Index No: | | | | | | – | |

Name: _____ Class : _____ Register No: _____

COMBINED IJ SCHOOLS PRELIMINARY EXAMINATION 2016

SCIENCE
PRIMARY 6

BOOKLET A

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

INSTRUCTIONS TO CANDIDATES

1. **Do not open this booklet until you are told to do so.**
2. **Follow all instructions carefully.**
3. **Answer all questions.**
4. **Shade your answers in the Optical Answer Sheet (OAS) provided.**

FOR MARKERS' USE

Booklet A	/60
Booklet B	/40
TOTAL	/100

Parent's signature _____

Date _____

For each question from 1 to 30, four options are given. One of them is the correct answer. Make your choice (1, 2, 3 or 4). Shade the correct oval (1, 2, 3 or 4) on the Optical Answer Sheet provided.

(60 marks)

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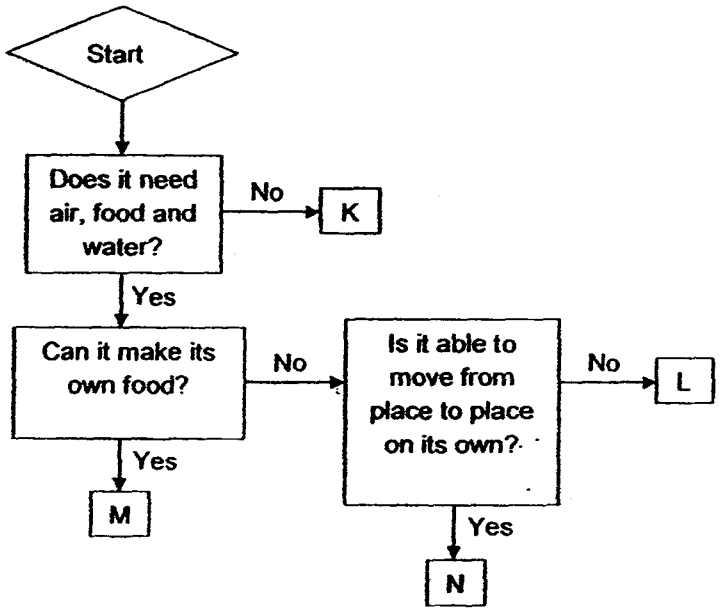
1 Study the flow chart below.



Based on the flowchart, which letter best represents the organism shown below?

(1) K
(2) L
(3) M
(4) N

2 Ali planted the same number of seeds at three different temperatures. His results are shown in the table below.

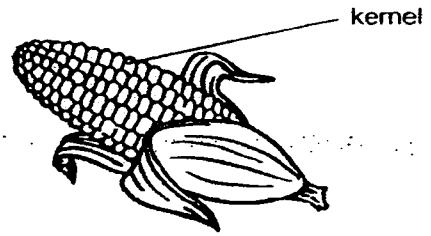
Temperature (°C)	Total number of seeds germinated					
	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
5	0	0	0	0	0	1
15	0	0	0	1	5	9
25	0	2	8	17	18	19

Based on the results in the table, which of the following statements is/are true?

A Germination cannot take place at 5°C.
B Germination takes place fastest at 25°C.
C The best temperature for germination is 15°C.

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

3 A scientist wanted to create corn that has multi-coloured kernels.



He obtained genetic material from Organism X that controls colour and injected it into a cell part of the corn. When the kernels were grown, the new corn plants also produced multi-coloured kernels.

Which one of the following indicates the correct cell part involved in the transfer of the genetic material?

	Cell part of Organism X where genetic material was obtained from	Cell part of the corn where genetic material was injected into
(1)	Cytoplasm	Cytoplasm
(2)	Cytoplasm	Nucleus
(3)	Nucleus	Cytoplasm
(4)	Nucleus	Nucleus

4 Animal X shown in the picture below is a slug that lives in the sea and is bright green in colour. It can carry out photosynthesis to make its own food.

Animal X

Which structures are most likely to be found in the cells of Animal X?

