

PRIMARY 6 MID-YEAR EXAMINATION 2022

Name : _____ ()

Date: 12 May 2022

Class : Primary 6 ()

Time: 8.00 a.m. - 9.45 a.m.

Duration: 1 hour 45 minutes

SCIENCE BOOKLET A

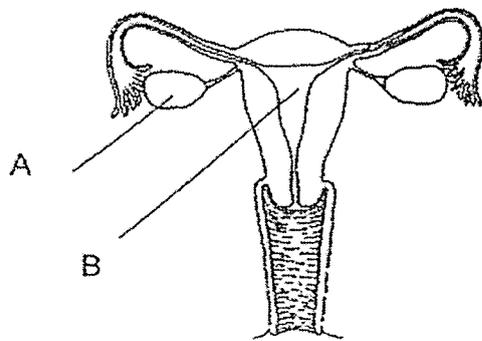
INSTRUCTIONS TO CANDIDATES

1. Write your name, class and register number.
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 answers ● on the Optical Answer Sheet (OAS) provided.

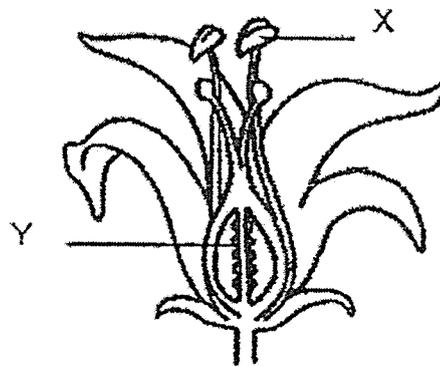
Booklet A (28 x 2 marks)

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. Study the diagrams below carefully.



human reproductive system

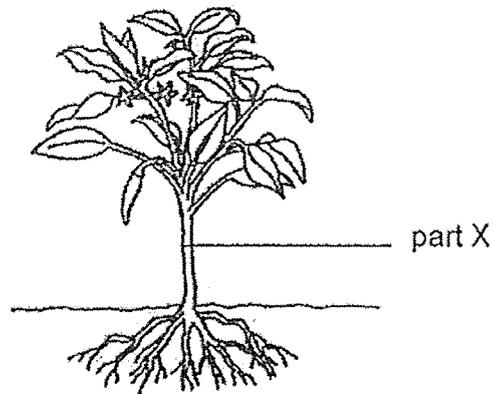


plant reproductive system

Which of the following parts of these reproductive systems perform the same function(s)?

- (1) A and X
- (2) A and Y
- (3) B and X
- (4) B and Y

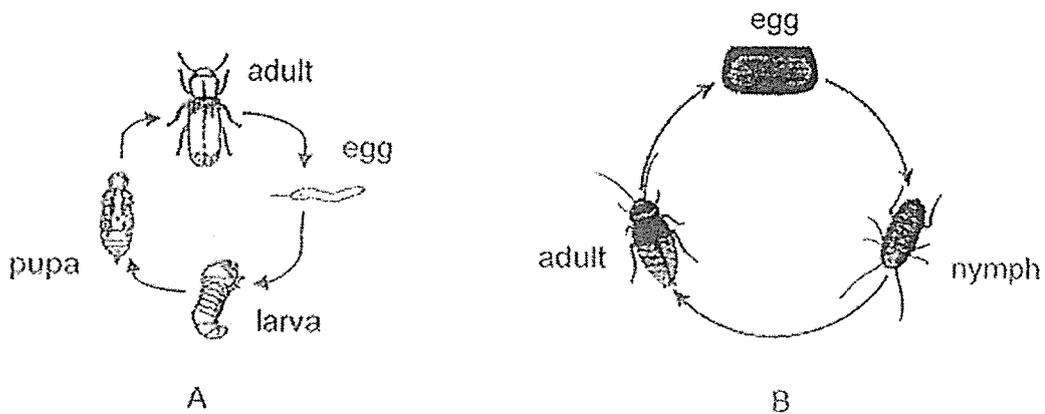
2. The diagram below shows a plant.



Which of the following about part X is correct?

- (1) It makes food for the plant.
- (2) It anchors the plant firmly to the ground.
- (3) It absorbs water and mineral salts from the soil.
- (4) It transports water and mineral salts to all parts of the plant.

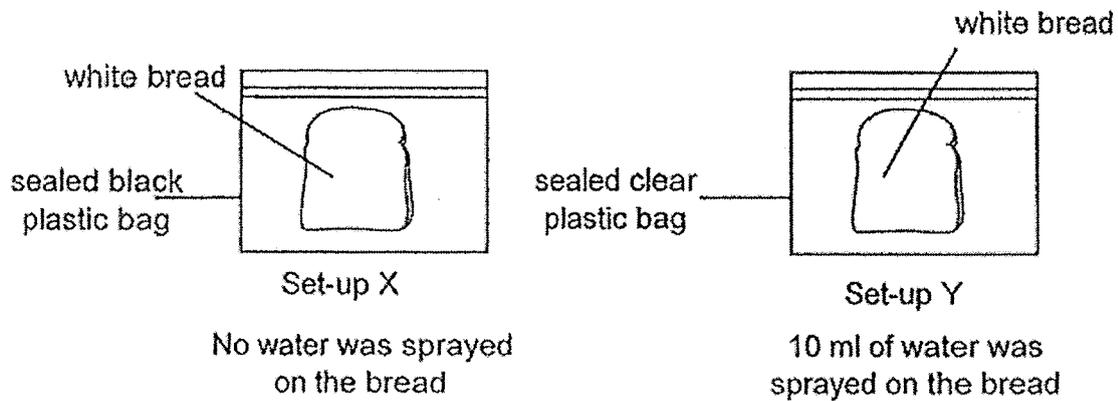
3. The diagrams below show the life cycles of two insects, A and B.



Which of the following statements is true about the life cycles of both insects?

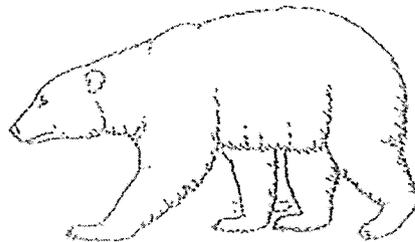
- (1) A has an egg stage while B does not.
- (2) A has a pupal stage while B does not.
- (3) Both A and B have a four-stage life cycle.
- (4) Both the young of A and B look like their adults.

4. Siti wanted to find out if moisture was needed for mould to grow. She set up the experiment as shown below.



To ensure a fair test, which of the following variables should have been kept the same?

- (1) Type of bread
 - (2) Amount of air received by the mould
 - (3) Amount of light received by the mould
 - (4) Amount of water received by the mould
5. Study the diagram of Animal P below.

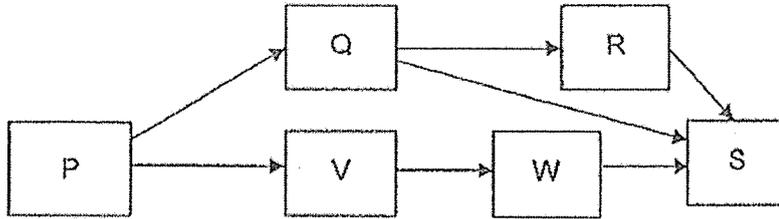


Animal P

Which of the following is a behavioural adaptation that helps it to survive in a cold environment?

- (1) Its thick fur helps to trap air to keep it warm.
- (2) Its layer of fat under the skin keeps itself warm.
- (3) It digs dens to protect itself from the cold winds.
- (4) Its small ears reduce heat loss to the environment.

Refer to the food web below for questions 6 and 7.



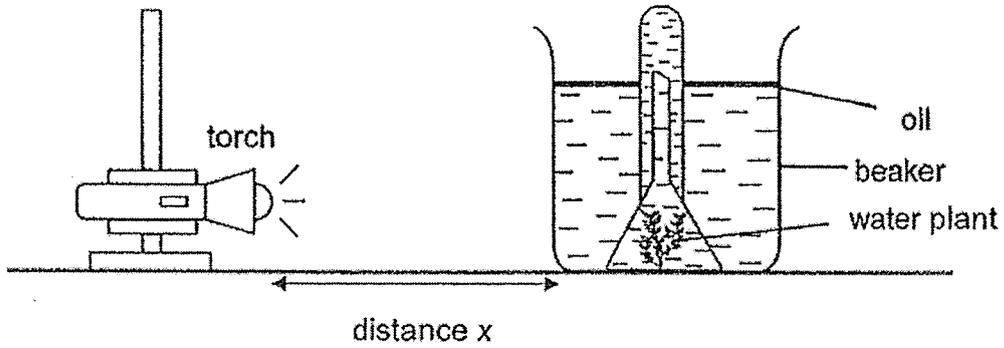
6. Which of the following statements is true of the food web shown above?

