



Anglo-Chinese School
(Primary)

A Methodist Institution
(Founded 1886)

PRELIMINARY EXAMINATION 2021
SCIENCE
PRIMARY SIX
BOOKLET A

Name: _____ ()

Class: Primary 6 _____

Date: 24 August 2021

Total Time for Booklets A and B: 1 h 45 min

Additional Materials: Optical Answer Sheet (OAS)

INSTRUCTIONS TO CANDIDATES

1. Write your name, index number and class in the spaces provided.
2. Do not turn over this page until you are told to do so.
3. Follow all instructions carefully.
4. Answer all questions.
5. Shade your answer on the Optical Answer Sheet (OAS) provided.

This booklet consists of 17 printed pages including this cover 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) and shade your answer on the Optical Answer Sheet.

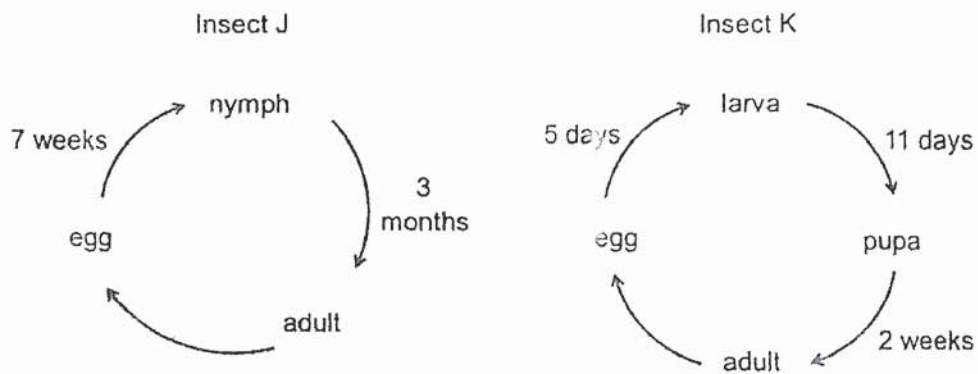
(56 marks)

1 Which of the following about the mushroom and the fern is/are correct?

- A Both need sunlight to make food.
- B Both need water for life processes.
- C Both need the wind to help them disperse their seeds.

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

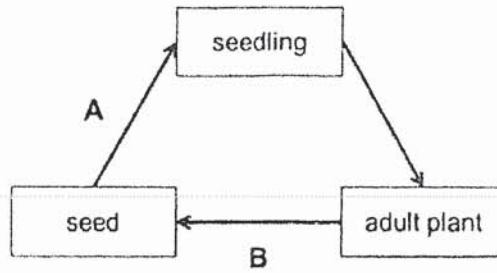
2 Study the life cycles of insects J and K.



Which of the following **cannot** be concluded based on the information above?

- (1) Both insects lay only one egg each time in their life cycles.
- (2) Both insects have different number of stages in their life cycles.
- (3) The young of J resembles its adult but the young of K does not.
- (4) The young of J takes a longer time to grow into an adult than the young of K.

- 3 The diagram shows the life cycle of a flowering plant.



What processes do A and B represent?

	A	B
(1)	fertilisation	pollination
(2)	pollination	dispersal
(3)	dispersal and germination	pollination and fertilisation
(4)	fertilisation and dispersal	pollination and germination

- 4 The table shows some characteristics about the male reproductive cells of a human and a flowering plant.

	Human	Flowering plant
A	Produced in the testes	Produced in the anther
B	Required for fertilisation	Required for pollination
C	Fuses with the female reproductive cell in the ovary	Fuses with the female reproductive cell in the ovary

Which of the following is correct?

- (1) C only
- (2) A and B only
- (3) B and C only
- (4) A, B and C

- 5 Paul wants to find out the factors that affect germination of seeds from a particular plant. He prepares four containers, P, Q, R and S, and varies the factors in each of the container. A tick (✓) shows the presence of the factor.

In which container will the seeds most likely germinate?

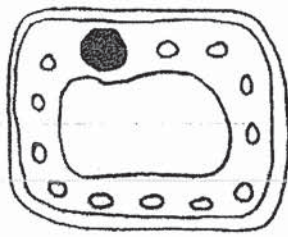
	Container	Temperature (°C)	Water	Light	Air
(1)	P	35	✓		✓
(2)	Q	7			✓
(3)	R	7		✓	✓
(4)	S	35	✓	✓	

- 6 Which of the following about cells is/are correct?

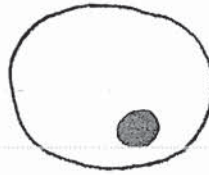
- A Cells are living things.
- B There are more cells in the body of a human adult than in the body of a baby.
- C Oxygen and carbon dioxide are needed by the cells in the human body for life processes.

- (1) A only
- (2) C only
- (3) A and B only
- (4) A, B and C

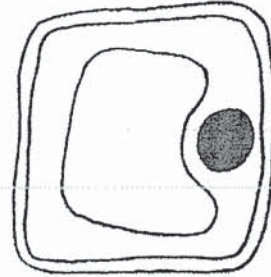
- 7 Three different types of cells are shown.



Cell X



Cell Y

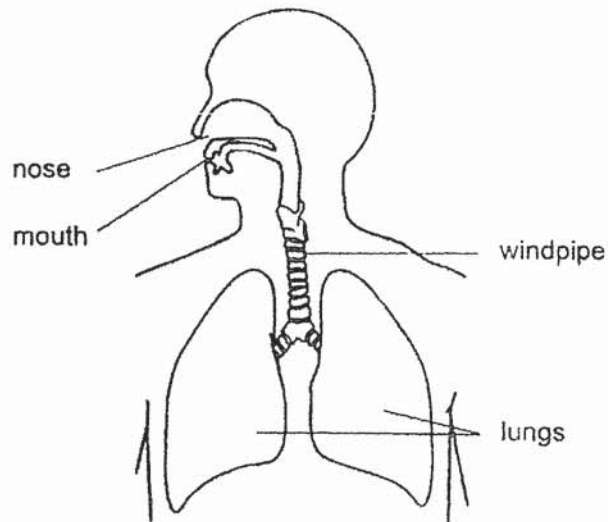


Cell Z

Which of the following descriptions of the cells is incorrect?

- (1) Cells X and Z are plant cells.
- (2) Cell Y does not have a regular shape.
- (3) Cell X can photosynthesize in the presence of light.
- (4) Each cell has a cytoplasm to control substances entering or exiting the cell.

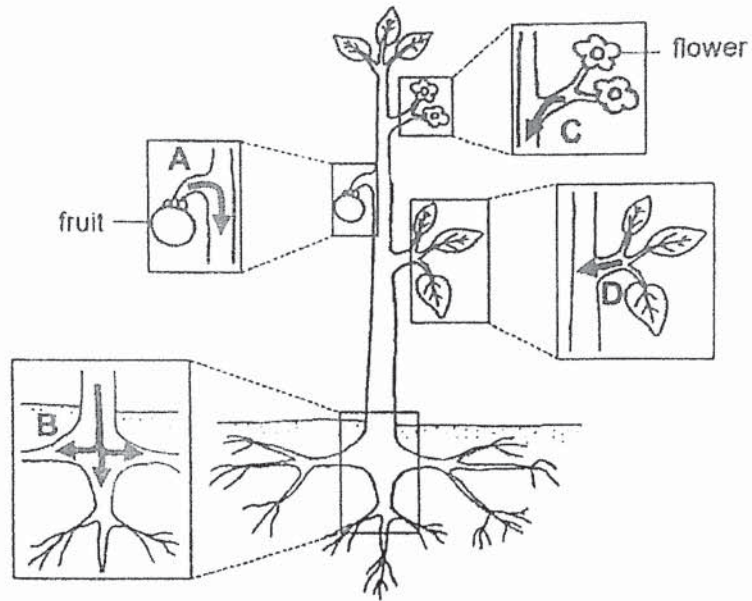
- 8 The diagram shows the respiratory system of a human.