	Cell wall	Chloroplast	Nucleus
(1)	Absent	Present	Present
(2)	Absent	Absent	Absent
(3)	Present	Present	Present
(4)	Present	Absent	Absent

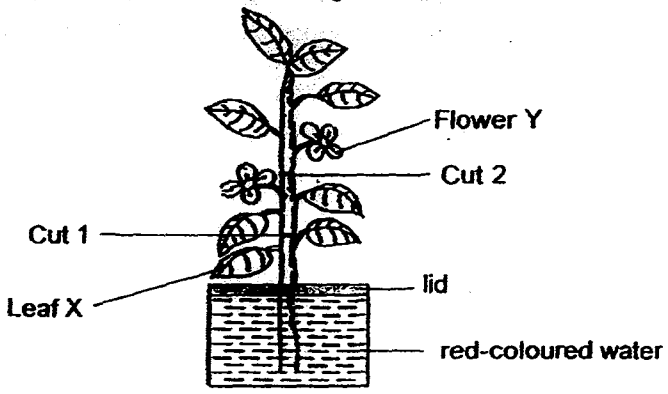
5 The table shown below describes the process of fertilisation in humans and flowering plants.

Statement	Humans	Flowering Plants
A	A sperm cell fuses with an egg cell.	The male sex cell in the pollen grain fuses with the female sex cell in the ovule.
B	The fertilised egg develops into a baby.	The fertilised ovule develops into a seed while the ovary develops into a fruit.
C	The sperm cell and the egg cell fuse in the ovary.	The pollen grain and the ovule fuse in the stigma.
D	The sperm cell travels towards the egg cell.	The male sex cell travels down the pollen tube towards the ovary.

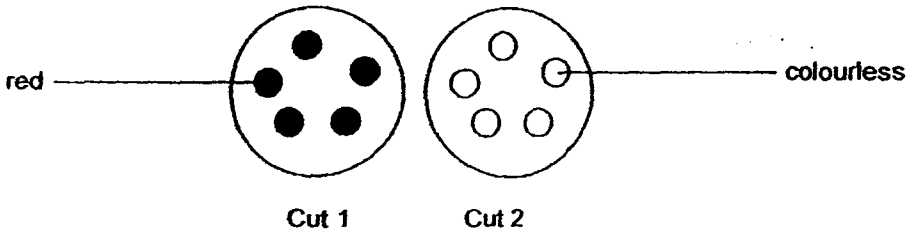
Which of the above statements correctly describe the fertilisation processes in humans and flowering plants?

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

6 Siti placed a plant with white flowers into a container of red-coloured water. After five hours, she made two cuts as shown in the diagram below.



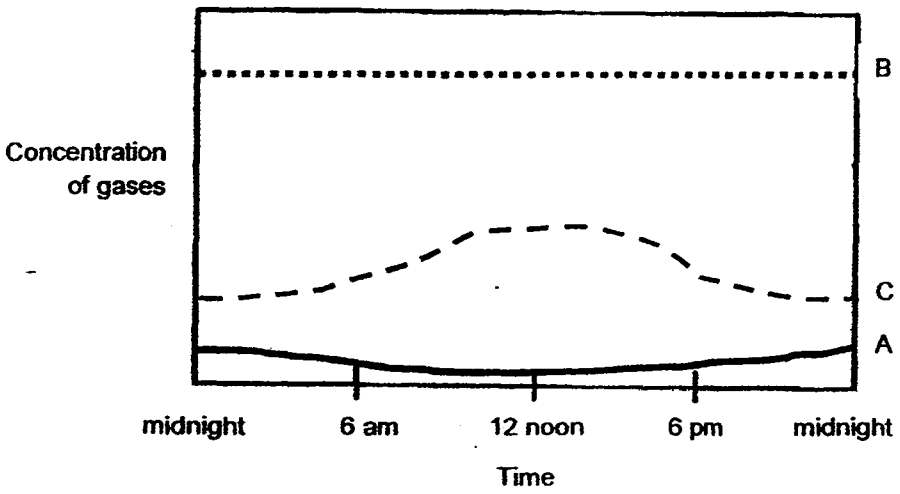
The cross-section of Cut 1 and Cut 2 showing the water-carrying tubes are shown in the diagram below.