- (1) S is a food producer.
- (2) Q and V are plant-eaters.
- (3) Q is a predator of R and S.
- (4) Only S and W are animal-eaters.

7. If the population of V increases quickly, which of the following below correctly shows the immediate changes in the populations of W and S?

	W	S
(1)	decreases	decreases
(2)	decreases	increases
(3)	increases	decreases
(4)	increases	increases

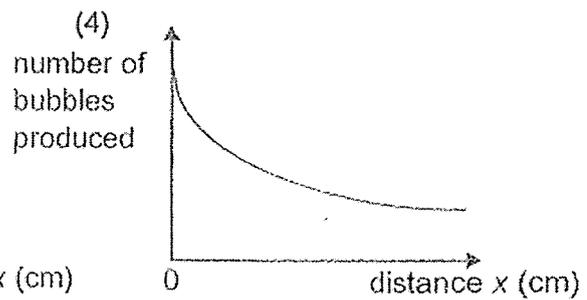
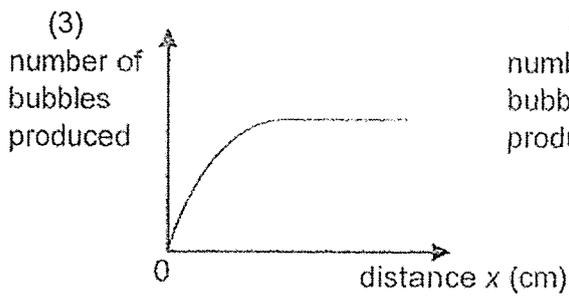
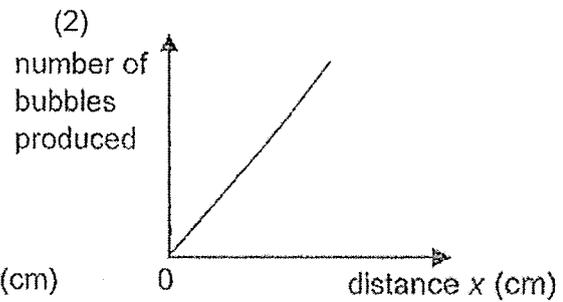
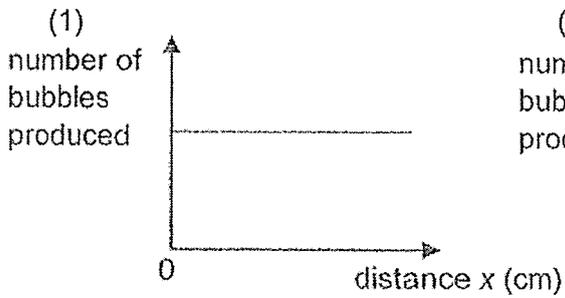
8. Gary conducted an experiment on photosynthesis using the set-up below.



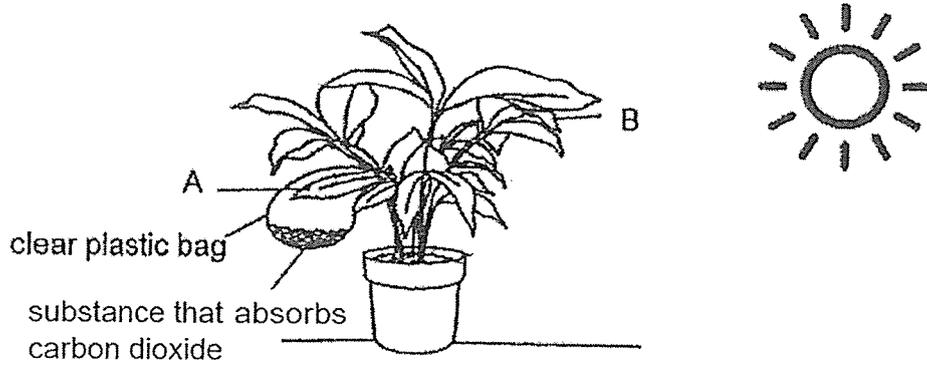
He placed the torch at a distance x from the beaker and counted the number of bubbles produced for ten minutes.

He repeated his experiment by increasing distance x , by 5 cm each time.

Which of the following graphs correctly show the results of the experiment?

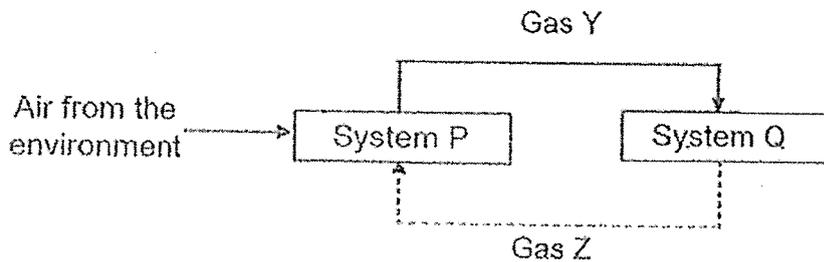


9. Ravi placed a pot of plant in the field. He watered the plant daily. Two days later, he plucked out leaves A and B and tested them for starch.



What is the aim of Ravi's experiment?

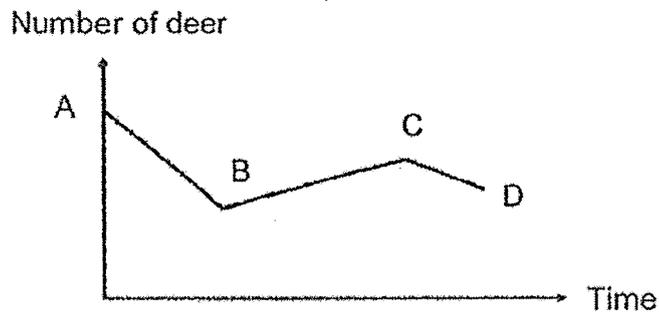
- (1) To find out if plants need water to make food.
 - (2) To find out if plants need sunlight to make food.
 - (3) To find out if plants need chlorophyll to make food.
 - (4) To find out if plants need carbon dioxide to make food.
10. The diagram below shows how substances are transported in the human body through systems P and Q. Gases Y and Z are exchanged between systems P and Q.



Which of the following best represents P, Q, Y and Z?

	P	Q	Y	Z
(1)	respiratory	circulatory	oxygen	carbon dioxide
(2)	respiratory	circulatory	carbon dioxide	oxygen
(3)	circulatory	respiratory	oxygen	carbon dioxide
(4)	circulatory	respiratory	carbon dioxide	oxygen

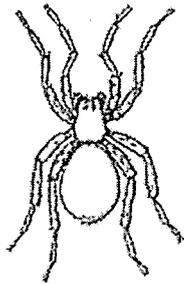
11. The graph below shows the number of deer on a grassland over time.



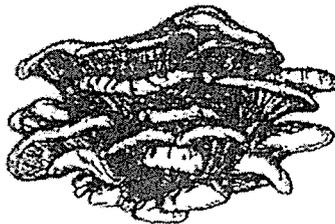
Based on the graph, which of the following is a possible reason for the change in the number of deer from period A to D?

- (1) A disease affected the deer population from period B to C.
- (2) The grassland was cleared to build houses from period C to D.
- (3) There was an increase in the population of grass from period C to D.
- (4) The number of predators feeding on the deer decreased from period A to B.

12. The diagrams below show some organisms in a community.



spider



bracket fungus

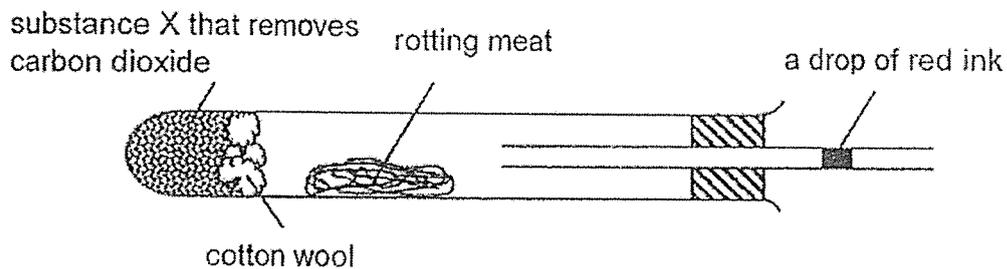


fern

Which community do these organisms belong to?

- (1) tree
- (2) field
- (3) leaf litter
- (4) seashore

13. 1 Study the diagram below.