Which of the following statements is correct?

- (1) Gaseous exchange takes place in the lungs.
- (2) When breathing out, the lungs becomes bigger.
- (3) When breathing in, the nose allows only oxygen to enter.
- (4) The windpipe will transport air from the mouth to the stomach.

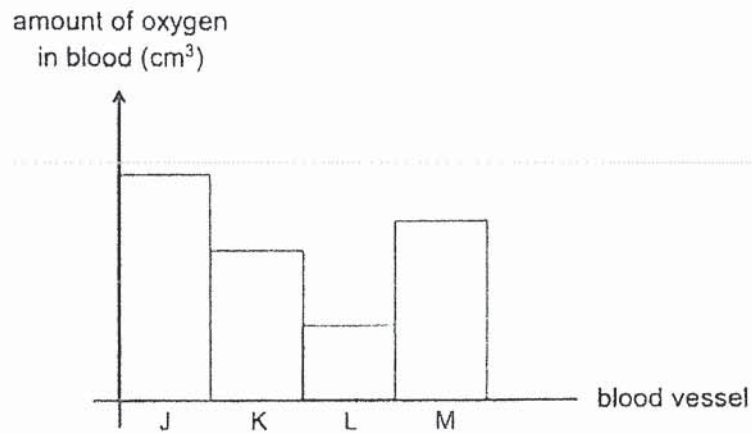
- 9 The diagram shows a plant growing in a garden.



Which arrow(s), A, B, C and D, represent(s) the correct movement of food in the plant during the daytime?

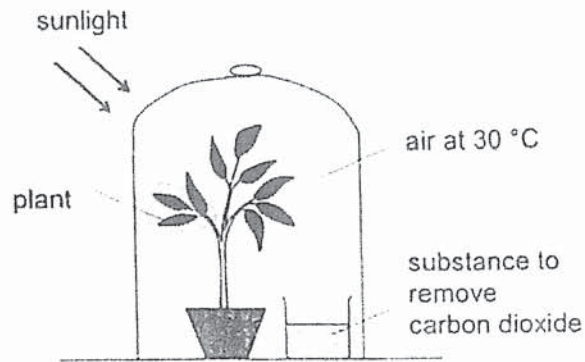
- (1) D only
- (2) A and C only
- (3) B and D only
- (4) C and D only

- 10 Four blood samples were taken from different blood vessels, J, K, L and M, in the human body. The graph shows the amount of oxygen in the blood from each vessel.



- Which blood vessel was carrying blood from the heart to the lungs?
- (1) J
 - (2) K
 - (3) L
 - (4) M
- 11 Which statement about the human digestive system is correct?
- (1) The mouth chews food into simple substances.
 - (2) The stomach is the only organ that digests food.
 - (3) The small intestine absorbs digested food into the blood stream.
 - (4) The large intestine completes the digestion of any undigested food.

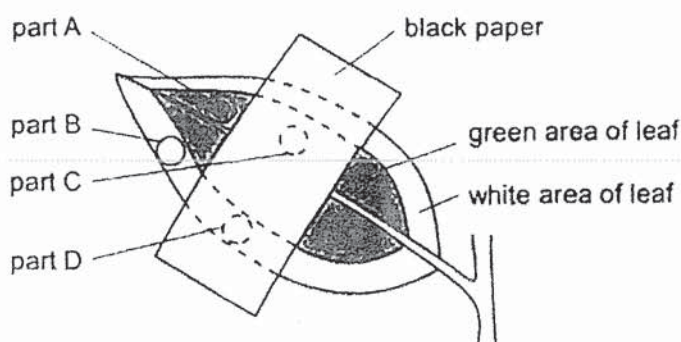
- 12 Raj wanted to find out if carbon dioxide is needed for photosynthesis. He set up an experiment as shown.



Which set-up should Raj use as a control?

- (1)
- (2)
- (3)
- (4)

- 13 A leaf on a plant was prepared as shown to investigate the factors affecting photosynthesis. The plant was kept in darkness for two days before the experiment.



The plant was then placed in sunlight for 12 hours. At the end of the experiment, four parts from the leaf, A, B, C and D, were cut from the positions shown and tested for starch using iodine solution. The original colour of the iodine solution was brown.

Which of the following is the most possible colour of the iodine solution after the starch test?

	Part of leaf	Colour of iodine solution after starch test
(1)	A	brown
(2)	B	dark blue
(3)	C	brown
(4)	D	dark blue

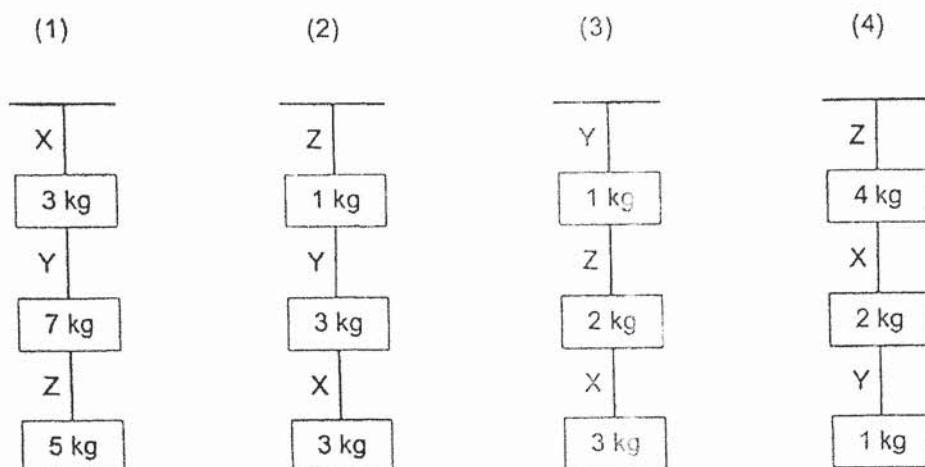
- 14 Which of the following statements is true?

- (1) Plants produce oxygen at night.
- (2) Leaves take in water through the stomata.
- (3) The sun is the main source of energy for all plants.
- (4) All plant parts will grow towards the sun to get more light.

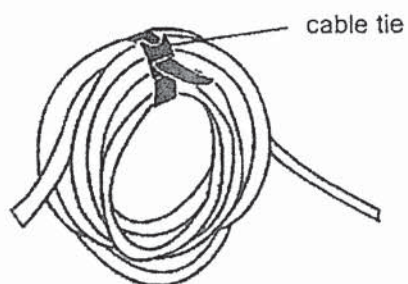
- 15 Meilin tested the strength of three strings X, Y and Z. The table shows the result of her test.

String	Maximum mass added without breaking the string (kg)
X	3
Y	5
Z	7

Based on the result, which of the following arrangements was possible to ensure none of the strings broke?



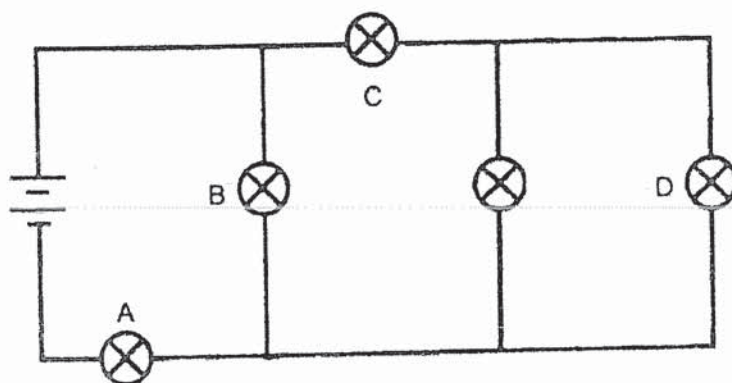
- 16 A cable tie is used to bundle cables together.