What would be the observed colour of Leaf X and Flower Y after five hours?

	Leaf X	Flower Y
(1)	Red	Red
(2)	Red	White
(3)	White	White
(4)	White	Red

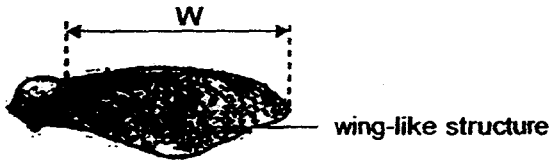
7 Alex carried out an experiment to find out the concentration of oxygen and carbon dioxide in a forest of trees over a period of 24 hours. He drew a graph to represent his findings.



Which lines could represent oxygen and carbon dioxide respectively? ®

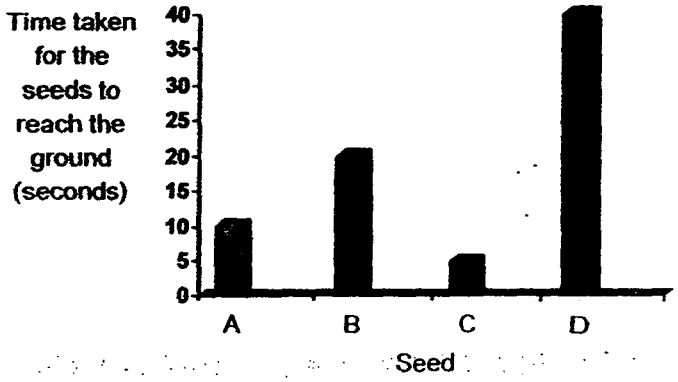
	Oxygen	Carbon dioxide
(1)	C	B
(2)	B	C
(3)	C	A
(4)	A	C

8 Ravi dropped four seeds from the same plant, A, B, C and D, at the same time, from the same height above the ground. The length of the wing-like structure of all four seeds were measured and recorded in the table below.



Length of wing-like structure, W(cm)			
Seed A	**Seed B**	**Seed C**	**Seed D**
6.5	7	5	9

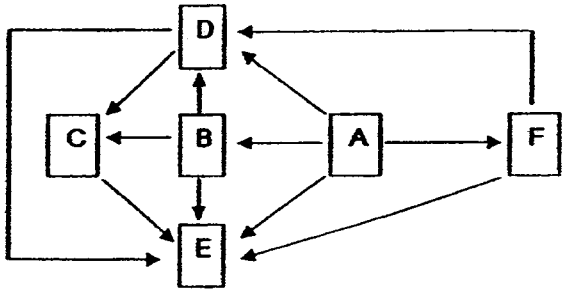
The graph below shows the readings of the time taken for the seeds to reach the ground.



Based on the information above, which one of the following statements shows the correct relationship and explanation for her observations?

	Relationship	Explanation
(1)	The longer the wing-like structure, the slower the rate at which the seed reaches the ground.	The longer the wing-like structure, the higher the chance of it being pollinated.
(2)	The shorter the wing-like structure, the longer the time taken for the seed to reach the ground.	The shorter the wing-like structure, the slower the seed will be pollinated.
(3)	The longer the wing-like structure, the longer the time taken for the seed to reach the ground.	The longer the wing-like structure, the more air resistance there is and so it can float in the air longer.
(4)	The longer the wing-like structure, the faster the rate at which the seed reaches the ground.	The longer the wing-like structure, the lower the air resistance and so it can float in the air longer.

9 Study the food web shown below.

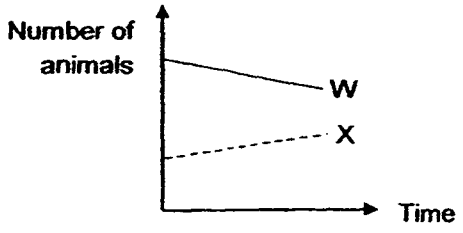
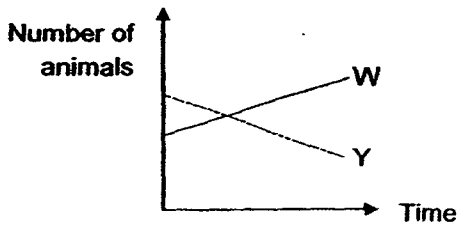
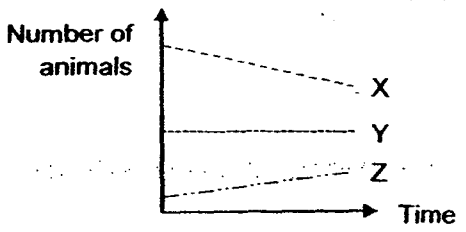


A large number of Organism E is found in the community. It plays an important role in maintaining balance in the community.