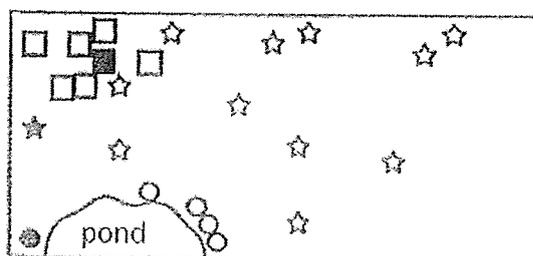
After 5 hours, the drop of ink moved towards the rotting meat. Explain why.

- (1) The rotting meat absorbed nitrogen.
- (2) The rotting meat gave out water vapour.
- (3) The rotting meat gave out carbon dioxide.
- (4) The rotting meat absorbed oxygen in the air.

14. The table below shows the characteristics of fruits A, B and C.

Fruits	Characteristic of fruit
A	Has stiff hair
B	Has fibrous husk
C	Has a pod

The diagram below shows the dispersal patterns of the fruits A, B and C.

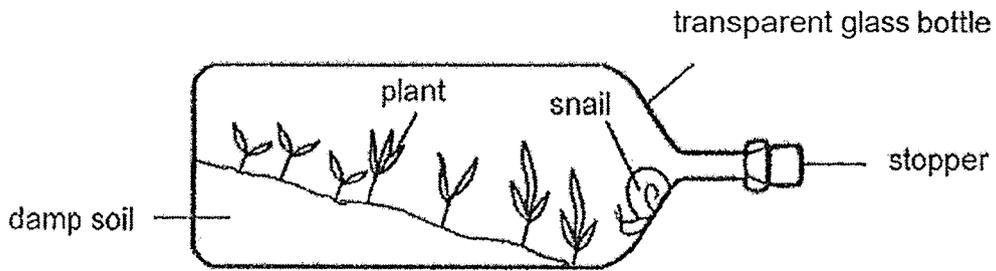


Key:	■	★	●	parent plant
	□	☆	○	young plant

Which of the following matches the dispersal patterns with the characteristics of fruits A, B and C?

	■	★	●
(1)	B	A	C
(2)	C	B	A
(3)	C	A	B
(4)	A	C	B

15. Andrew placed the following set-up in the garden.



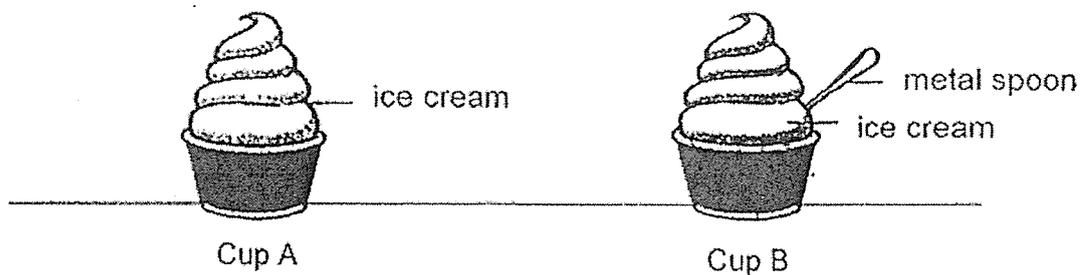
After five days, he observed that the snail and the plants are still alive. However, the number of plants decreased.

Which of the following statements most likely explains his observations?

- (1) The plant is a source of food for the snail.
 - (2) The snail obtained energy directly from the Sun.
 - (3) The plant obtained energy indirectly from the Sun.
 - (4) The snail provided oxygen for the plants to make food.
16. Substance P freezes at 41°C and boils at 173°C .
- Which of the following shows the correct state of substance P at 75°C and 250°C ?

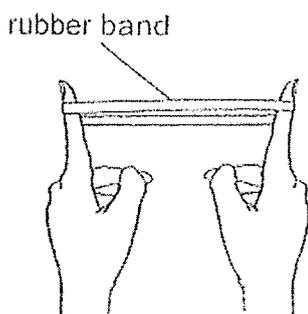
State of substance P at		
	75°C	250°C
(1)	solid	liquid
(2)	solid	solid
(3)	liquid	gas
(4)	liquid	liquid

17. Mary placed two similar cups of ice cream in the living room as shown below. She added a metal spoon into the ice cream in cup B.



Which of the following statements is true?

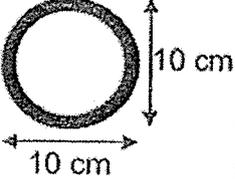
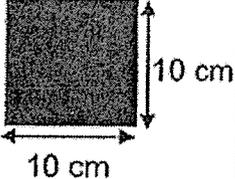
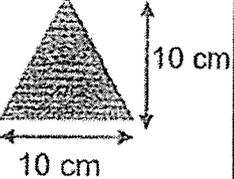
- (1) Only the ice cream in cup A will melt.
 - (2) The ice cream in cup B will melt faster.
 - (3) Both cups of ice cream will melt at the same rate.
 - (4) The coldness from the ice cream in cup B will travel to the spoon.
18. Zachary stretched a rubber band as shown below.

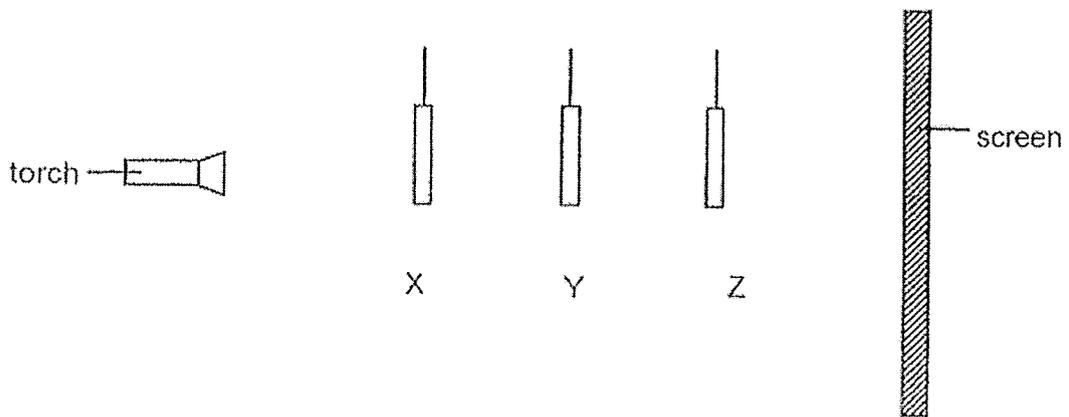


Which of the following force(s) was/ were present?

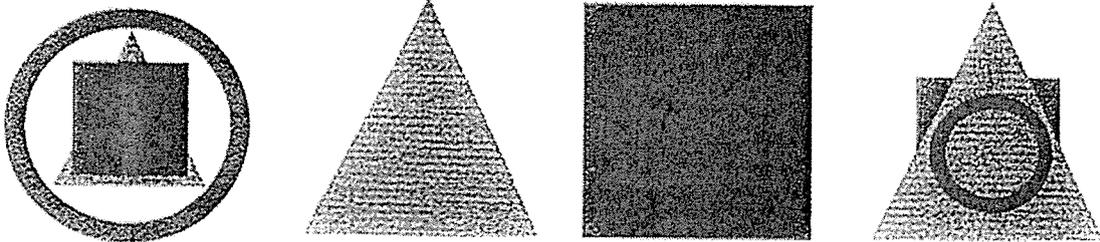
- (1) Elastic force only
- (2) Frictional force only
- (3) Gravitational force and elastic force
- (4) Frictional force, gravitational force and elastic force

19. Three objects made of different materials and different shapes, are arranged in a straight line at positions X, Y and Z in a dark room as shown below.

Objects			
Material	Wood	Ceramic	Frosted Glass



Which of the following are possible shadows that can be cast on the screen when the torch is switched on?



