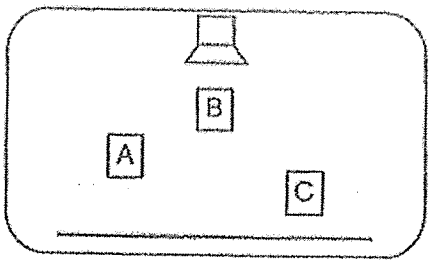
(2)



(3)



(4)



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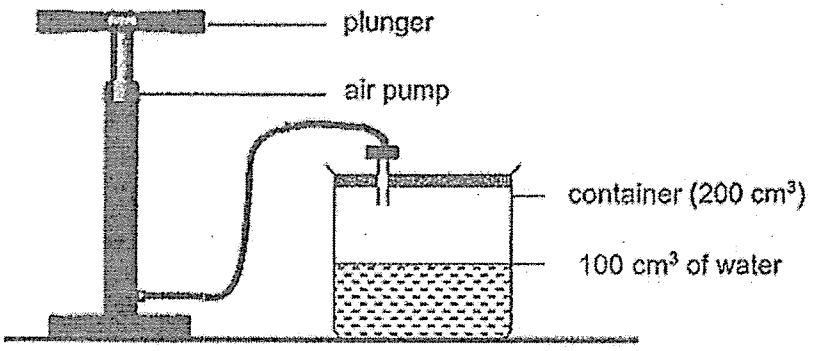
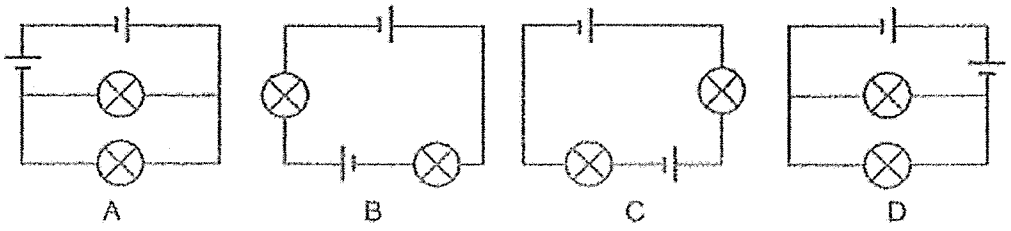
23 The diagram below shows an air pump fitted to a container which has a capacity of 200cm^3. Each time the plunger was pushed in completely, 50 cm^3 of air would enter the container.



Which of the following represents the changes in the volume of air inside the container when the plunger was pushed in completely for three times?

	Before (cm^3)	After (cm^3)
(1)	0	100
(2)	0	150
(3)	100	100
(4)	100	150

24 Minah wanted to find out how the arrangement of bulbs in a circuit affect their brightness. The diagrams below show four possible set-ups.



Which two of the above set-ups should Minah use for the experiment?

(1) A and B
(2) A and C
(3) B and D
(4) C and D

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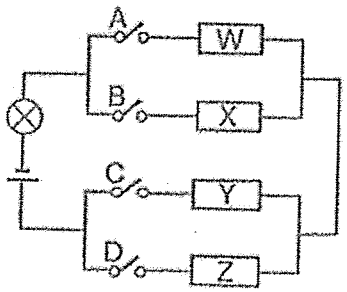
25 Wei Hong set up the following circuit to find out which of the objects, W, X, Y and Z are electrical conductors.



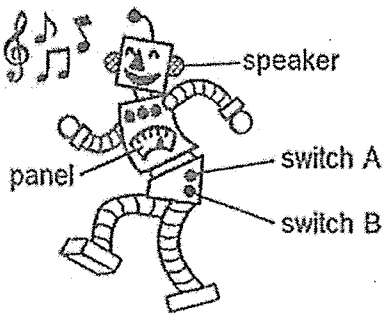
The table below shows the observation when he closed different switches.

Switched closed	Observation
A and C	Bulb does not light up
A and D	Bulb lights up
B and D	Bulb does not light up

Which of the following describes W, X, Y and Z?

	Electrical conductor	Electrical insulator
(1)	W, X	Y, Z
(2)	W, Z	X, Y
(3)	X, Y	W, Z
(4)	X, Z	W, Y

26 Hamsa has a toy operating on batteries. It has four limbs moved by motor, a panel which lights up and a speaker which plays music.



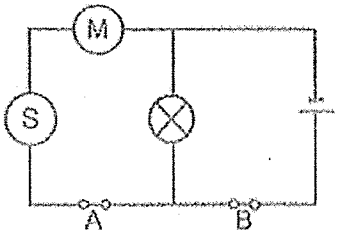
Hamsa turned on the two switches, A and B, and her observations of the toy are shown below.

Switched on	Observations
A only	Limbs move Panel does not light up Speaker plays music
B only	Limbs move Panel lights up Speaker does not play music
Both A and B	Limbs move Panel lights up Speaker plays music

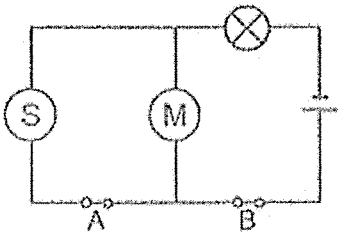
Legend:
(S) speaker
(M) motor

Which of the following shows the arrangement of the electrical circuit in the toy?