Which property allows the cable tie to perform the function above?

- (1) flexibility
- (2) waterproof
- (3) ability to float
- (4) allows light to pass through

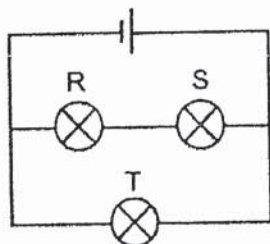
- 17 The diagram shows five identical bulbs connected to two batteries.



When one bulb fused, only two other bulbs remained lighted. Which bulb had fused?

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

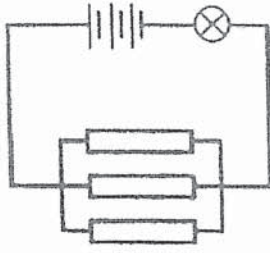
- 18 Identical bulbs, R, S and T, are used in the circuit.



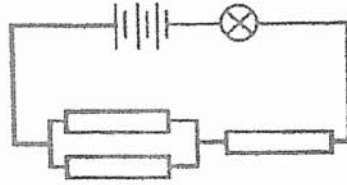
Which change will allow all bulbs to light up with equal brightness?

- (1) Add an identical bulb next to T.
- (2) Switch the positions of R and T.
- (3) Increase the number of batteries.
- (4) Add an identical bulb between R and S.

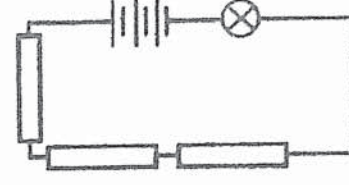
- 19 An iron rod, a wooden rod and a plastic rod are components of each circuit below.



circuit A



circuit B



circuit C

The bulbs and the batteries in all the circuits are identical and in working condition. In which circuit(s) would the bulb light up?

- (1) A only
- (2) B only
- (3) A and B only
- (4) A, B and C

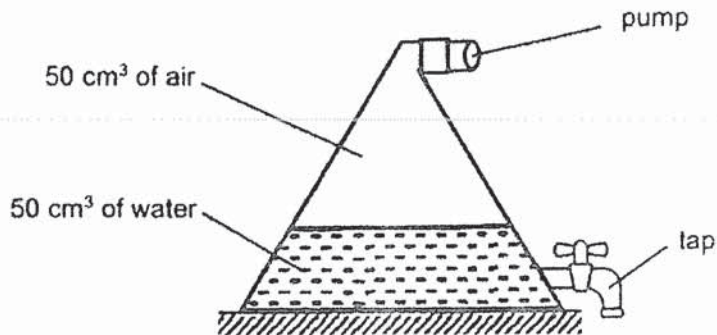
- 20 Sean observed some changes in substance X during an experiment and recorded them in the table below.

	Substance X's	
	shape	volume
Start of experiment	Definite	Definite
End of experiment	Not definite	Definite

Which of the following processes could cause the changes shown?

- (1) Boiling
- (2) Melting
- (3) Evaporation
- (4) Condensation

- 21 A 100 cm³ sealed metal container holds 50 cm³ of water and 50 cm³ of air as shown. First, 20 cm³ of water was removed from the container through the tap. Next, 10 cm³ of air was added in using the pump.



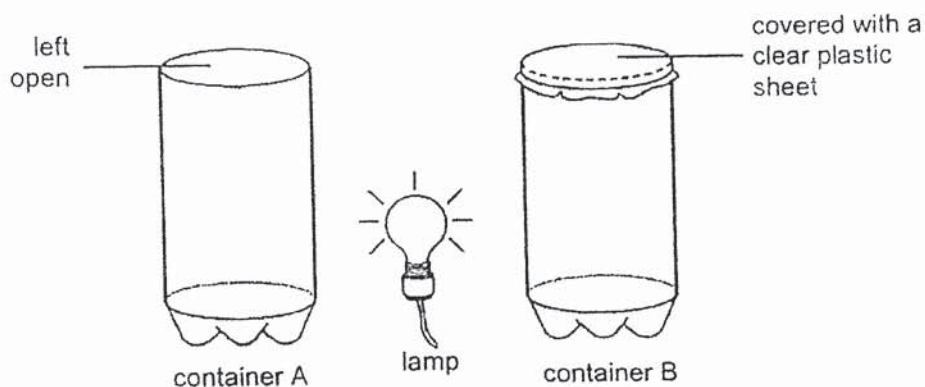
What would be the final amount of the air in the container?

- (1) 30 cm³
 - (2) 60 cm³
 - (3) 70 cm³
 - (4) 80 cm³
- 22 Which of the following is a possible effect on the water cycle due to higher temperatures?
- (1) There is less water vapour which then condenses to form more clouds.
 - (2) There is more water vapour which then condenses to form more clouds.
 - (3) The rate of evaporation of water decreases to form more clouds.
 - (4) The rate of evaporation of water increases to form less water vapour.

- 23 The melting point and boiling point of substance X are $17\text{ }^{\circ}\text{C}$ and $118\text{ }^{\circ}\text{C}$ respectively. Which of the following shows the correct state of substance X at $30\text{ }^{\circ}\text{C}$ and at $100\text{ }^{\circ}\text{C}$?

State of substance X at		
	$30\text{ }^{\circ}\text{C}$	$100\text{ }^{\circ}\text{C}$
(1)	solid	liquid
(2)	solid	solid
(3)	liquid	liquid
(4)	liquid	gas

- 24 The diagram shows a lamp placed at the same distance from two identical clear plastic containers A and B. The top of container A was left open while container B was covered with a clear plastic sheet.

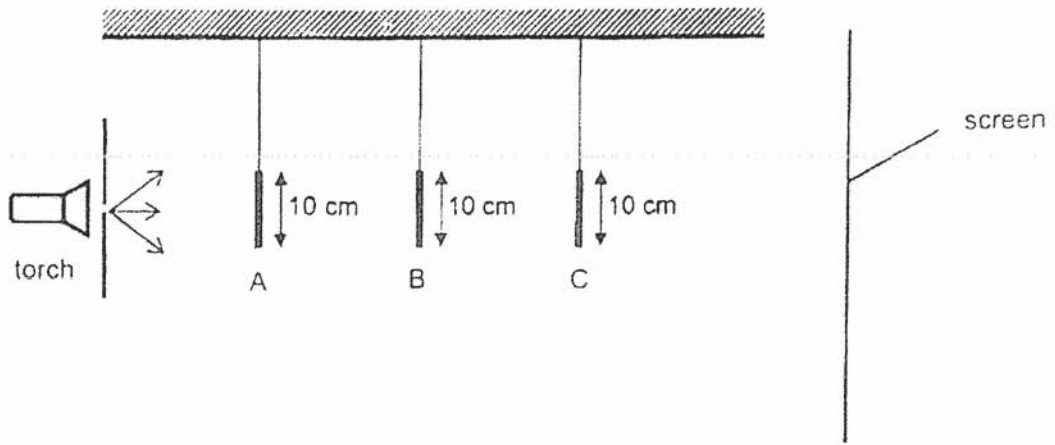


At the end of experiment, the temperature of the air in container A is lower than the temperature of the air in container B.

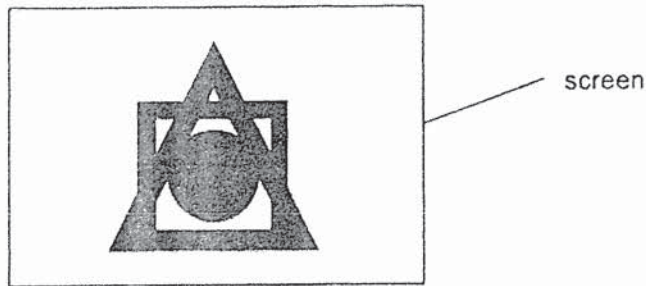
Which statement best explains the difference in the temperature?