A

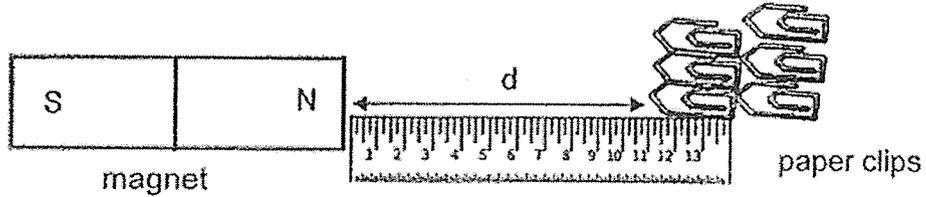
B

C

D

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

20. Bala placed 4 magnets, P, Q, R and S, at various distances from some paper clips as shown in the diagram below.



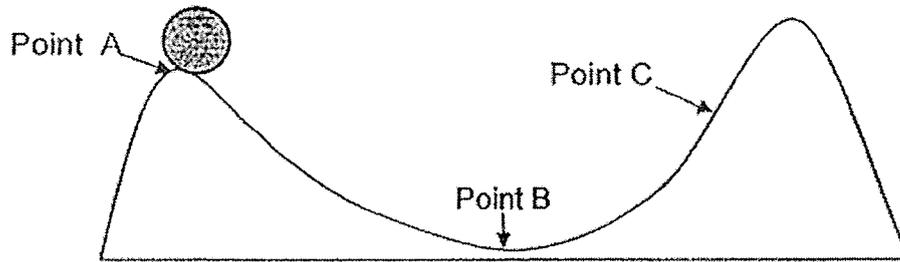
He recorded the number of paper clips each magnet attracted when placed at a distance, d , from the paper clips in the table below.

Magnet	d (cm)	Number of paper clips attracted by the magnet
P	7	8
Q	4	6
R	7	6
S	11	8

Which of the following shows the correct order of the magnetic strength of the magnets from the strongest to the weakest?

	Strongest \longrightarrow Weakest			
(1)	S	R	P	Q
(2)	S	P	R	Q
(3)	Q	R	P	S
(4)	S	P	Q	R

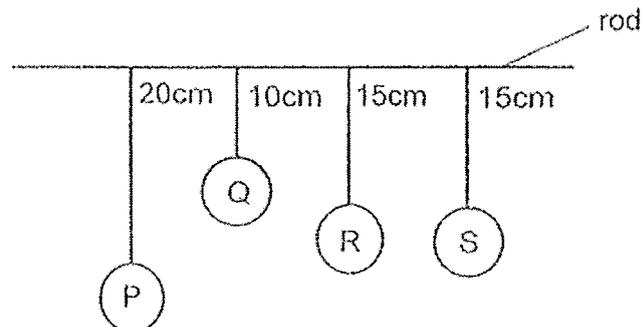
21. A ball was released at point A and it rolled to point C before rolling back towards point A.



Which of the following correctly shows the changes in the potential energy and kinetic energy of the ball as it rolls from point A to point C?

	Change in potential energy from A to B	Change in kinetic energy from B to C
(1)	decrease	decrease
(2)	decrease	increase
(3)	increase	increase
(4)	increase	decrease

22. Lily hung four identical balls, P, Q, R and S, of the same size and mass with strings of different length as shown below.

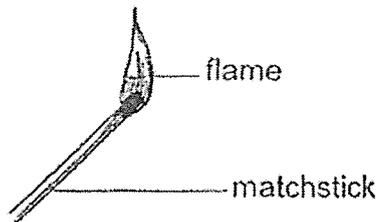


Which of the following statements is/ are true?

- A: Ball P possesses more potential energy than Ball S
- B: Ball Q possesses more potential energy than Ball R.
- C: Ball R and S possess the same amount of potential energy.

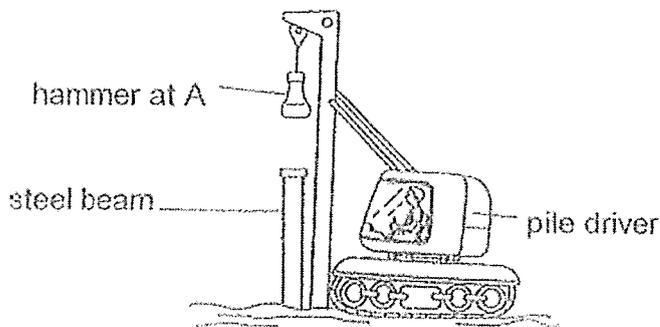
- (1) A only
- (2) A and B only
- (3) B and C only
- (4) A, B and C

23. The picture below shows the burning of a matchstick.



Which of the following correctly shows the conversion of energy during the burning of the matchstick?

- (1) potential energy \rightarrow light energy
 - (2) heat energy \rightarrow light energy \rightarrow potential energy
 - (3) potential energy \rightarrow kinetic energy \rightarrow heat energy
 - (4) potential energy \rightarrow heat energy + light energy
24. The diagram below shows a pile driver. It is a machine that pushes a beam into the ground. The hammer is raised to A and dropped onto the steel beam several times until the beam is driven to the ground.



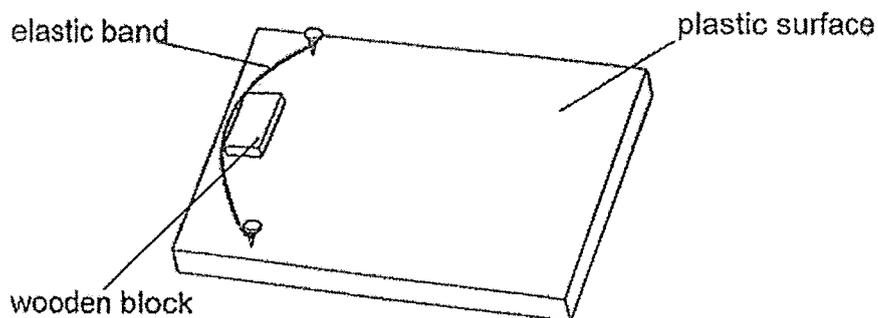
Three students observed a pile driver and made the following statements based on their observations of the hammer.

- Aini: The hammer possesses gravitational potential energy when it is at A.
Bala: The hammer possesses both kinetic energy and gravitational potential energy when it is falling.
Gaya: When the hammer is released from A and hits the steel beam, all of its gravitational potential energy will be converted to kinetic energy.

Who had made the correct statement(s)?

- (1) Aini only
- (2) Aini and Bala
- (3) Bala and Gaya
- (4) Aini, Bala and Gaya

25. Jing Wen conducted an experiment to find out which liquids, P, Q, R or S, is best able to reduce friction between a wooden block and a plastic surface. She applied a thin layer of liquid P on the plastic surface, in the set-up below. She then stretched the elastic band by 2 cm from its original position. She released the block and measured the distance it moved before coming to a stop.



She repeated the experiment with liquids Q, R and S. The table below shows the results of her findings.

Liquid	P	Q	R	S
Distance moved by the block (cm)	9	19	27	33

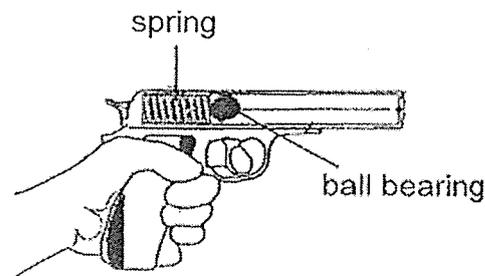
Based on the results, which of the following statements is true?

- (1) Liquid P reduces the most friction between the block and the surface.
- (2) Liquid S reduces the least friction between the block and the surface.
- (3) There is no friction between the block and the surface when liquid S is used.
- (4) There is more friction between the block and the surface when Q is used compared to R.

26. Melanie conducted an experiment to find out how much springs X and Y can compress with different masses added on it. She recorded her readings in the table as shown below.

Mass of load (g)	Length of Spring X (cm)	Length of Spring Y (cm)
0	10	10
300	8	9
600	6	8
900	4	7

Melanie has a toy gun that uses a compressed spring to shoot out the ball bearing.



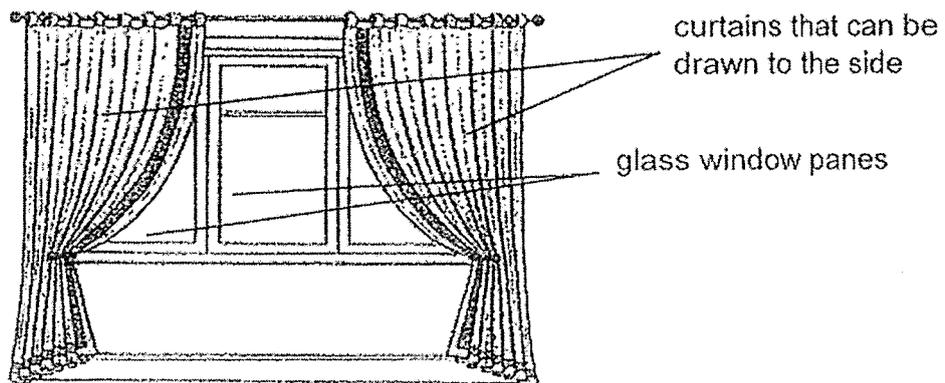
Based on the results above, which spring, X or Y, should Melanie choose to install in her toy gun to shoot the ball bearing further? Which of the following reasons correctly explains why?