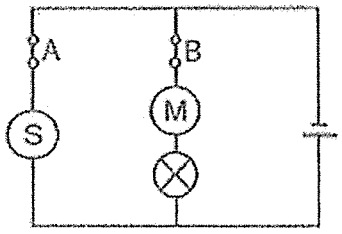
(1)



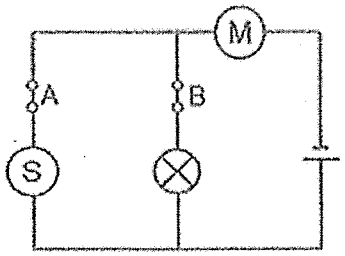
(2)



(3)



(4)



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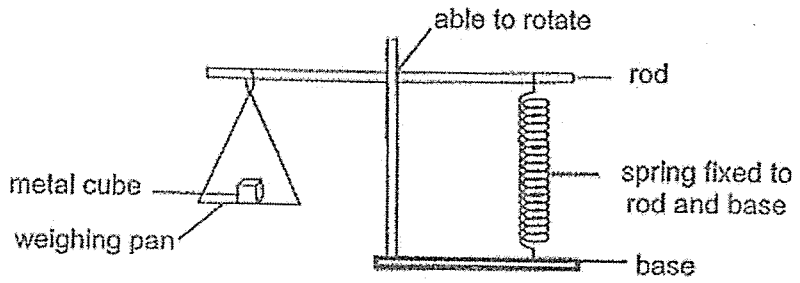
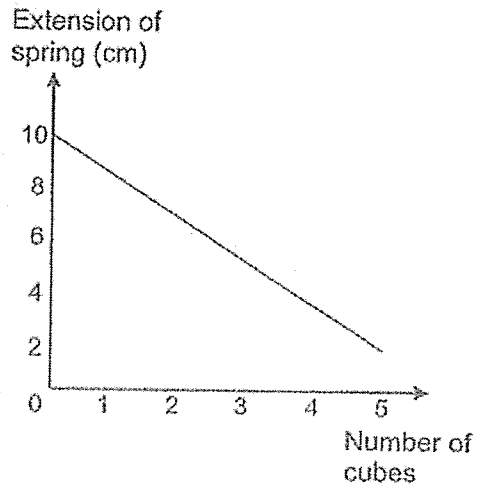
27 Joe conducted an experiment using the set-up as shown below.



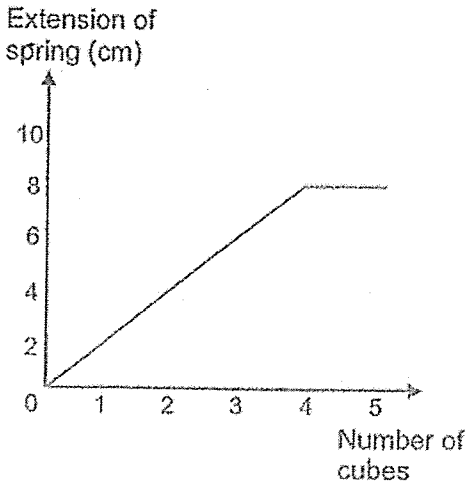
He placed identical metal cubes on the weighing pan, one at a time, and measured the increase in length of the spring.

Which of the following graph most likely shows the results of Joe's experiment?

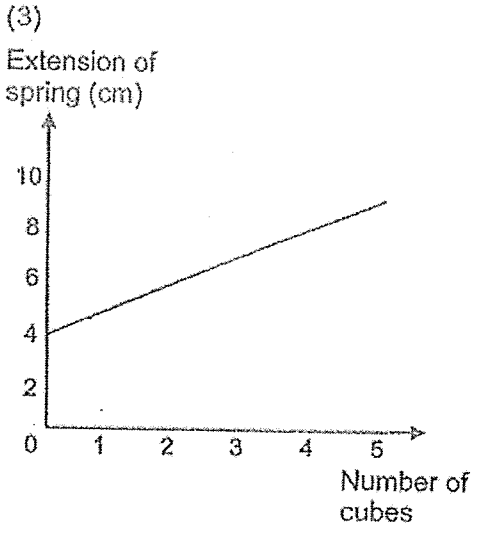
(1)



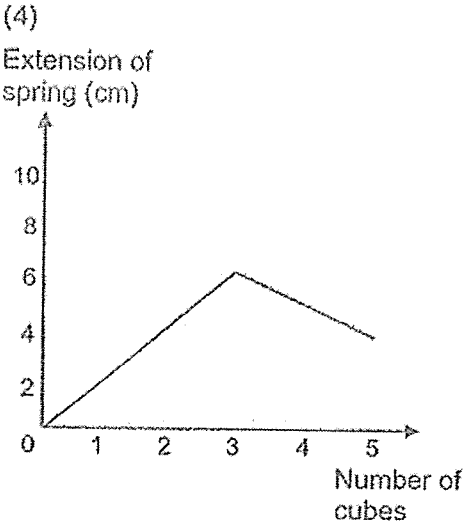
(2)



(3)



(4)



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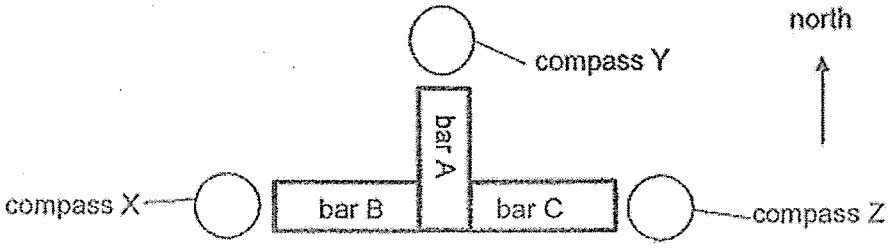
28 Ali suspended three bars freely using two different set-ups and obtained the results as shown below.

Set-up 1 **Set-up 2**

He then arranged the three bars and put three compasses at three different positions as shown below.



Which one of the following shows the direction which each compass would point to?