- (1) The air in container A has less heat than container B.
- (2) The air in container B has less heat than container A.
- (3) The air in container A is able to gain heat faster than the air in container B.
- (4) The air in container B is able to gain heat faster than the air in container A.

- 25 The set-up shows light from a torch shining on three wooden objects A, B and C. The objects have different shapes but have the same height.



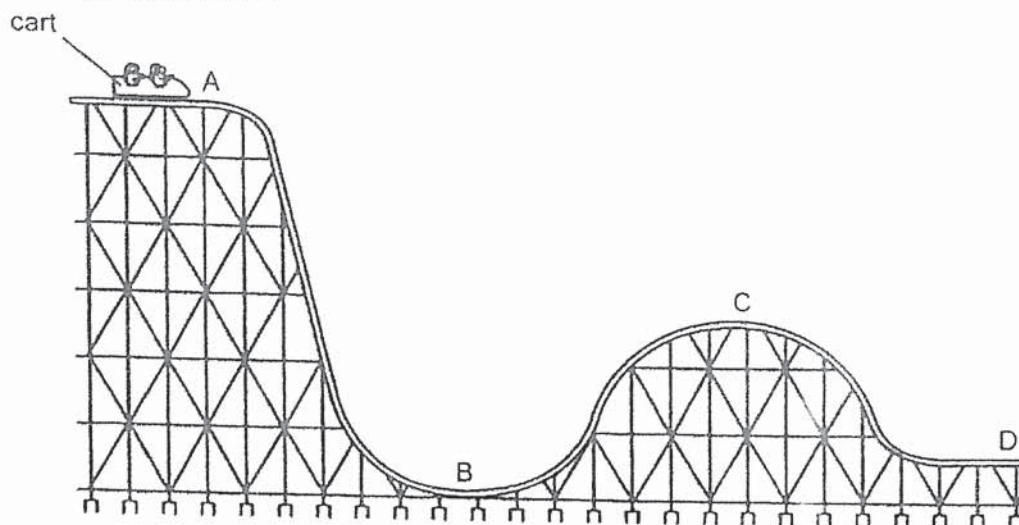
The diagram below shows the shadow of the objects formed on the screen.



Which of the following shows the correct shape of the objects?

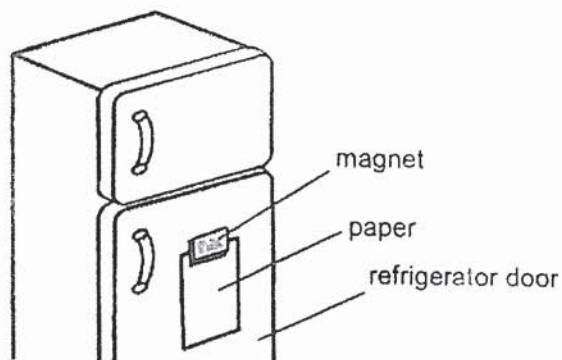
	A	B	C
(1)			
(2)			
(3)			
(4)			

- 26 The diagram shows part of a roller coaster ride. The cart starts from position A and stops at position D.



Which statement about the cart is correct?

- (1) Friction only acts on the cart at D.
 - (2) The kinetic energy of the cart at C is zero.
 - (3) The gravitational force acting on the cart at A is the highest.
 - (4) The gravitational potential energy of the cart at B is the lowest.
- 27 A magnet is used to hold a piece of paper onto the refrigerator door as shown.

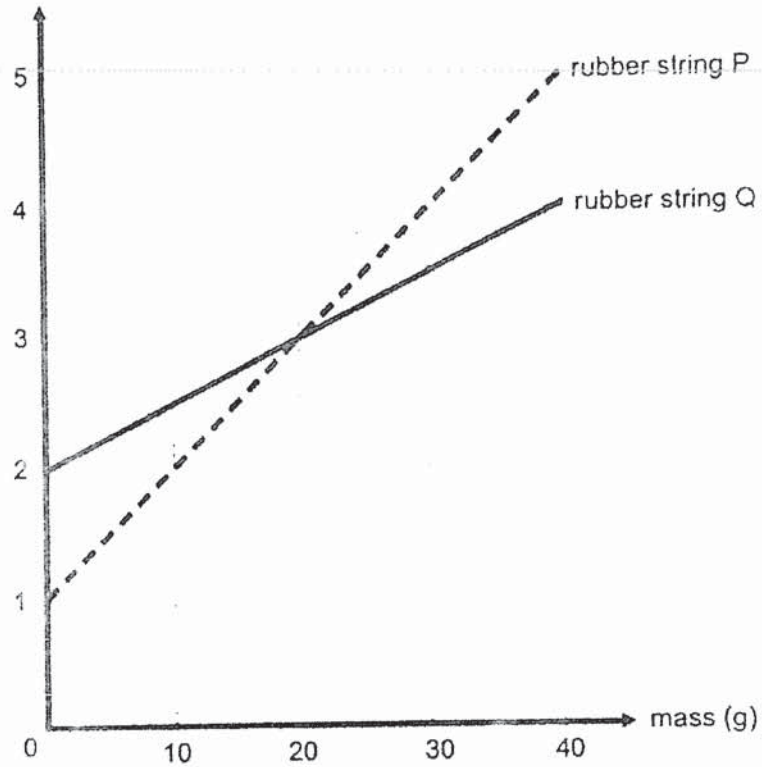


Which of the following statements is correct?

- (1) The magnet is attracting the paper.
- (2) The refrigerator door is made of aluminum.
- (3) The magnetic force is acting against gravity.
- (4) The magnetic force is able to pass through the paper.

- 28 Li Yong conducted an experiment on rubber strings P and Q. He hung four 10 g mass, one at a time, on each rubber string. He measured the length of each rubber string and recorded his results as shown.

length of the rubber string (cm)



Which of the following could Li Yong conclude from his results?

- (1) More mass could be hung on rubber string P before it broke.
- (2) More mass could be hung on rubber string Q before it broke.
- (3) Rubber string P stretched more than rubber string Q with the same load.
- (4) Rubber string Q stretched more than rubber string P with the same load.

(Go on to Booklet B)



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PRELIMINARY EXAMINATION 2021
SCIENCE
PRIMARY SIX
BOOKLET B

Name: _____ ()

Class: Primary 6 _____

Date: 24 August 2021

Total Time for Booklets A and B: 1 h 45 min

Parent's/ Guardian's signature

INSTRUCTIONS TO CANDIDATES

1. Write your name, index number and class in the spaces provided.
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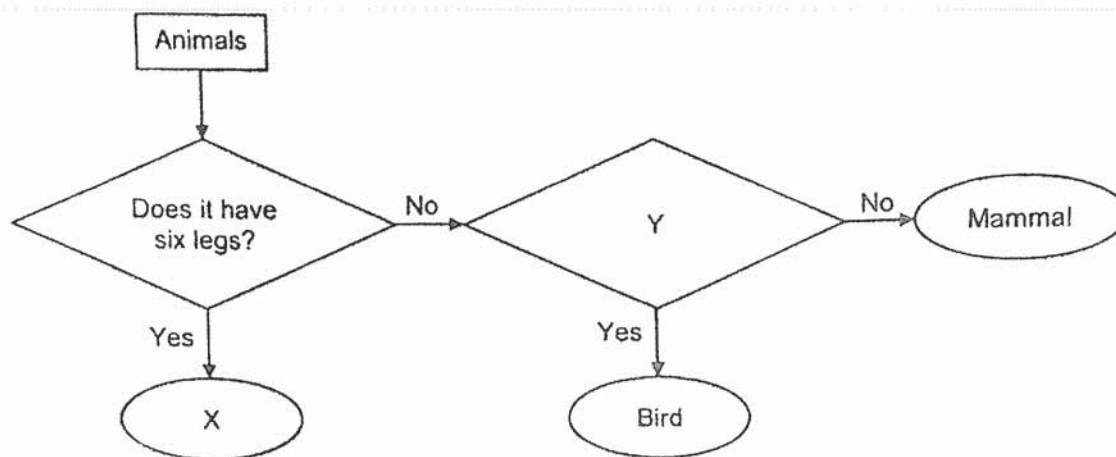
BOOKLET	MAX MARKS	MARKS OBTAINED
A	56	
B	44	
Total	100	

This booklet consists of 14 printed pages including this cover page.