	Spring	Reason
(1)	X	Spring X is stiffer than Spring Y.
(2)	Y	Spring Y is stiffer than Spring X.
(3)	Y	Spring Y needs less force to compress to the same length as Spring X.
(4)	X	Spring X compresses more when the same mass of load is placed on it.

27. The table below shows the properties of 3 materials, X, Y and Z.

Properties of the materials	Materials		
	X	Y	Z
Flexible	Yes	No	No
Waterproof	No	No	Yes
Allow light to pass through	No	No	Yes

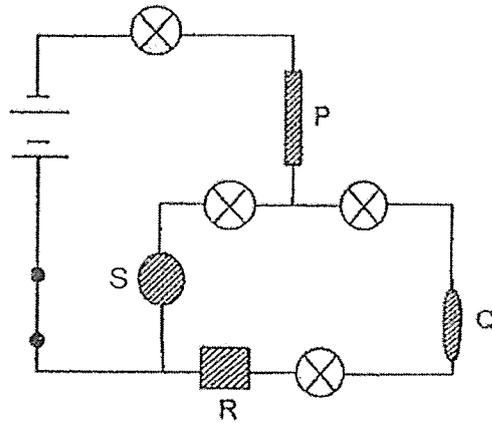
Adeline wants to choose materials for the curtains and window panes in her bedroom as shown below.



Which materials must she choose to be able to most effectively control the amount of light entering her room?

	Window Panes	Curtains
(1)	Y	X
(2)	Z	Y
(3)	Z	X
(4)	X	Z

28. Four materials, P, Q, R and S were connected in the circuit shown below.



When the switch is closed, only 3 bulbs lit up. Which one of the materials, P, Q, R or S is an electrical insulator?

- (1) P
- (2) Q
- (3) R
- (4) S

End of Booklet A



PRIMARY 6 MID-YEAR EXAMINATION 2022

Name : _____ ()

Date: 12 May 2022

Class : Primary 6 ()

Time: 8.00 a.m. – 9.45 a.m.

Parent's Signature : _____

Duration: 1 hour 45 minutes

SCIENCE

BOOKLET B

INSTRUCTIONS TO CANDIDATES

1. Write your name, class and register number.
2. Do not turn over this page until you are told to do so.
3. Follow all instructions carefully.
4. Answer all questions.
5. Use a dark blue or black ballpoint pen to write your answers in the space provided for each question.
6. Do not use correction fluid/tape or highlighters.

Booklet A	56
Booklet B	44
Total	100

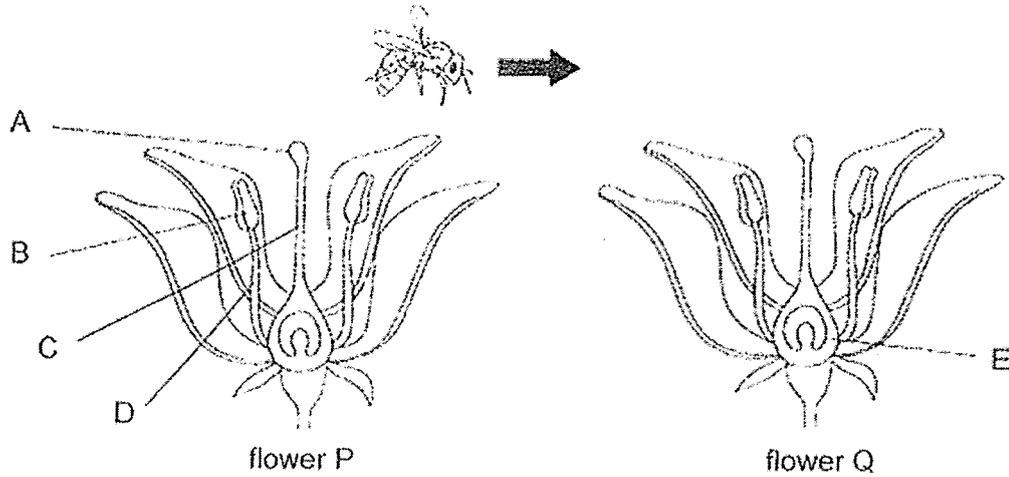
Booklet B (44 marks)

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

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

(44 marks)

29. A bee carried pollen grains from flower P to flower Q as shown below.



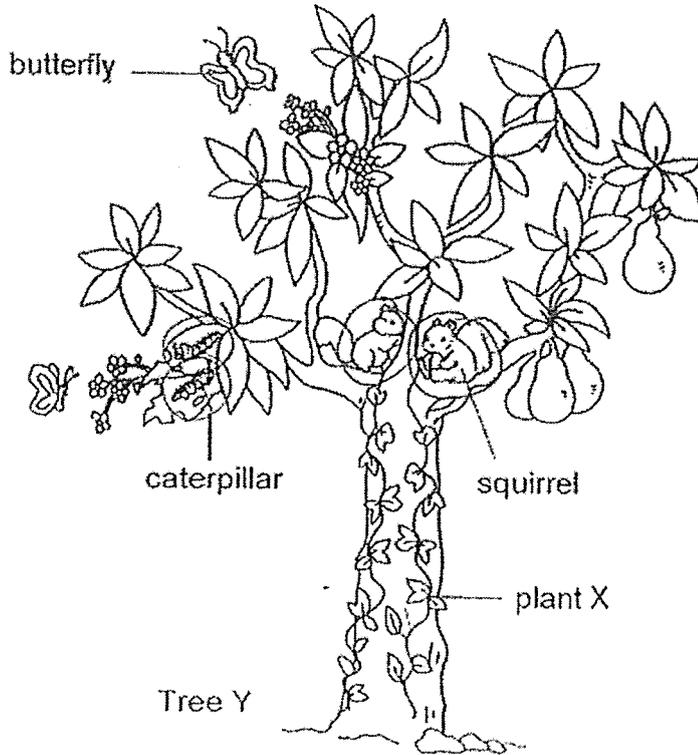
(a) Which part of the flower, A, B, C, or D, were the pollen grains obtained from? [1]

(b) If part E is removed from flower Q, reproduction will not take place. Give a reason why the plant cannot reproduce. [1]

(c) Why is reproduction important? [1]

Score	3
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30. The diagram below shows a single tree community.



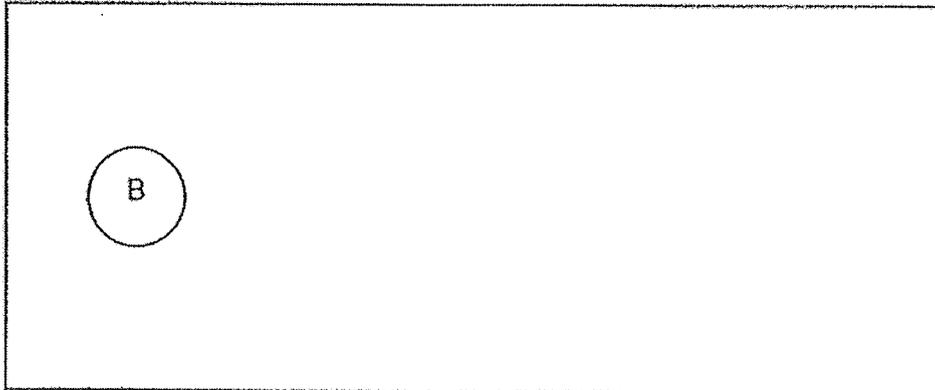
(a) How many populations can be found in the single tree community shown above. [1]

(b) Kim sprayed pesticide on the tree to kill the caterpillars so that she can have sweeter fruits. Explain why sweeter fruits can be produced. [2]

Score	3
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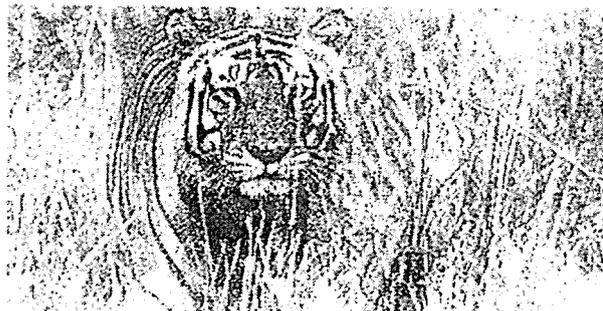
31. A, B, C, D, and E are five organisms living in the same community. Some information about them are given below.
- A eats plants only.
 - B is a food producer.
 - C is a predator of E.
 - D eats both A and B.
 - E eats both A and D.

(a) Based on the information given above, construct a food web in the box below. B has been drawn for you. [2]



(b) Another prey of D is introduced into the community. What will happen to the population of E? Explain your answer. [2]

To hunt for its prey, organisms C has striped fur to help it blend in with the tall grass.