	Compass X	Compass Y	Compass Z
(1)	←	↓	←
(2)	↑	↓	→
(3)	→	↓	←
(4)	↑	↑	↑

End of Booklet A

METHODIST GIRLS' SCHOOL

Founded in 1887

MID-YEAR EXAMINATION 2022
PRIMARY 6
SCIENCE

BOOKLET B

Total Time for Booklets A and B: 1 hour 45 minutes

INSTRUCTIONS TO CANDIDATES

Do not turn over this page until you are told to do so.
Follow all instructions carefully.
Answer all questions.

Name: _____ ( )

Class: Primary 6._____

Date : 10 May 2022

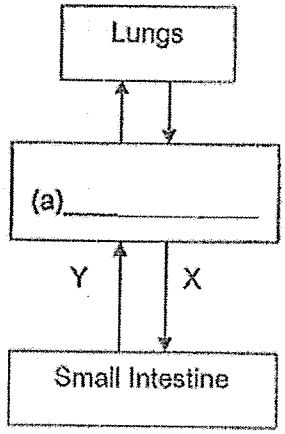
Booklet B	44

This booklet consists of 14 printed pages including this page.

For questions 29 to 40, write your answers in the spaces provided. The number of marks available is shown in brackets [ ] at the end of each question or part question.

[44 marks]

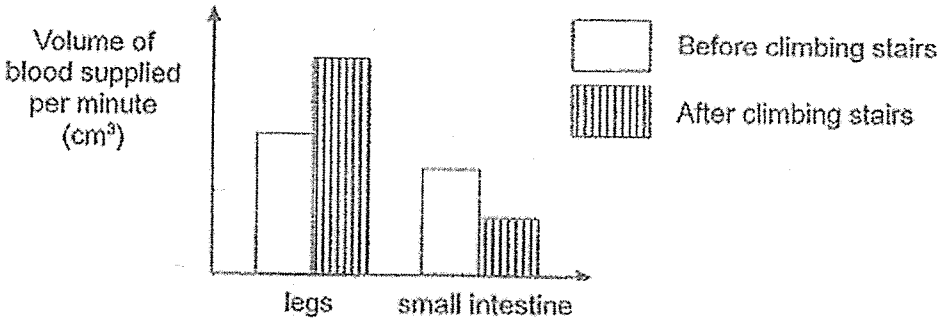
29 The diagram shows the blood flow in some parts of the human body.



(a) State the name of the organ in the above diagram. [1]

(b) State two substances carried in the blood at Y which are more than at X. [1]

The graph below shows the volume of blood supplied per minute to the small intestine and legs before and after climbing stairs.



(c) Using the graph above, explain how climbing stairs after a meal affects the absorption of digested food in the small intestine. [2]

4

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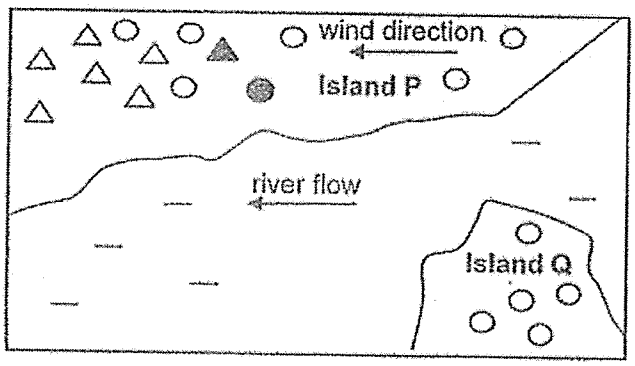
30 At the beginning, there was no plants and no animals on island Q. A few years later, plants B were found growing on island Q, as indicated in the following diagram.



Adult Plant	Young Plant
A ▲	A △
B ●	B ○

(a) Suggest one way how plant B started growing on island Q. [1]

(b) Which of the following, X or Y, could be fruits of plant B? Explain your answer. [1]

Fruit X  Fruit Y 

(c) Some birds were found living on island Q. Give a reason why these birds could be found living on island Q only after plants were found growing there. [1]

(d) After some time, there was a virus that caused fewer male than female birds to be hatched on island P. Why did the population of birds decrease? [1]

4

31 Xiaohui cut out circular discs from a leaf. These discs can still carry out their functions as a leaf for some time, after being cut out.

She placed ten discs into each glass container with water, as shown in Figure 1.

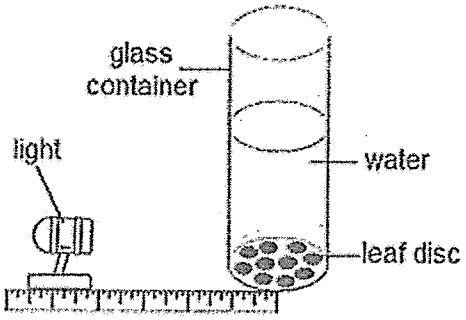


Figure 1

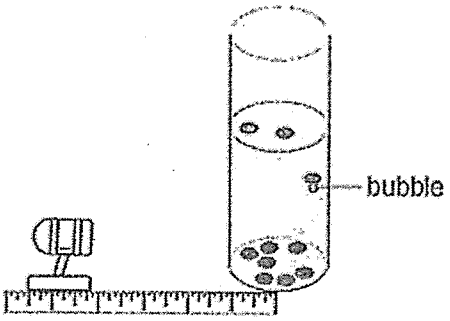


Figure 2

Bubbles were observed under the discs after some time and the leaf disc floated up to the surface of water, as shown in Figure 2.