Based on the food web only, what could Organism E be?

(1) Predator
(2) Producer
(3) Decomposer
(4) Predator and Prey

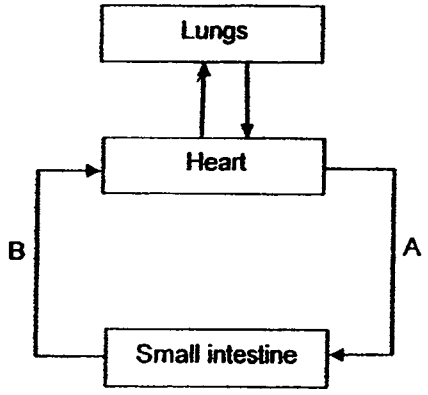
10 W, X, Y and Z are four different types of aquatic animals. The same number and type of water plants were placed in each of the aquariums, A, B and C. The number of animals in each aquarium was counted weekly and represented in the graphs shown below.

Aquarium	Animals present at the start of experiment	Graph representing the change in the number of animals over time
A	W and X	
B	W and Y	
C	X, Y and Z	

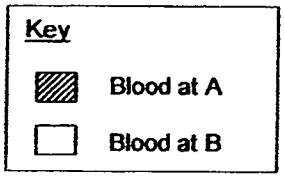
From the information given above, which one of the following correctly shows the most likely food chain linking the four animals?

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

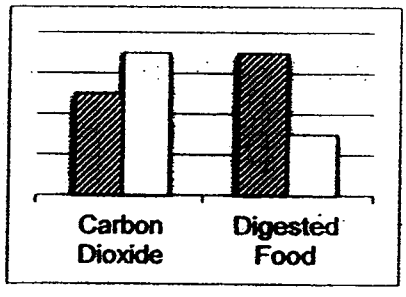
11 The diagram below shows the flow of blood in certain parts of the human body.



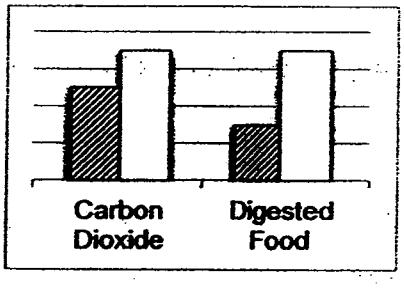
Which one of the following graphs shows the amount of carbon dioxide and digested food in the blood at A and B when a person has just fully digested a meal?



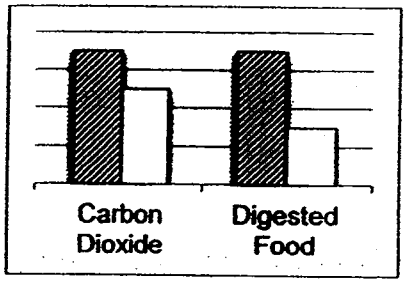
(1)



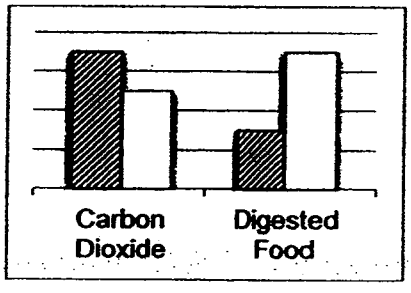
(2)



(3)



(4)



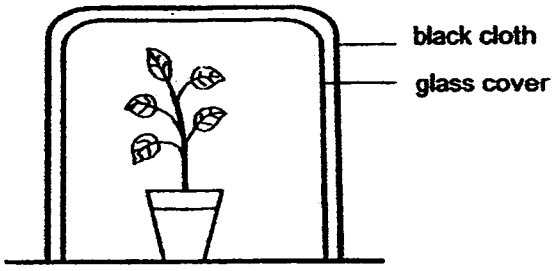
12 Five students, John, May, Perry, Jean and Sally, made the following statements about dispersal in plants.