(c) State whether this adaptation is structural or behavioural. [1]

Score	5
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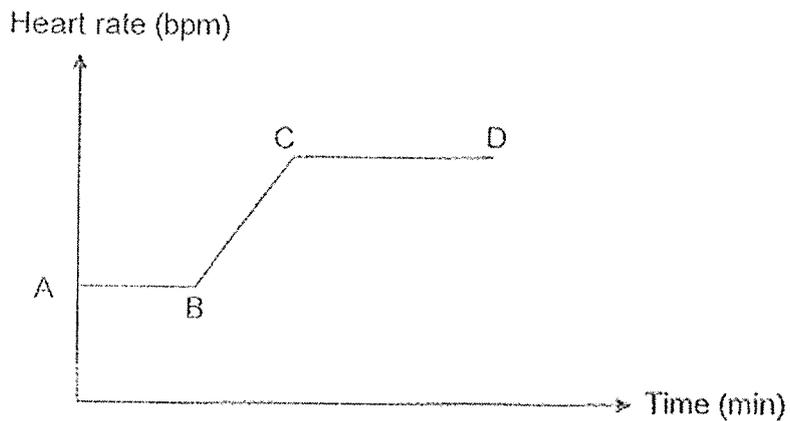
32. Yasmin wanted to find out how swimming affects the heart rate. The table below shows the heart rates of Yasmin and her two friends before and immediately after swimming.

Student	Heart rate before swimming (bpm)	Heart rate immediately after swimming (bpm)
Yasmin	91	144
Wendy	85	137
Xavier	70	130

- (a) What can be concluded from the above results? [1]

- (b) What is a possible heart rate of Yasmin after she had stopped swimming and rested for 5 minutes? [1]

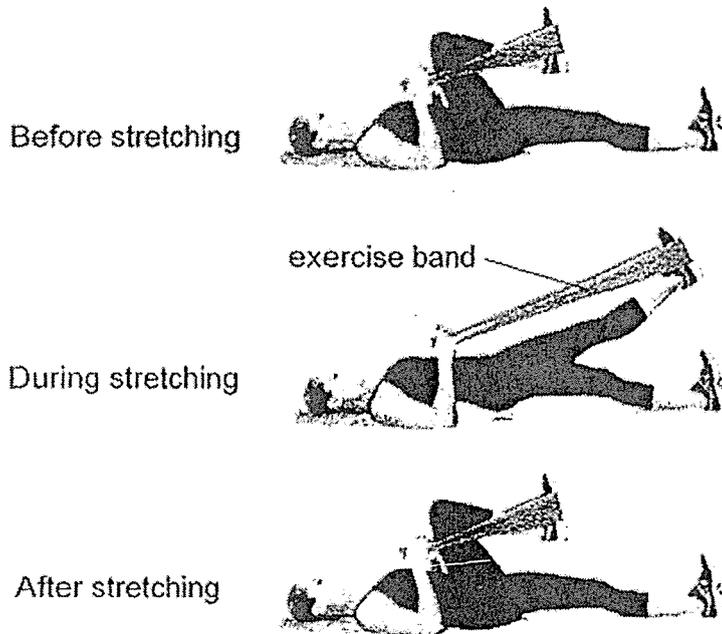
The graph below shows Yasmin's heart rate while she was at the swimming pool.



- (c) At which point in the graph did Yasmin start swimming? Explain your answer. [2]

Score	4
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33. Melissa uses an exercise band to help her to do stretching exercises.



The table below shows the properties of materials A, B, and C. A tick (✓) indicates that the material has that property.

Material	Flexible	Waterproof	Strong
A	✓	✓	
B	✓		✓
C		✓	✓

(a) Based on the table above, which material, A, B, or C, is most suitable to make the exercise band? State two properties of the material and explain why. [2]

Material _____ is most suitable to make the exercise band.

1) _____

2) _____

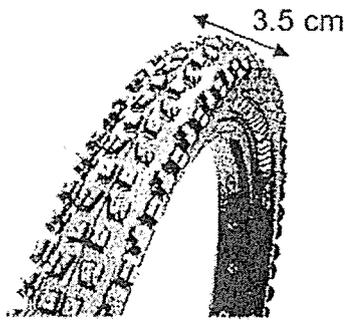
Score	2
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(b) The exercise band must also be elastic. Explain why.

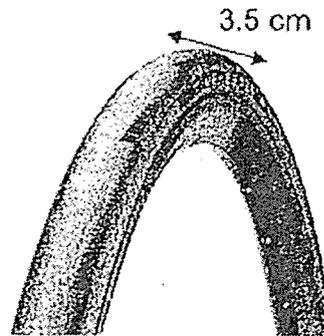
[1]

Score	1
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34. Imran has two bicycles that use similar-sized tyres with different thread patterns. Both tyres have the same mass and width. The diagram below shows the tyre tread patterns of his bicycles.



tyre of bicycle A

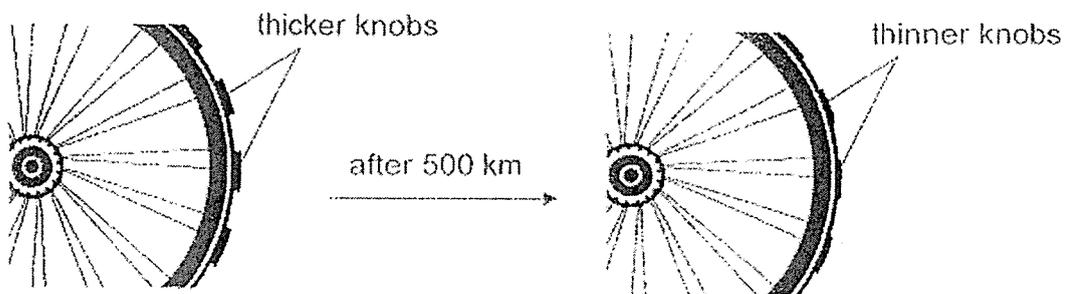


tyre of bicycle B

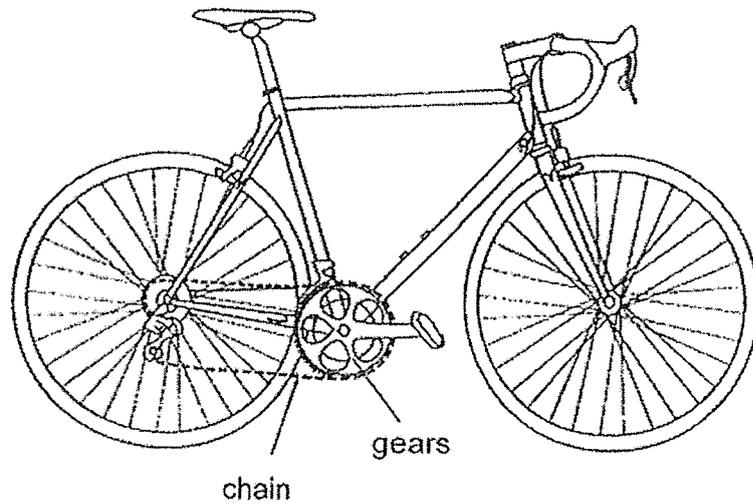
- (a) Which bicycle should Imran choose if he wants to cycle on a rocky mountain path without slipping? Explain your answer. [1]

- (b) Explain why Imran found it more difficult to cycle up the mountain than down the mountain. [1]

After cycling 500 km, Imran noticed some changes to the tyres of his bicycle.

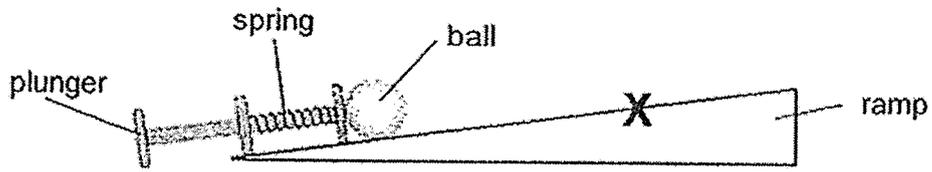


- (c) Explain why the knobs were no longer as thick as before. [1]



- (d) The chain on his bicycle could not turn smoothly when moving over the gears. What could Imran do to reduce the friction so that the chain turns smoothly when he pedals? [1]
-

35. The diagram below shows a ball launcher. When De Ming pulls the plunger back by 5 cm and releases it, the ball rolled to point X on the ramp.