(a) Describe the process that occurred in the leaf discs when they were placed in the set-up in Figure 1. [1]

(b) State how the process in (a) caused the leaf disc to rise to the surface of water. [1]

(c) Suggest one thing Xiaohui could do to obtain more reliable results. [1]

(Go on to the next page)

Xiaohui recorded the time taken for the ten leaf discs to float up to surface of water for Experiment 1 as shown in the table below.

She repeated Experiment 2 using a fresh set of leaf discs and added baking soda into the water. Her results are as shown in table below.

Experiment	Time taken for ten leaf discs to float up to the surface (min)
1	14
2	9

(d) Explain why it took a shorter time for ten leaf dics to float up to the surface in Experiment 2. [1]

(e) Without using different apparatus or additional materials, suggest a way to reduce the time taken for the leaf discs to float up to the surface in process (a). Explain your answer. [1]

5

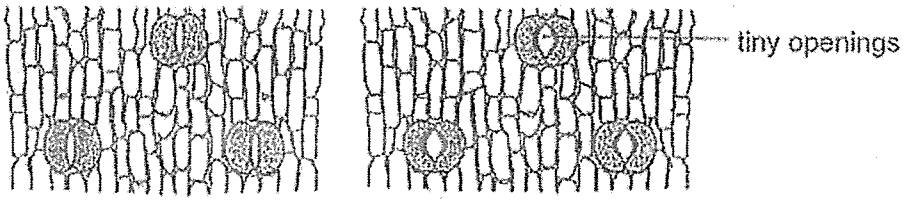
(Go on to the next page)

32 Rafel conducted an experiment to measure the temperature and amount of oxygen present in the water of three tanks, A, B and C. His results are shown in the following table.

Tank	A	B	C
Temperature of the water (°C)	20	25	30
The amount of oxygen (units)	50	40	30

(a) Rafel then placed the same number of fishes into each tank. He noted that the breathing rate of the fishes increased when the temperature of water was higher. Explain his observation using the results of the experiment. [2]

Rafel also studied the cells of a leaf during day and night as shown below. Some of the gases that move through the tiny openings are oxygen, carbon dioxide and water vapour.



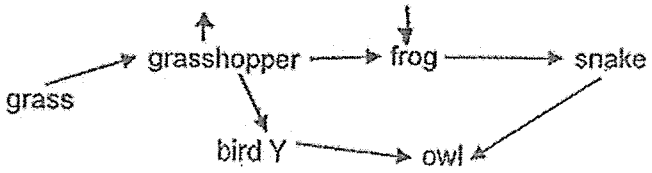
(b) Suggest a reason to explain his observation about the size of tiny openings between day and night. [1]

(c) In the day, the change in the size of tiny openings can also be a disadvantage to the plant. What is this disadvantage? [1]

4

(Go on to the next page)

33 Study the food web of a habitat as shown below.



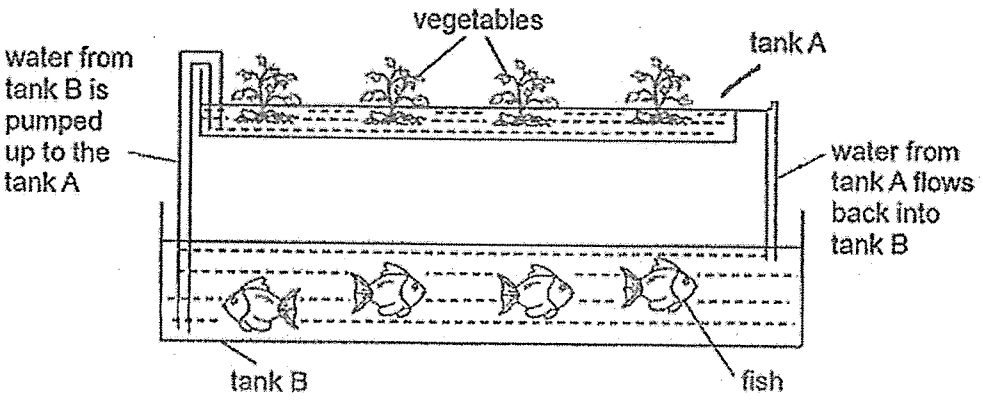
(a) Construct one food chain with five organisms from the above food web. [1]

(b) A large number of frogs were killed. How would the population of grass change? Explain your answer. [1]

(c) A population of animal X was introduced into the habitat. With this introduction, the bird Y population decreases. Give a reason for the decrease in population for bird Y. [1]

3

34 The diagram below shows a system of growing vegetables and fishes together.



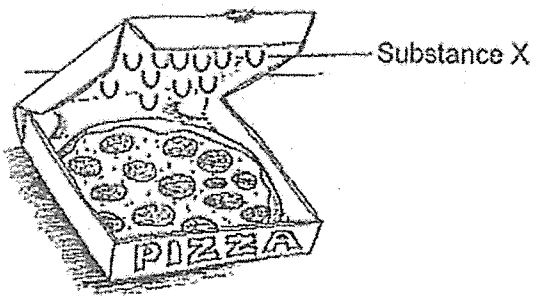
(a) How does pumping water from tank B into tank A benefit the vegetables? Explain your answer clearly. [1]

(b) The above system is placed on an exposed rooftop. Explain why. [1]

2

(Go on to the next page)

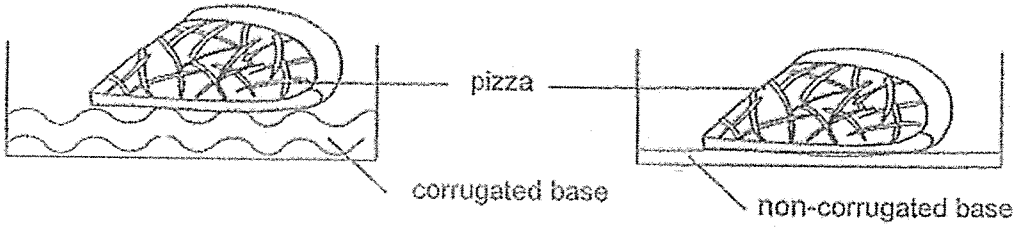
35 Christine bought a freshly baked pizza which was packed in a paper box. When she opened the box, she found substance X underneath the lid as shown in the following diagram.