Student	Statement
John	Fruits or seeds dispersed by water are light.
May	Fruits or seeds with wing-like structures are most likely dispersed by wind.
Perry	All fruits which are dispersed by animals have fleshy parts.
Jean	Some fruits that are dispersed by animals have indigestible seeds.
Sally	Fruits and seeds that are dispersed by explosive action are small and light.

Which students had made **incorrect** statements?

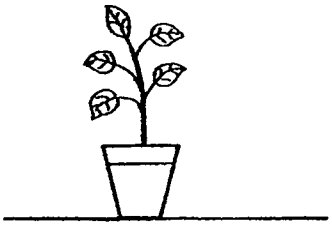
(1) May and Jean only
(2) Perry and Sally only
(3) May, Jean and Sally only
(4) John, Perry and Sally only

13 Patrick carried out an experiment to find out if plants need light to survive. He set up the experiment as shown below.

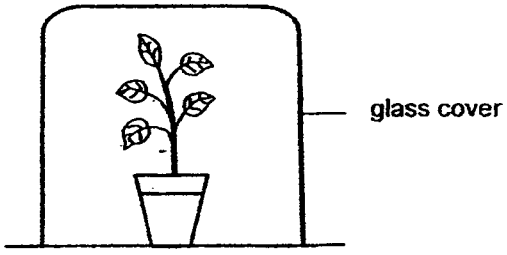


Which of the following should Patrick use as a control for his experiment?

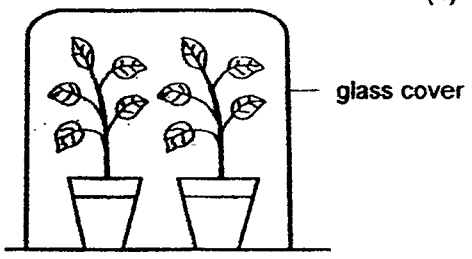
(1)



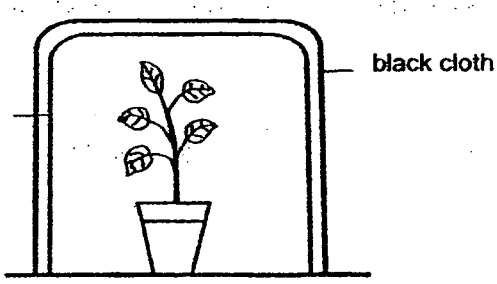
(2)



(3)



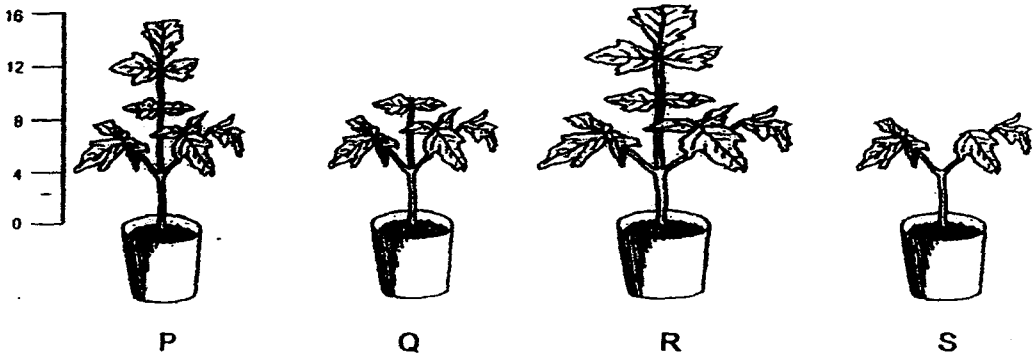
(4)



14 Afiq wanted to examine the effect of Fertiliser X on some seedlings, P, Q, R and S.

The seedlings were 8 cm tall, and had four similar-sized leaves. They were placed in similar sized pots filled with the same type of soil.