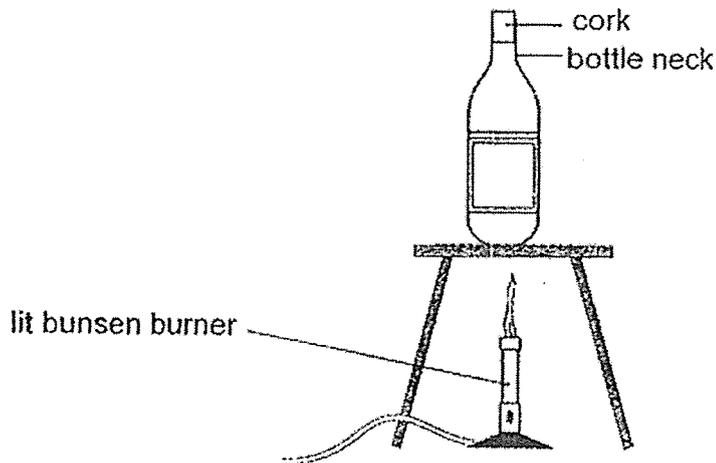


- (a) When the ball reached point X, it rolled back towards the launcher. What caused this to happen? [1]

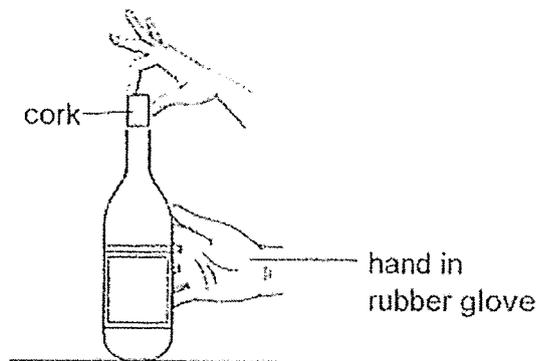
- (b) Using the same set-up, what should De Ming do if he wants the ball to roll beyond point X? Explain your answer in terms of forces. [2]

Score	3
-------	---

36. The picture below shows an empty wine bottle. The cork is stuck at the neck of the wine bottle. Tom placed the bottle over a lit bunsen burner as shown below.



After 2 minutes of heating, the cork was seen moving up the neck of the bottle. Then, Tom could remove the cork from the bottle.

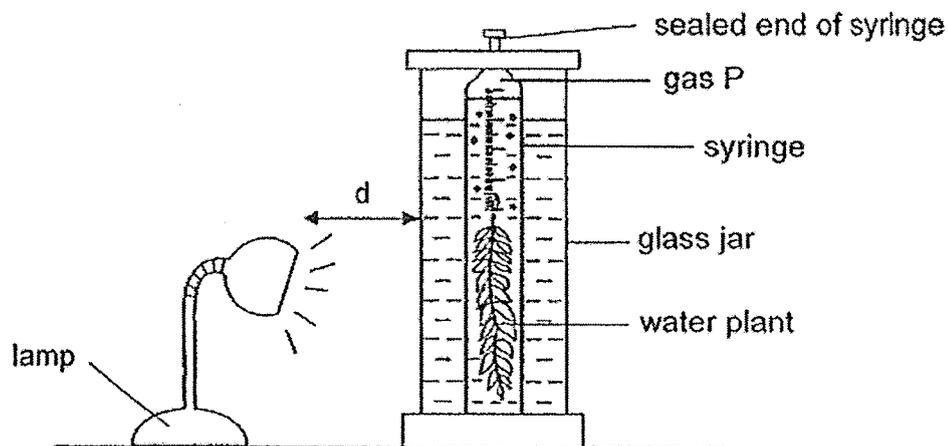


- (a) Explain why the cork could move up the bottle with the help of the lit bunsen burner. [2]

- (b) Tom wore rubber gloves to hold the bottle when he removed the cork from the bottle. Explain why. [1]

Score	3
-------	---

37. Shaheena carried out an experiment on photosynthesis in a dark room as shown below. She placed the lamp at different distances, d , from the water plant and measured the volume of gas P produced after two hours. The results of her experiment are shown in the table below.



d (cm)	Volume of gas P collected after 2 hours (cm^3)
5	10
10	6
15	4

- (a) Identify gas P. [1]

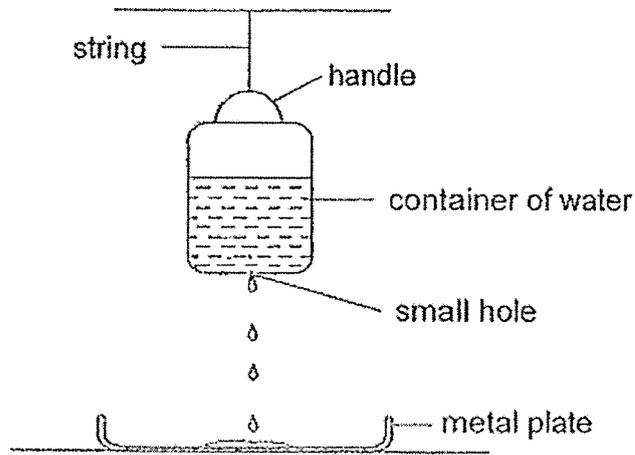
- (b) Suggest how Shaheena can increase the volume of gas P produced without changing distance d and explain why. [2]

Suggestion: _____

Explanation: _____

- (c) Why is it important for Shaheena to carry out her experiment in a dark room? [1]

38. Ming Yang hung a container of water over a large metal plate. The small hole at the bottom of the container allowed water to drip as shown below.



- (a) State the energy change that occurs when the water droplets fell from the container and hit the metal plate. [1]

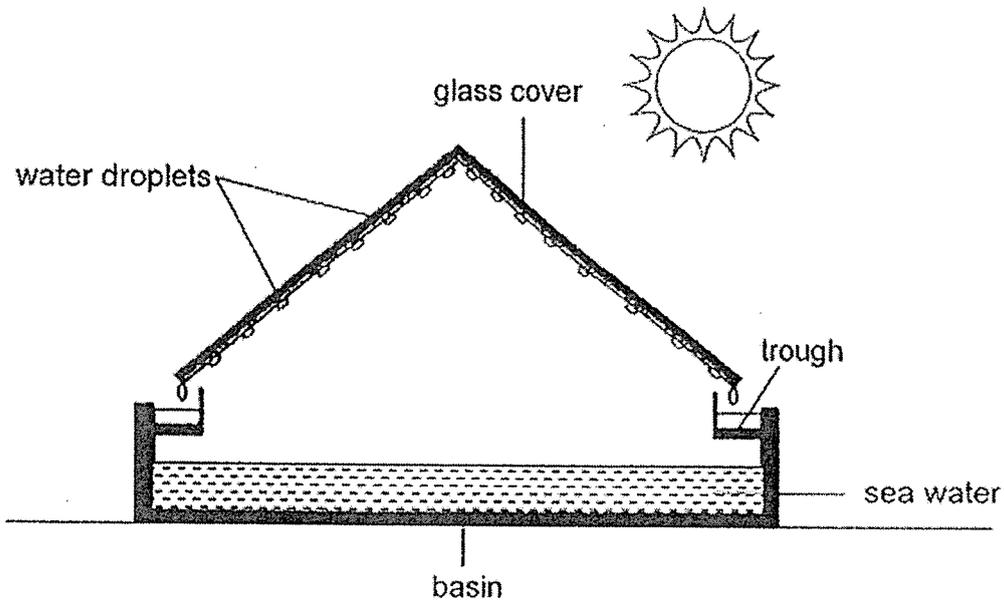
_____ energy → _____ energy → _____ energy
 (water in container) (falling water droplet) (water hitting the metal plate)

- (b) Ming Yang lifted the container of water higher. What change would he observe? Explain your answer in terms of energy conversion. [2]

- (c) Ming Yang poked a second hole in the container to allow the water to drip faster from the small hole. Mark an X in the diagram above to show where he poked the hole. [1]

Score	4
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39. The diagram below shows a device used to collect clean water from sea water. The device was placed out in the open on a sunny day.



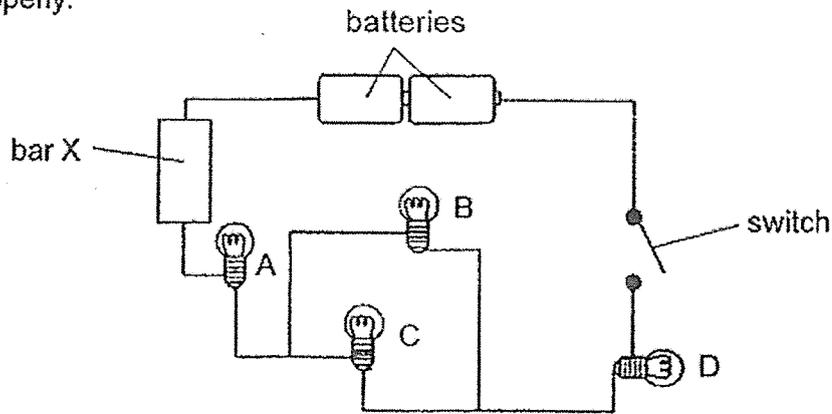
- (a) Explain how clean water was collected in the trough after several hours. [2]

The table below shows the amount of clean water collected over 3 days for 2 four-hour periods.