(a) What state of matter is substance X? [1]

(b) Describe how substance X was formed. [2]

Christine found that the pizza was still warm when she reached home. The following diagram shows that the base of the pizza box is corrugated.

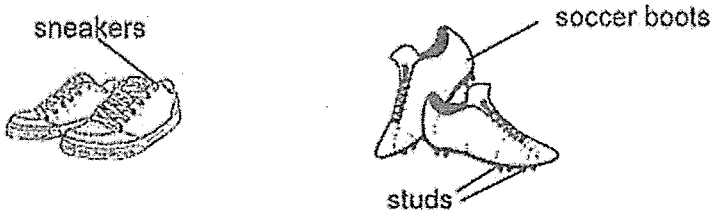


(c) Explain how the corrugated box helped to keep the pizza warm. [1]

4

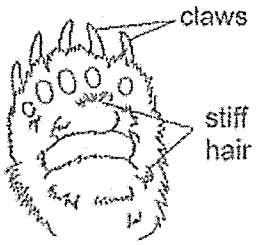
(Go on to the next page)

36 Study the pictures of a pair of sneakers and soccer boots as shown below.



(a) Soccer players wear soccer boots instead of sneakers. Explain how the boots help the player during the game. [2]

(b) The diagram below shows the base of an animal's paw.



Based on the diagram above, explain how the structural adaptation enables the animal to move on ice? [1]

3

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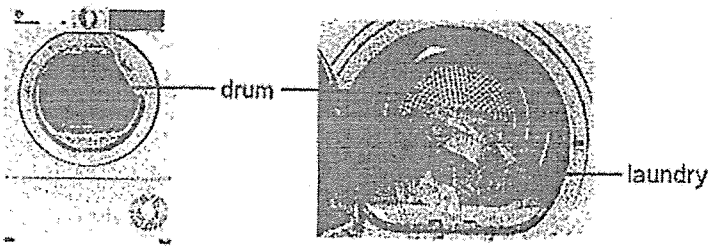
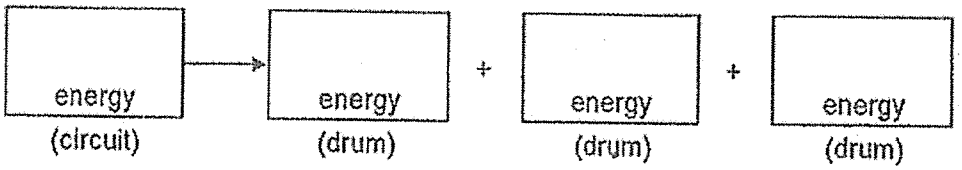
37 The diagram below shows an electric dryer. When it is switched on, an electric motor turns the drum at 40 turns per minute and the dryer blows hot air onto the laundry.



(a) State the energy conversions in the dryer when it is drying laundry. [1]



The table below shows the energy usage for the different heat settings.

Heat setting	Temperature (°C)	Energy usage per cycle (kWh)
Low	55	4.5
Medium	65	6
High	75	8

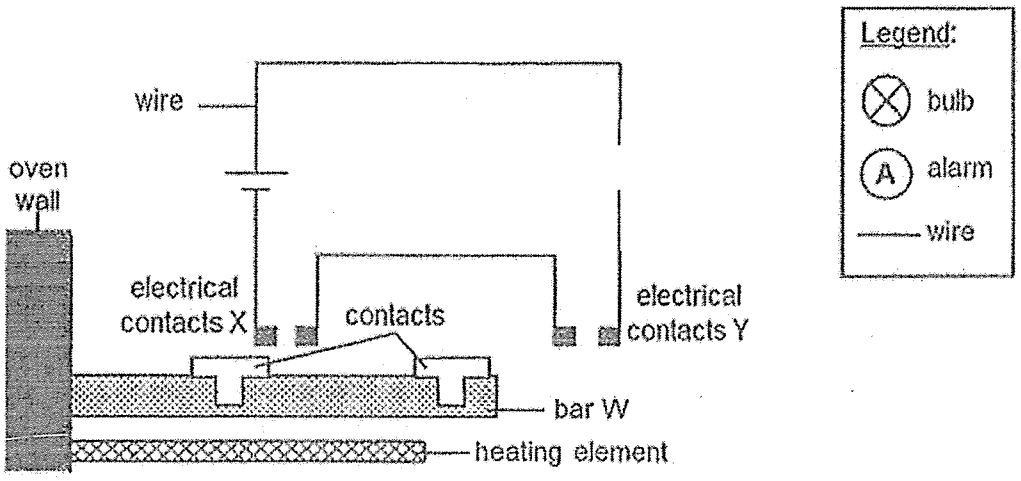
(b) How does the heat setting of the dryer affect the energy usage per cycle? Explain your answer in terms of energy conversion. [2]

(c) The turning drum helps to spread the laundry out. Explain how the turning drum helps to dry the laundry faster. [1]

4

(Go on to the next page)

38 An oven has a system which consists of bar W, a bulb and an alarm to alert users when the temperature of the oven is too high, as shown below. Bar W expands when temperature increases.



The table below shows the observations at different temperatures.