The amounts of water and Fertiliser X given to each seedling are shown in the table below. The results after 15 days are shown below.

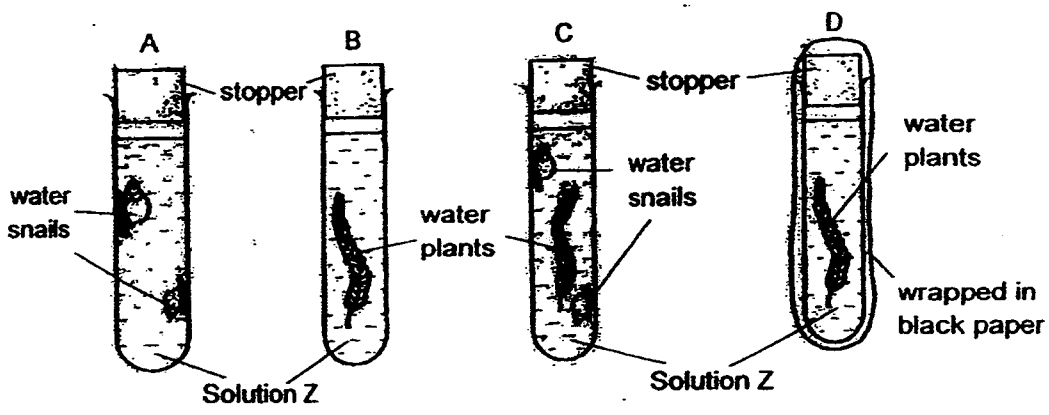


Seedling	Amount of water per day (*ml*)	Amount of Fertiliser X (drops)
P	70	8 drops every 5 days
Q	70	0
R	70	8 drops daily
S	0	0

What effect did the daily use of fertiliser have on the seedlings?

	Height of seedling	Leaf size
(1)	Stayed the same	Decreased
(2)	Stayed the same	Increased
(3)	Increased	Increased
(4)	Increased	Stayed the same

15 Four test-tubes, A, B, C and D, were set up as shown below. Equal amount of air was pumped into solution Z, which was then poured into each test-tube. The test-tubes were left in the sun for three hours.



Solution Z changes colour depending on the amount of carbon dioxide dissolved in it as shown in the table below.

Colour of Solution Z	Amount of dissolved carbon dioxide
Purple	less carbon dioxide than in the air
Yellow	more carbon dioxide than in the air
Reddish orange	same amount of carbon dioxide as in the air

What would be the colour of solution Z in test-tubes A, B, C and D?

(1)

Test-tube	Colour of solution Z
A	yellow
B	purple
C	reddish orange
D	purple

(2)

Test-tube	Colour of solution Z
A	purple
B	yellow
C	purple
D	yellow

(3)

Test-tube	Colour of solution Z
A	yellow
B	purple
C	reddish or ange
D	yellow

(4)

Test-tube	Colour of solution Z
A	reddish orange
B	purple
C	yellow
D	yellow

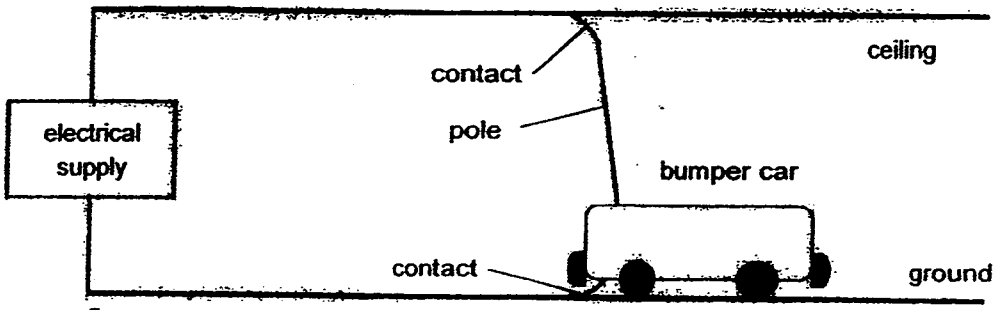
16 Mr Lim wanted to find out which object, W, X, Y or Z, is made of the hardest material. He used an object from Group A to scratch an object from Group B to compare their hardness. He recorded the results in the table as shown below.