For questions 29 to 40, write your answers in this booklet.

The number of marks available is shown in brackets [] at the end of each question or part question
(44 marks)

- 29 Study the flow chart below. X represents a group of animals and Y is a question related to the body covering of animals.



What could X and Y be?

[2]

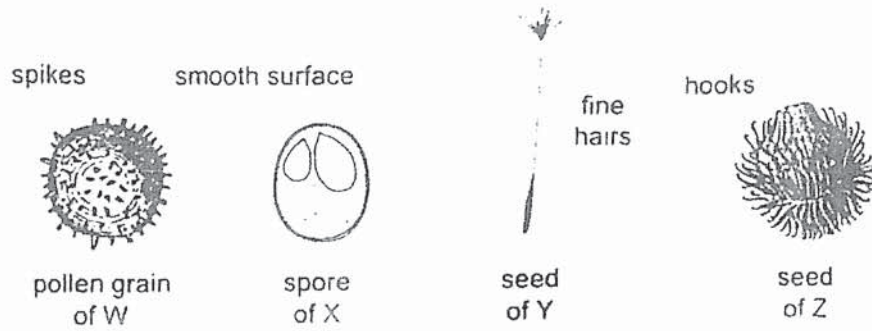
X: _____

Y: _____?

(Go on to the next page)

Score	2
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30 The diagram shows some parts taken from different organisms W, X, Y and Z. They are not drawn to scale.



(a) Group W, X, Y and Z under the correct headings in the table below. [1]

Carried by wind	Carried by animal

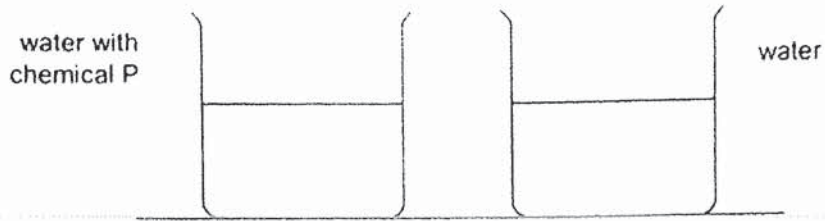
(b) What is one way for organism X to increase the chances of the continuity of its own kind during the production of spores? [1]

(c) Explain how dispersing seeds Y and Z far away from the parent plant will be an advantage for their young. [1]

(Go on to the next page)

Score	3
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- 31 Mr Lim conducted an experiment to find out if mosquitoes prefer to lay their eggs in water with chemical P as compared to water only.

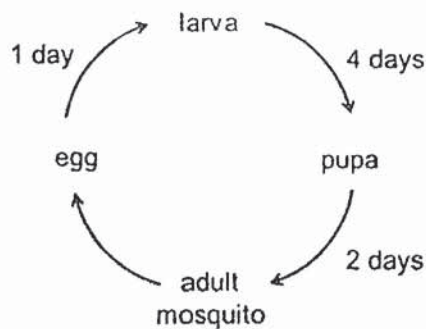


He placed the two beakers side by side in the garden and returned to check the results at the end of the experiment. There were no mosquito eggs, larva or pupa in both beakers at the start of the experiment. The results are recorded below.

Stage of mosquito	Number counted in beaker containing	
	water with chemical P	water
Egg	100	100
Larva	200	50
Pupa	300	50

- (a) Based on the results, what is the conclusion of Mr Lim's experiment? [1]

Mr Lim also studied the life cycle of the mosquito and recorded the number of days the mosquito took to develop from one stage to the other as shown.

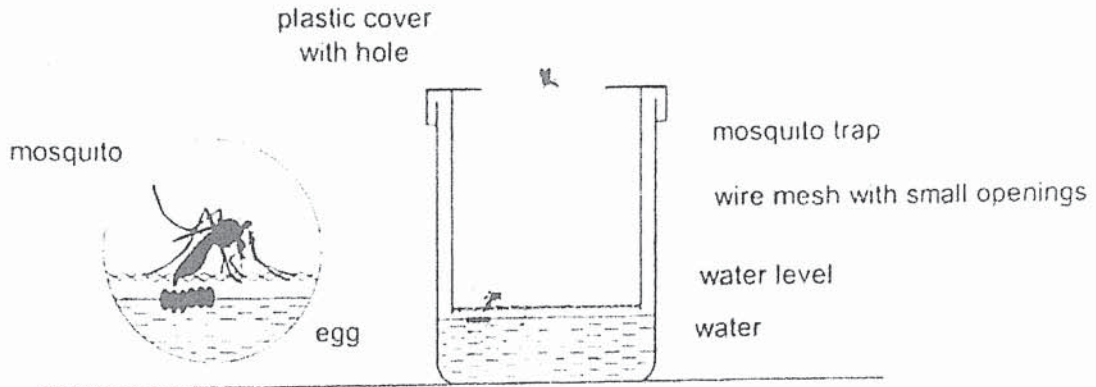


- (b) Based on the information above, what is the maximum number of days Mr Lim should conduct the experiment to ensure no pupa develops into an adult mosquito? [1]

Number of days: _____

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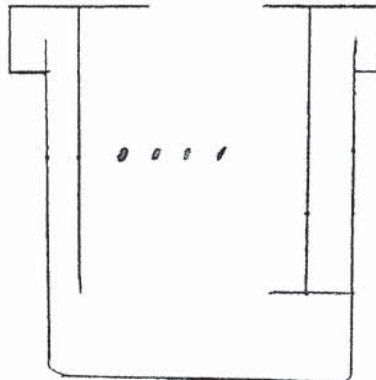
Mr Lim made a mosquito trap as shown. A hole is made at the top to allow mosquitoes to pass through. A wire mesh is positioned above the water and has small openings



- (c) Explain how the trap would help to reduce the number of mosquitoes in the surrounding area. [2]

Mr Lim placed the mosquito trap in the garden and noted that it collected rainwater when it rained.

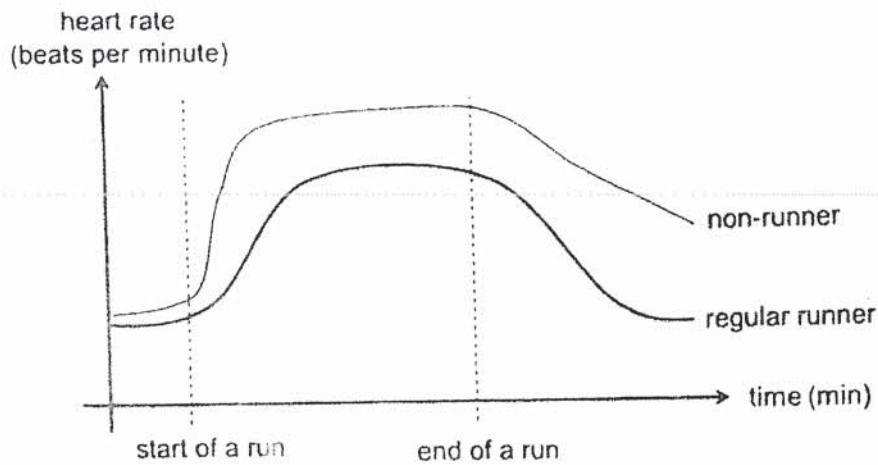
- (d) Explain how this makes the trap unsuitable for its use. You may use a diagram in your answer. [1]



(Go on to the next page)

Score	5
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- 32 Johnny investigated the heart rates of two participants, a regular runner and a non-runner, before, during and after a run.