Temperature of oven (°C)	Bulb B	Alarm A
26	off	off
100	on	off
300	on	on

(a) There are two contacts on bar W. State a possible material for the contacts that allows the system to work properly. [1]

(b) Draw on the diagram above, using the legend given, to show how the bulb and alarm are connected in the circuit so that the oven works according to the observations recorded. [2]

(c) Explain how bar W works as the temperature of the oven increases and reaches 100°C. [1]

4

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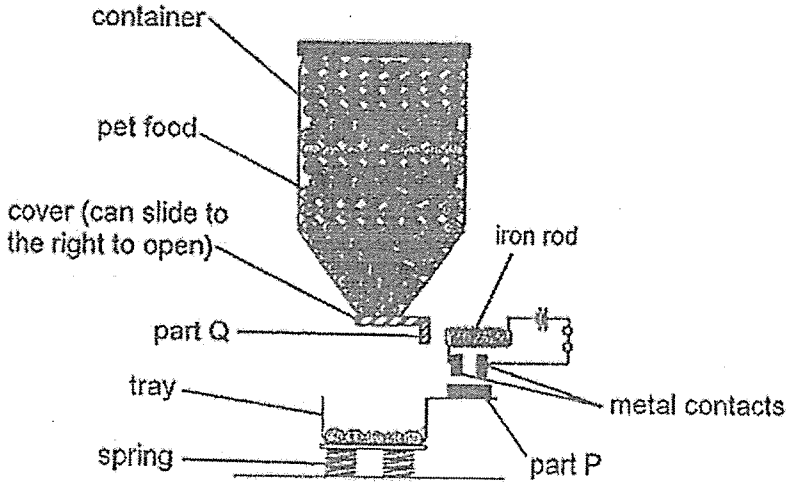
39 Mr Lee designed a pet feeder dispenser as shown.
When he closed the switch, a fixed amount of pet food automatically drops from the container into the tray whenever it is empty.



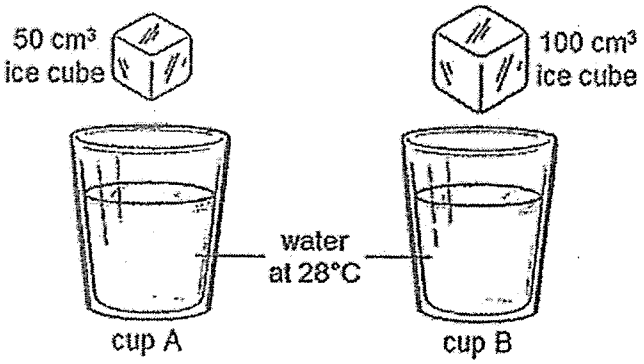
(a) State a physical property of part Q that allows this pet feeder dispenser to work. [1]

(b) Explain how the pet feeder dispenser works to allow the pet food to fall after the switch is closed. [2]

(c) Suggest one change to the spring so that more pet food can be dropped and collected in the tray. Explain your answer. [2]

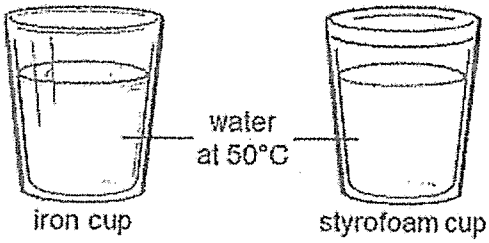
5

40 Two identical cups are filled with the same amount water at 28°C. An ice cube of 50 cm^3 is added into cup A while another ice cube of 100 cm^3 into cup B.



(a) Which cup of water will reach 20°C first? Explain your answer. [1]

An equal volume of water at 50°C is poured into an iron cup and a styrofoam cup of the same size and thickness and left in a room.



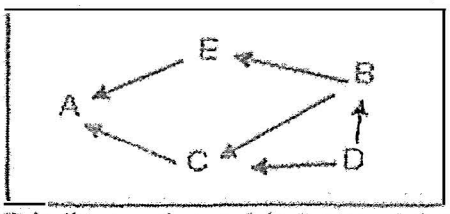
(b) Which cup shows a greater decrease in temperature of the water after five minutes? Explain your answer. [1]

2

End of Booklet B

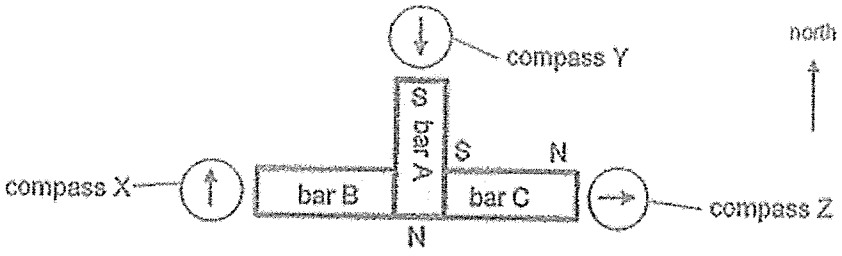
Booklet A

<table>
<tr><th>Qn</th><th>Ans</th><th>Explanation</th></tr>
<tr><td>1</td><td>(3)</td><td>Animals A, B and C belong to the groups, reptile, amphibian, and fish respectively. Reptiles have dry skin covered with scales, amphibians have moist skin and fish have scales.</td></tr>
<tr><td>2</td><td>(3)</td><td>The young of insect A resembles the adult and hence it should have 3 stages in its life cycle.
The young of insect B looks like a larva and does not resemble the adult. It should have 4 stages in its life cycle.