Group A	Group B	Were scratch marks observed on the object in Group B?	
		Yes	No
W	X	✓	✗
X	Y		✓
Y	Z	✓	
Z	W	✓	

Based on his observations, which one of the following objects is made of the hardest material?

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

17 The diagram below shows the circuit for a bumper car.



The car uses electricity to move. The contacts can move along the ceiling and the ground.

Study the properties of the four materials shown below.

Material	Property of material	
	Can bend easily	Can conduct electricity
A	yes	yes
B	yes	no
C	no	no
D	no	yes

Which material is most suitable for making the ceiling?

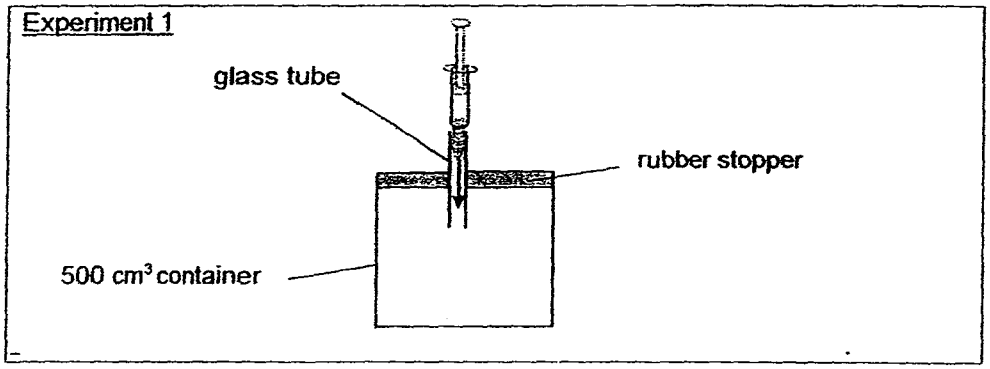
(1) A

(2) B

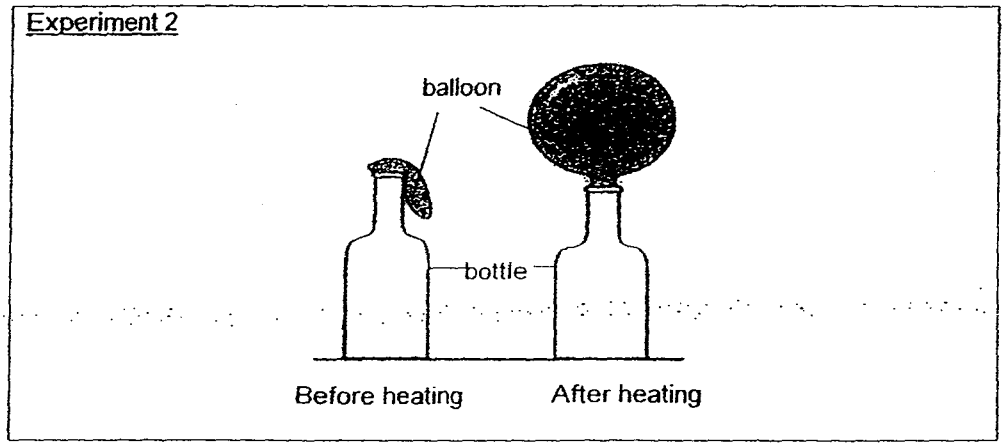
(3) C

(4) D

18 Xiaoli sealed a 500 cm^3 container with a rubber stopper and inserted a glass tube through the rubber stopper. She then pumped 100 cm^3 of air into it.



In a separate experiment, Xiaoli covered the opening of a bottle with a balloon and heated it.



What happened to the mass and volume of air in the container and bottle in experiments 1 and 2?