- (a) Both the heart rates of the participants were higher during the run. Explain why. [2]

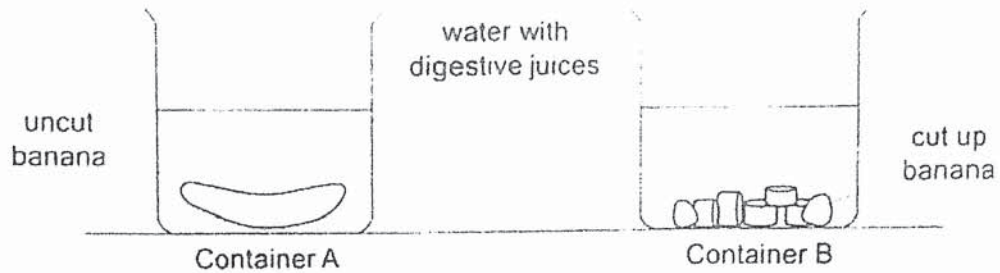
- (b) Based on the graph above, describe how the rate of gaseous exchange changed in the lungs from the start to the end of the run. [2]

- (c) Both the participants in Johnny's investigation were males. What would be one other characteristic to consider when selecting the participants so that the investigation would be a fair one? [1]

(Go on to the next page)

Score	5
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- 33 Mary conducted an experiment as shown. She placed a 50 g uncut banana into container A and a 50 g banana that was cut up into container B.



She then recorded the time taken to completely digest the banana in each container as shown.

Container	Time taken to completely digest the banana (min)
A	45
B	30

- (a) Based on the information given, what is the aim of Mary's experiment? [1]

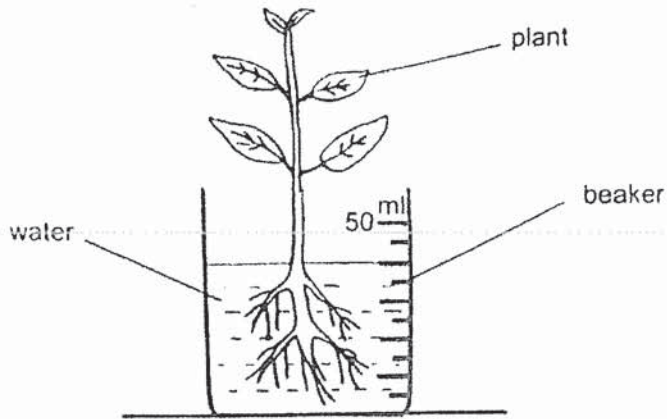
- (b) State how the digestive juices digest the banana. [1]

- (c) Why did the banana in container B take a shorter time to be digested? [1]

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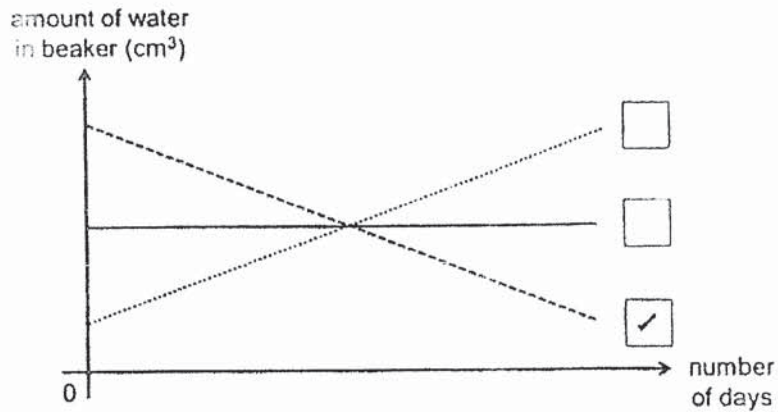
Score	3
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34 Siti placed a plant, as shown in the diagram, next to a window for one week.



She checked and recorded the amount of water left in the beaker daily.

- (a) Which line below correctly shows the change in the amount of water in the beaker? Put a tick (✓) in the correct box. [1]



- (b) What is photosynthesis? Explain how it caused the change in the amount of water during this experiment. [2]

- (c) Without changing any apparatus, suggest one way Siti can make to the set-up to ensure her results are accurate. [1]

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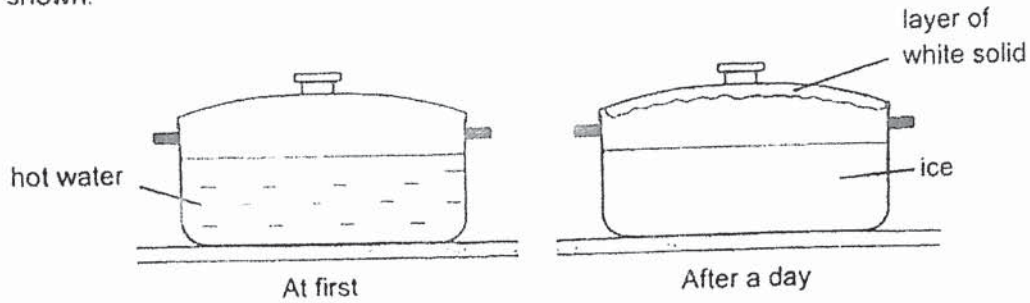
Score	4
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35 Mikael wanted to freeze some water.

(a) State what freezing means.

[1]

Mikael heated a pot of water and placed it in the freezer. After a day, he observed that the water had turned into ice and a layer of white solid had formed on the underside of the lid as shown.



(b) Explain how the layer of white solid was formed.

[2]

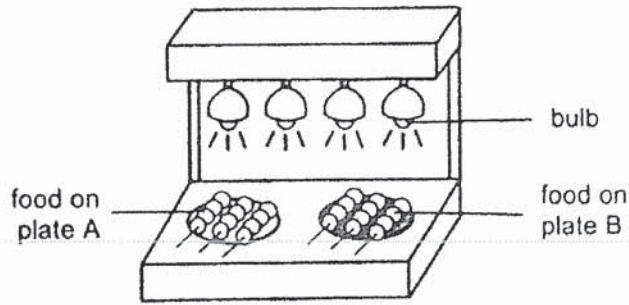
(c) Without changing the pot, suggest what Mikael can do at the start of the experiment if he wanted to form more white solid on the underside of the lid.

[1]

(Go on to the next page)

Score	4
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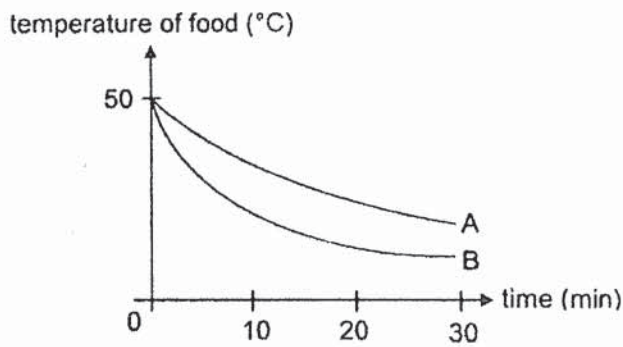
- 36 Helen used the set-up shown which consisted of four identical bulbs to keep food warm. When the brightness of the bulb increased, the amount of heat produced by it increased.