Stage 1 = Eggs were being laid.
<table>
<tr><th></th><th>Insect A</th><th>Insect B</th></tr>
<tr><td>Stage 1</td><td>Day 1 (Egg)</td><td>Day 1 (Egg)</td></tr>
<tr><td>Stage 2</td><td>Day 5 (Nymph)</td><td>Day 6 (Larva)</td></tr>
<tr><td>Stage 3</td><td>Day 18 (Adult)</td><td>Day 17 (Pupa)</td></tr>
</table>
On day 17, Insect B will be Pupa while insect A is still a nymph.</td></tr>
<tr><td>3</td><td>(2)</td><td>The flowers have to be pollinated (Process A) and then fertilised (Process B). Then the ovary will become the fruit X and the ovule will become the seed Y.</td></tr>
<tr><td>4</td><td>(3)</td><td>Gaseous exchange takes place at the lungs (part C) and through tiny openings/ stomata (part Z) for human and plant respectively.</td></tr>
<tr><td>5</td><td>(2)</td><td>The amount of undigested food is highest at the mouth (part P), followed by gullet (Part Q). Since no digestion takes place at the gullet, the amount of undigested food entering the gullet and stomach (Part S) should be the same.</td></tr>
<tr><td>6</td><td>(4)</td><td>Line C (steepest, water decreased the most)→ Line B → Line A (least steep, water decreased the least)
Plant in beaker P (most number of roots, absorbs most water, least amount of water left in the beaker), followed by Q & R.</td></tr>
<tr><td>7</td><td>(3)</td><td> 

D is the producer. A is the predator. B is a prey as it feeds on D only and is eaten by C and E. C and E are both predator and prey as they both feed on B and are hunted by A.</td></tr>
</table>

8	(3)	We observed that substance Y is found inside the cell, hence, the cell membrane must have allowed substance Y to enter.
9	(3)	Experiment set-up contains the substance which removes carbon dioxide. Control set should be without the substance.
10	(2)	An animal gives out carbon dioxide when it breathes. Carbon dioxide is taken in by a plant during photosynthesis.
11	(4)	The diagram shows a community with three populations, namely plant A, plant B and animal Z.
12	(4)	When the population of plant X increased after the animal waste entered the pond, the population of plant Y decreased. This is because the floating plant X blocked sunlight from reaching plant Y. When plant Y could not trap sunlight to carry out photosynthesis, it could not make food and its population decreased.
13	(4)	Since organism Q only feeds on plant P, the number of organism Q is highly dependent on the number of plant P. An increase in the number of plant P will result in the corresponding increase in the number of organism Q. A decrease in the number of plant P will also result in the corresponding decrease in the number of organism Q. The number of plant P should be larger than the number of organism Q to supply enough food to it.
14	(1)	Only part X is swollen. Food-carrying tube was removed because food made by the leaves on top could not be transported downwards via the food-carrying tube. It was then accumulated above the cut at X. However, part Y is not swollen, indicating that water absorbed by the roots at the bottom can be transported upwards via water-carrying tube. Water-carrying tube is intact.
15	(2)	Substance B is in liquid state at 60°C. Substance A is in gaseous state, C and D are in solid state.
16	(4)	Strip Z bends the least (3mm) and hence it is the least flexible. It is most suitable to make a food tray because it will bend the least when we put the food items on top.
17	(3)	The source of energy for the solar powered light at night is the battery. Potential energy → Electrical energy → light energy + heat energy
18	(1)	The amount of frictional force acting on the wooden block does not depend on the surface area of the wooden block in contact with the plank and the mass of the person pulling it.
19	(4)	The amount of gravitational force does not change as the wooden block moves up the slope and gravitational force always acts on the block downwards. Frictional force will always act in the opposite direction of motion of the wooden block.
20	(4)	When heated, Block D increases temperature at the slowest rate. It is the most suitable material for constructing a container to keep food cold.

<table>
<tr><td>21</td><td>(4)</td><td>
<table>
<tr><td></td><td>bottle rolling downhill</td><td>ball being thrown upwards</td><td>athlete running on treadmill</td><td>person taking escalator down</td></tr>
<tr><td>potential energy</td><td>decreases</td><td>increases</td><td>constant</td><td>decreases</td></tr>
<tr><td>kinetic energy</td><td>increases</td><td>decreases</td><td>constant</td><td>constant</td></tr>
</table>
</td></tr>
<tr><td>22</td><td>(4)</td><td>Shadow of B is the tallest so it is the nearest to the light source. Shadow of C is the shortest so it is furthest from the light source. Position of shadow from left to right: A, B and C.</td></tr>
<tr><td>23</td><td>(3)</td><td>Volume of air (100 cm^3) = Total capacity (200 cm^3) - volume of liquid (100 cm^3)
There is no change in the total capacity and volume of liquid, so the volume of air inside will remain the same as 100 cm^3. Air has indefinite volume and hence it can be compressed.</td></tr>
<tr><td>24</td><td>(1)</td><td>Set-ups A and B have 2 batteries connected in series. Set-up A has 2 bulbs in parallel while set-up B has 2 bulbs in series.</td></tr>
<tr><td>25</td><td>(2)</td><td>When switch A and D are closed, the bulb lights up so W and Z are electrical conductors. When switch B or C is closed, the bulb does not light up so X and Y are electrical insulators.</td></tr>
<tr><td>26</td><td>(4)</td><td>Limbs move for any combination of switches so the motor is not connected to the speaker or light (panel). Switch A controls the speaker. Switch B controls the light.</td></tr>
<tr><td>27</td><td>(2)</td><td>The line graph should start from zero as extension of spring is the difference between the new length and the original length of the spring. The extension of spring should also increase until it reaches its maximum for Joe's experiment. After that, it stays constant after 4 cubes are added.</td></tr>
<tr><td>28</td><td>(2)</td><td>Bars A and C are magnets as they repel each other. Bar B is a non-magnetic material as it is not attracted or repelled by bar A.
 