Time	Volume of clean water collected (ml)		
	Day 1	Day 2	Day 3
2 pm to 6 pm	300	350	330
8 pm to 12 am	450	475	455

- (b) Explain why more clean water was collected between 8 pm to 12 am. [1]

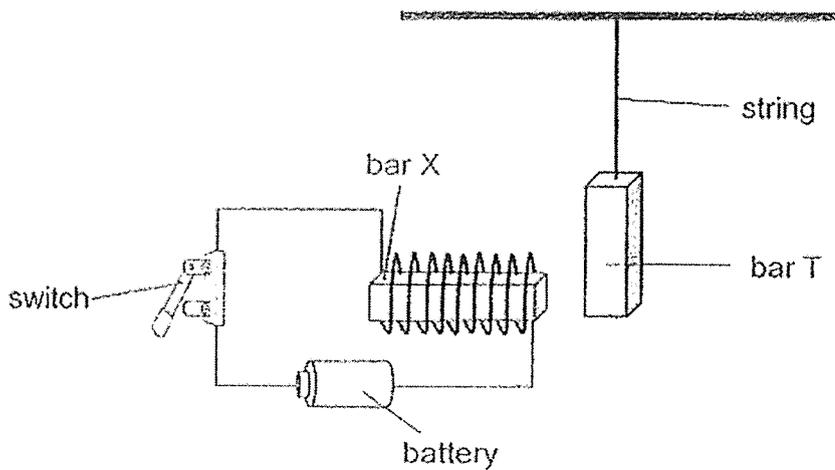
40. The diagram shows an electrical circuit. All the batteries and bulbs are working properly.



- (a) When the switch is closed, all the bulbs lit up. What is the property of bar X? [1]
-

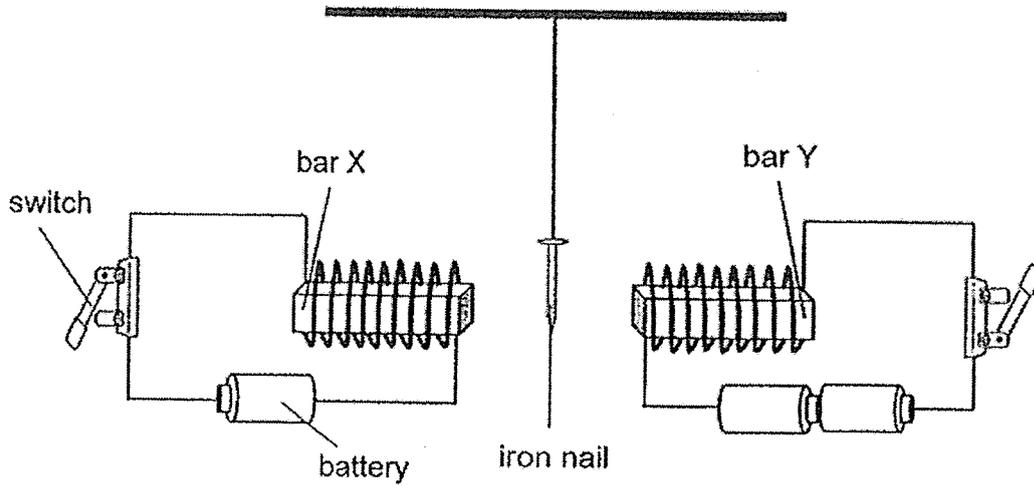
- (b) When bulb A fuses, how many bulbs will light up? Explain why. [1]
-

Dave used bar X in the set-up as shown below. When the switch was closed, bar T swung away from bar X.



- (c) Explain why bar T swung away from bar X when the switch was closed. [2]
-
-

Dave set up another experiment as shown below using similar batteries, wires and switches. Two similar bars X and Y were fixed in position and an iron nail was hung between them.



(d) What will Dave observe when both switches are closed at the same time?
Explain your answer.

[1]

Score	1
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End of Paper

SCHOOL : TAO NAN PRIMARY SCHOOL
LEVEL : PRIMARY 6
SUBJECT : SCIENCE
TERM : 2022 SA1

SECTION A

Q 1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
2	4	2	3	3	2	4	4	4	1
Q 11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20
2	1	4	3	1	3	2	4	2	2
Q 21	Q22	Q23	Q24	Q25	Q26	Q27	Q28		
1	3	4	2	4	2	3	4		

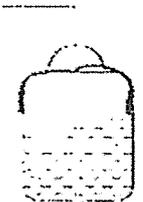
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TAO NAN SCHOOL
P6 SCIENCE MID YEAR EXAM 2022
Suggested Answers

Booklet B

This only serves as a reference. Variations of students' answers have been accepted if they have shown conceptual understanding.

29 (a)	Part B
29 (b)	Male reproductive cell from the pollen grain will not be able to fuse with the egg cell. /Fertilisation cannot take place.
29 (c)	To ensure the continuity of their own kind/ species.
30 (a)	3
30 (b)	There will be less caterpillars to eat the leaves of tree Y so the tree will have more leaves. With more leaves, the tree will be able to make more food so more sugar will be stored in the fruits/more sugar sent to the fruits.
31 (a)	<pre> graph LR B --> A B --> D A --> D A --> E D --> E E --> C </pre>
31 (b)	D has more prey/ food to eat so its population increases. There will be more D for E to eat so the population of E will increase.
31(c)	Structural
32 (a)	Swimming increases heart rate.
32 (b)	Any number between 91 and 144
32 (c)	Point B. The heart rate started increasing at/after B as the heart pumps blood faster to send more oxygen and digested food to her muscles/ other parts of the body.
33 (a)	Material B. It is flexible so Melissa can bend it into different shapes. It is strong so that it will not break/ tear when pulled.
33 (b)	So that after it is stretched, it can return to its original shape/ length.
34 (a)	Bicycle A. There will be more friction between the tyres of bicycle A and the ground.
34 (b)	He is going against the direction of gravity.
34 (c)	Friction caused the tyres to wear out.
34 (d)	He can apply lubricant/ oil on the chain.
35 (a)	Gravity is acting on the ball./ Gravity is pulling it down.

35 (b)	De Ming should pull the plunger back by more than 5 cm/ further. The spring will be more compressed so it will exert more elastic spring force to push the ball up the ramp.
36 (a)	Air in the bottle gained heat from the flame and expanded, pushing the cork up the bottle.
36 (b)	Rubber is a poor conductor of heat. Hence the gloves will reduce heat gained by the hand/will not burn Tom's hands.
37 (a)	Oxygen
37 (b)	Shaheena can increase the brightness of the lamp. The water plant will receive more light which increases the rate of photosynthesis. OR Shaheena can add baking soda to the water. This increases the amount of carbon dioxide in the water thus increasing the rate of photosynthesis. OR Shaheena can add more water plants into the jar. More plants will make more food/ increase the rate of photosynthesis.
37 (c)	It is to ensure the plant only receives light shining from the lamp. OR It is to ensure that no other sources of light would affect the readings/rate of photosynthesis.
38 (a)	Potential energy → kinetic energy → sound energy
38 (b)	The water makes a louder sound when it hits the plate. When the container of water is lifted higher, the (gravitational) potential energy of the water in the container increases. More (gravitational) potential energy is converted into more kinetic energy when the water falls and more kinetic energy is converted into more sound energy when it hits the metal plate.
38 (c)	<p>Anywhere on the dark line</p> 
39 (a)	Sea water gains heat from the Sun/ surroundings and evaporates into water vapour. The water vapour touches the cooler surface of the glass cover and condenses into water droplets. The clean water droplets slide/flow down the glass cover where it is collected in the trough.
39 (b)	The glass cover was cooler so the rate of condensation was higher.
40 (a)	Bar X conducts electricity / is an electrical conductor.
40 (b)	Zero bulbs will light up. An open circuit is formed.
40 (c)	When the switch is closed, a closed circuit is formed/ electricity can flow through the circuit. Bar X becomes an electromagnet/ is magnetised. The like poles of bar X/ the electromagnet and bar T are facing each other hence they repel.
40 (d)	The iron nail will be attracted more towards iron bar Y as iron bar Y is a stronger electromagnet.