- (a) Which arrangement of the bulbs, series or parallel, would keep the food warmer? Give a reason why. [1]

- (b) Based on the arrangement of the bulbs stated in part (a), what would happen to the other bulbs when one bulb fused? [1]

The graph shows the change in the temperature of the food on plates A and B after the bulbs were switched off. The amount and type of food on the plates were the same.

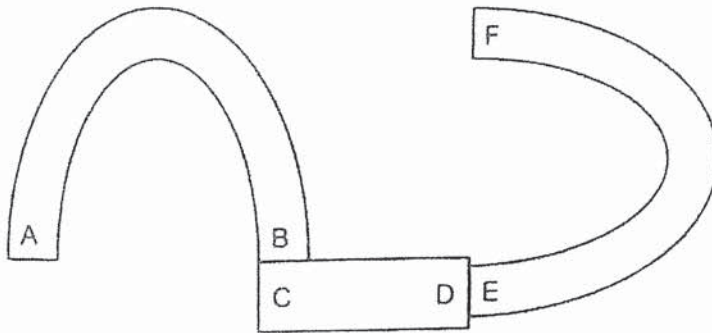


- (c) Explain which plate, A or B, was a poorer conductor of heat. [1]

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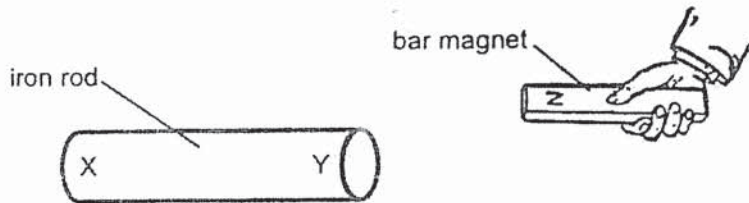
Score	3
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37 Two U-shaped magnets and a bar magnet with their poles marked A to F could be arranged as shown.



- (a) If the pole marked C is a North pole, state the pole for the following: [1]
- (i) A: _____ pole.
- (ii) F: _____ pole.

The diagram below shows an iron rod with two ends X and Y.

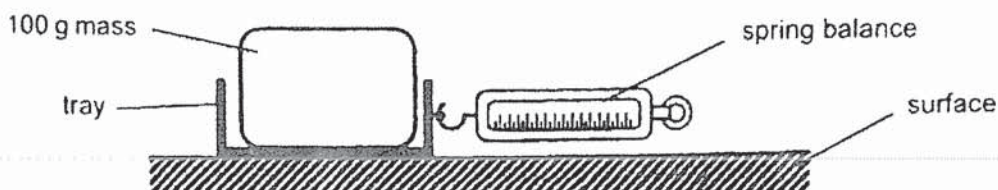


- (b) Using the North pole of a bar magnet, describe what you can do and the observation you can make in order to find out if the iron rod is a magnet. [2]

(Go on to the next page)

Score	3
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- 38 Ameen set up an experiment as shown. He placed a 100 g mass on a tray and pulled it using a spring balance.



He wanted to find out how the amount of base area of the tray in contact with the surface affected the force needed to move the tray across the surface. His results are as shown.

Amount of base area of tray (cm ²)	Force needed to move the tray across the surface (units)			Average force needed to move the tray across the surface (units)
	1 st try	2 nd try	3 rd try	
40	12.3	11.7	12.5	12
50	11.8	12.2	11.7	12
70	12.3	11.8	12.2	12

- (a) Why did Ameen carry out three tries with each tray? [1]

- (b) State two variables that Ameen must keep constant for his experiment. [2]

- (c) Predict the amount of force needed to move a tray with a base area of 60 cm² carrying the same 100 g mass. [1]

_____ units

Ameen raised the surface at one end by placing a book as shown below. He found that the force needed to move the tray across the surface had increased.

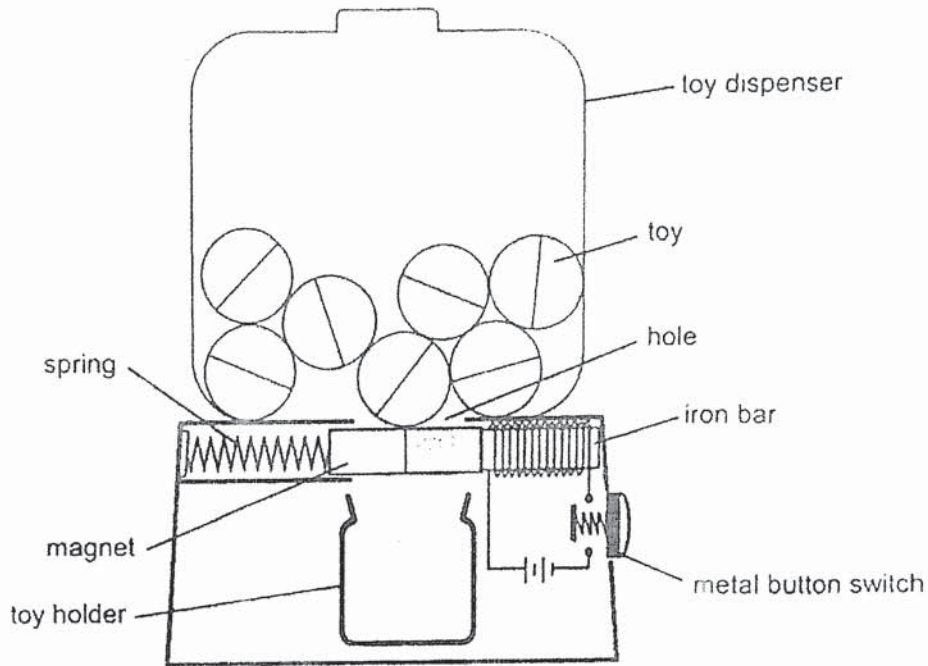


- (d) Explain in terms of forces, why is it so. [1]

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Score	5
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39 Uncle Tan owns a toy dispenser as shown. The iron bar and electrical circuit are fixed in place. The magnet is attached to a spring.



(a) Name the force(s) acting on the magnet when the switch is **not** pressed. [1]

(b) Explain how a toy can drop through the hole into the toy holder when the metal button switch is pressed. [2]

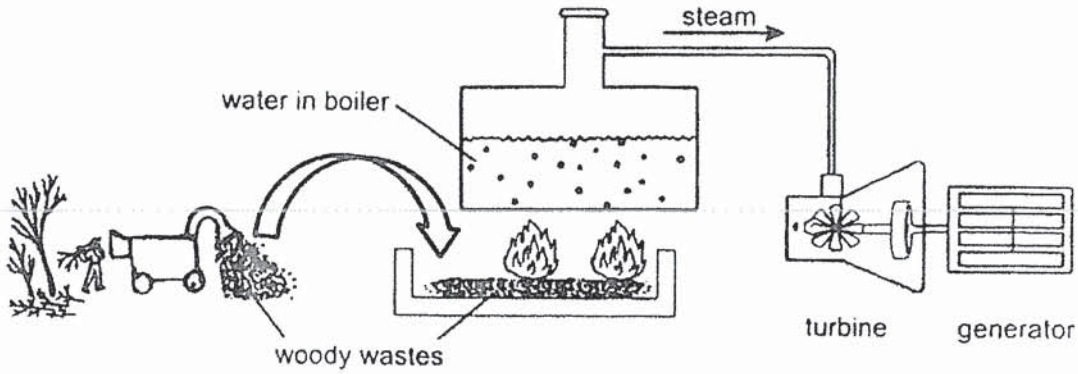
When the switch is released, the spring will push the magnet back to the right to close the hole.