The needle in compass X will point towards north as it is not affected by bar B. Bar A and bar C are attracted to each other so their unlike poles are facing each other. Assuming compass Y is facing south pole of bar A, the needle will be pointing towards bar A. Thus, the needle in compass Z will be pointing away from bar C as it is facing north pole of bar C.</td></tr>
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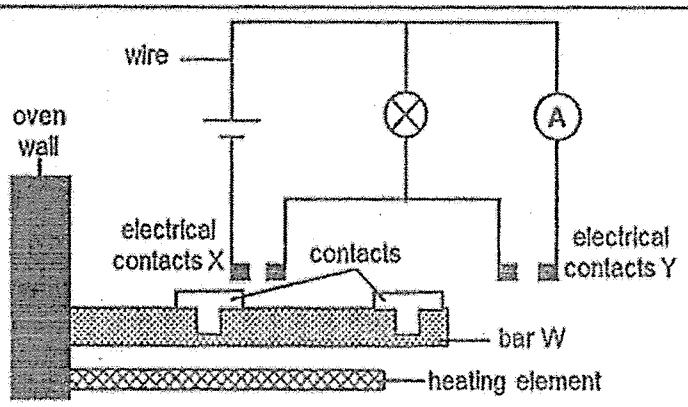
Methodist Girls' School (Primary) P6
Sci MYE 2022 Answer Key

Booklet B

Qn	Answer	Marks
29a	Heart	1
29b	Carbon dioxide and digested food	1
29c	When climbing stairs after a meal, less blood is supplied to the small intestine than the legs per minute so less digested food can be absorbed into the blood in the small intestine.	2
30a	The seeds / fruits of plant B could be dispersed by animals that flew / swam to Island Q.	1
30b	Fruit X. Fruit X is fleshy and juicy to attract animals to eat it. The animals disperse the seeds by swallowing the indigestible seeds which will be passed out in their dropping/waste.	1
30c	Plant / fruit/ seeds of plant B could be the food source for the birds.	1
30d	There will be fewer males to produce fewer male reproductive cells to fuse with female reproductive cells for fertilization.	1
31a	Plants/ The leaf discs use carbon dioxide and water to produce sugar and oxygen in the presence of light.	1
31b	The oxygen bubbles produced during photosynthesis caused the leaf discs to rise to the surface of liquid A.	1
31c	Conduct the experiment a few times/ repeat the experiment two or more times.	1
31d	Baking soda increases the amount of carbon dioxide in the water and the rate of photosynthesis increases so more oxygen bubbles are produced.	1
31e	Move the light nearer to the container/leaf discs. The light intensity increases and rate of photosynthesis increases and more oxygen bubbles are produced.	1
32a	As the temperature of water increases, the amount of oxygen in the water decreases. Fishes increase their breathing rate so that they can take in more (dissolved) oxygen.	2
32b	In the day with light, stomata / tiny openings will increase in size to take in more carbon dioxide to carry out photosynthesis.	1

32c	When the tiny openings are bigger, the plant will lose more water vapour through the tiny openings on the leaves.	1
33a	grass → grasshopper → frog → snake → owl	1
33b	The frog feeds on grasshoppers which feed on grass. With less frogs feeding on grasshoppers, there will be more grasshoppers feeding on grass so the population of grass will decrease.	1
33c	Animal X feeds on bird Y / is a predator / prey on bird Y so the population of bird Y decreases.	1
34a	Water from tank B contains fish waste which will fertilise the vegetables for better plant growth.	1
34b	The system is placed on an exposed rooftop for the leaves of the vegetables to trap sunlight so that it can carry out photosynthesis/ make food.	1
35a	Liquid state.	1
35b	Warm water vapour inside the box came into contact with the cooler underside of the lid, lost heat and condensed into water droplets.	2
35c	The corrugated base reduced the surface area in contact with pizza and reduced the heat loss from the pizza to the box. OR The corrugated base traps air which is a poor conductor of heat. The pizza will lose heat slower to the box.	1
36a	Soccer boots, unlike the sneakers, have studs which dig into /grip the ground and increase the frictional force between the ground and boots/ player so that the player will not slip and fall easily.	2
36b	The paws have claws which allow the animal to grip/dig into the ice and increase frictional force between the paw and the ground/ice to prevent it from slipping. OR The paw has stiff hair which increases frictional force between the paw and the ground/ ice and helps the animal to have a better grip when walking on ice to prevent slipping.	1
37a	electrical energy (circuit) → heat energy (drum) + kinetic energy (drum) + sound energy (drum)	1
37b	When the heat setting is higher, the energy usage per cycle increases. Air in the dryer gains heat and increases in temperature. More electrical energy is required to be converted to more heat energy.	2

37c	The laundry spread out has a greater exposed surface area so the rate of evaporation of water increases.	1
38a	Metal	1
38b	 *Make sure there is no gap in the circuit	2
38c	Bar W gains heat and expands and the (metal) contacts touch electrical contacts X and the bulb lights up.	1
39a	Part Q is a magnetic material.	1
39b	When the tray is empty, Part P touches the metal contacts forming a closed circuit and electric current flows through the circuit. The iron rod becomes an electromagnet/ becomes magnetised and attracts part Q which opens the cover allowing the pet food to drop/fall into the tray.	2
39c	Use a stiffer/less elastic spring so that more pet food will be required to compress the spring to break the contact between part P and the metal contacts.	2
40a	Cup B. Ice cube in cup B has a larger surface area in contact with water. The water loses heat to the ice cube faster and its temperature decreases faster.	1
40b	Iron cup. Iron is a better conductor of heat so hot water in the iron cup loses heat faster to the cooler surrounding.	1