(c) Uncle Tan wants to close the hole more quickly so that only one toy drops into the toy holder. Suggest a change that Uncle Tan can do to the set-up to ensure this. Explain your answer. [1]

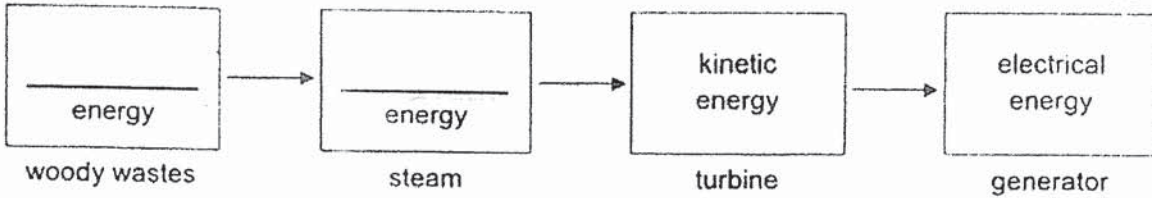
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Score	4
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40 The woody wastes around Singapore are collected and sent to an electrical power plant as shown.

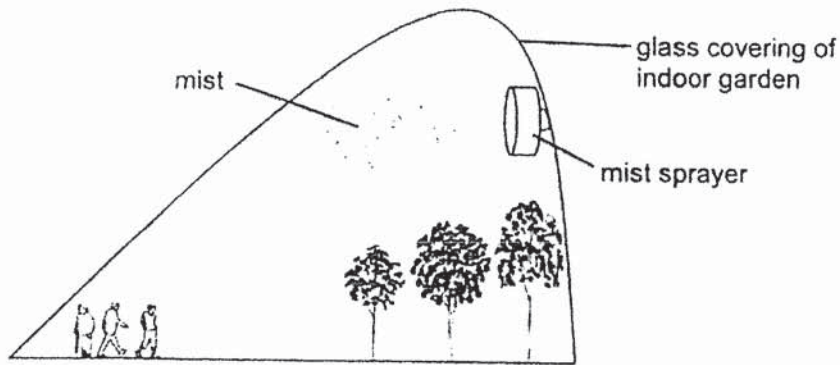


(a) Fill in the boxes below to complete the energy conversions taking place in the power plant. [1]



(b) State the advantage of using woody wastes as a source of energy. [1]

Some of the electrical energy generated by the power plant is used to operate a mist sprayer in an indoor garden. The mist produced helps to cool down the garden.



(c) Explain how the mist helps to cool down the garden. [1]

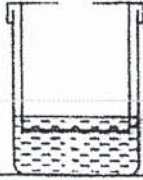
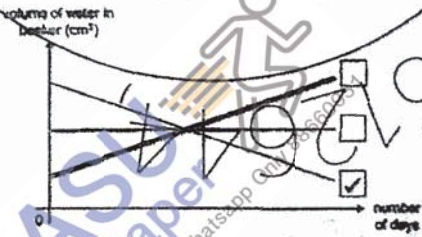
End of Paper

Score	3
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ACS(P) 2021 Science Preliminary Correction Template

Q1	1	Q2	1	Q3	3	Q4	2	Q5	1
Q6	3	Q7	4	Q8	1	Q9	3	Q10	3
Q11	3	Q12	2	Q13	3	Q14	3	Q15	4
Q16	1	Q17	3	Q18	1	Q19	1	Q20	2
Q21	3	Q22	2	Q23	3	Q24	1	Q25	4
Q26	4	Q27	4	Q28	3				

Qn	Acceptable Responses				
29	X: <u>Insect</u> Y: Does it have <u>feathers</u> ?				
30(a)	<table border="1"> <tr> <td>Wind</td><td>Animal</td></tr> <tr> <td>X, Y</td><td>W, Z</td></tr> </table>	Wind	Animal	X, Y	W, Z
Wind	Animal				
X, Y	W, Z				
30(b)	X produces <u>many spores</u> each time.				
30(c)	To reduce <u>overcrowding</u> and the young need not <u>compete</u> with the parent plant for sunlight, <u>water</u> , <u>minerals</u> and space.				
31(a)	Water with chemical P attracted <u>more</u> mosquitoes to lay eggs than water without chemical P.				
31(b)	S. <u>6</u> OR <u>7</u>				
31(c)	Mosquitoes will lay <u>eggs</u> in the water inside the <u>trap</u> . <u>Adults</u> that developed are <u>too big</u> to <u>escape</u> through the wire mesh and <u>cannot</u> fly away.				

31(d)	 <p>Water level <u>high</u> than wire mesh</p> <p>Adults that developed is <u>not trapped</u> by wire mesh and can fly away from trap.</p>
32(a)	Both participants need <u>more</u> energy, so their heart <u>pumps faster</u> to transport <u>blood</u> with <u>oxygen</u> and digested <u>food</u> around the body faster.
32(b)	Rate of gaseous exchange <u>increase</u> at the start of the run, and stayed at <u>maximum</u> at the end of the run.
32(c)	Participants of the same <u>age</u> .
33(a)	To find out if a larger (exposed) surface area in <u>Contact</u> with digestive juices will digest the banana <u>faster</u> .
33(b)	The digestive juices break <u>down</u> the bananas into simple <u>substances</u> .
33(c)	The smaller bananas pieces have a <u>larger</u> (exposed) surface area in <u>Contact</u> with the digestive juices to be digested faster.
34(a)	
34(b)	<p>A process where plants take in <u>water</u>, <u>Carbon Dioxide</u> and <u>Light</u> trapped by chlorophyll to produce sugar/ <u>food</u> and <u>oxygen</u>.</p> <p>The roots <u>absorb</u> water for the plant to carry out photosynthesis.</p>

34(c)	Add a layer of <u>oil</u> into the beaker OR <u>Cover</u> the beaker
35(a)	A process of <u>liquid</u> losing heat and changing into <u>solid</u> state at a fixed <u>temperature</u> .
35(b)	The hot water <u>evaporates</u> into water vapour which <u>condenses</u> on the cooler underside of the lid into water droplets. The water droplet <u>lose heat</u> and <u>freezes</u> into ice which is the white solid.
35(c)	Heat the water to a higher <u>temperature</u> (before placing in the freezer).
36(a)	Parallel (read on) as the bulbs are <u>brighter</u> and will produce <u>more</u> heat.
36(b)	The other bulbs will <u>remain</u> lit.
36(c)	A (read on), as the temperature of the food on plate A decreases <u>slower</u> , heat is lost more <u>slowly</u> from it.
37(a)	(I) A: <u>North</u> (II) F: <u>South</u>
37(b)	Bring the North pole of the bar magnet and bring it <u>near both</u> ends of the iron rod. If one of the ends of the iron rod <u>repel</u> the North Pole of the magnet shows that the iron rod is also a magnet.
38(a)	To ensure the results are <u>reliable</u> . Other Acceptable Answers: To reduce human error.
38(b)	(Any two) Weight / Mass of mass, Type of spring balance, (Type / Material of) surfaces, Type / Material / Mass of tray, Speed / Angle of pull.
38(c)	<u>11.7</u> or 12.5 (any number with 0 or 1 decimal place)

38(d)	The force is needed to pull the tray/mass (in the direction) <u>against</u> gravity. Other Acceptable Answers: A (greater) force is needed to pull the tray/mass in the <u>opposite</u> direction as gravity.
39(a)	<u>Gravitational</u> force and <u>Elastic Spring</u> force.
39(b)	The circuit will be <u>Closed</u> and the iron bar becomes an <u>electromagnet</u> and <u>repels</u> the magnet as the like poles are facing each other. Magnet moves to the <u>left</u> . The hole is opened.
39(c)	Use a <u>Stiffer</u> spring to push the magnet (back) <u>fast</u> / with greater elastic spring force.
40(a)	(chemical) potential → <u>Kinetic</u>
40(b)	It is a <u>renewable</u> source of energy.
40(c)	The mist / water droplets <u>gains</u> heat from the (warmer surrounding) air and <u>evaporates</u> .