	Experiment 1		Experiment 2	
	Volume of air	Mass of air	Volume of air	Mass of air
(1)	Increased	Remained the same	Increased	Remained the same
(2)	Increased	Increased	Increased	Increased
(3)	Remained the same	Remained the same	Remained the same	Increased
(4)	Remained the same	Increased	Increased	Remained the same

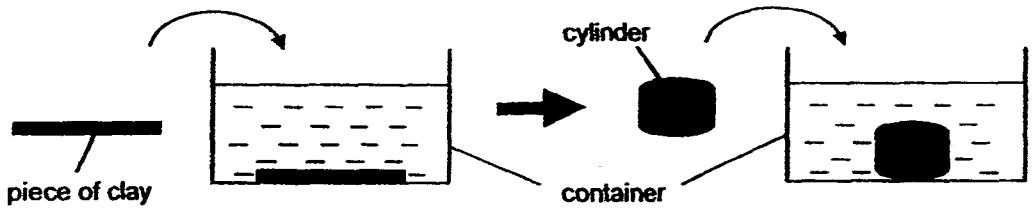
19 James, Ali and Yiheng made the following observations about two substances, P and Q.

James	The two substances are in the same state at 85 °C.
Ali	Substance P is a liquid at 20 °C.
Yiheng	Substance Q is a solid at 30 °C.

Which one of the following shows the possible melting and boiling points of the two substances?

	Substance P		Substance Q	
	Melting point (°C)	**Boiling point (°C)**	**Melting point (°C)**	**Boiling point (°C)**
(1)	45	105	15	120
(2)	60	75	25	90
(3)	5	120	35	70
(4)	10	90	50	110

20 Bala completely submerged a piece of clay into a container filled with 1000 ml of water and recorded the water level. Next, he moulded the same piece of clay into a cylinder and completely submerged it in the same container of 1000 ml of water and recorded the water level again.



He recorded the results in the table below.

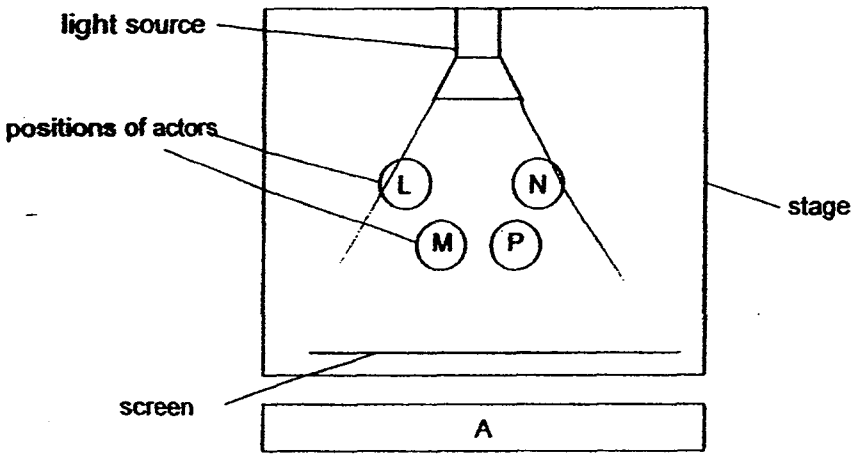
Original water level (ml)	Water level with the piece of clay (ml)	Water level with the cylinder (ml)
1000	1200	1200

Based on Bala's observation, what can he conclude about the properties of clay and water?

A Both have mass.
B Both occupy space.
C Clay has a definite volume.
D Water has a definite volume.

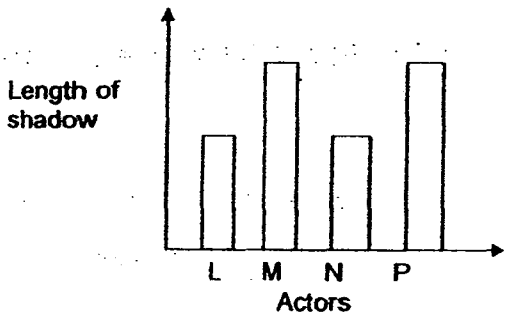
(1) A and C only
(2) B and D only
(3) B, C and D only
(4) A, B, C and D

21 The diagram below shows the layout of the stage for a shadow performance. Four actors represented by letters, L, M, N and P, who were of similar height, were performing on the stage at the positions shown below. The audience seated at A saw the shadows of the actors on the screen.

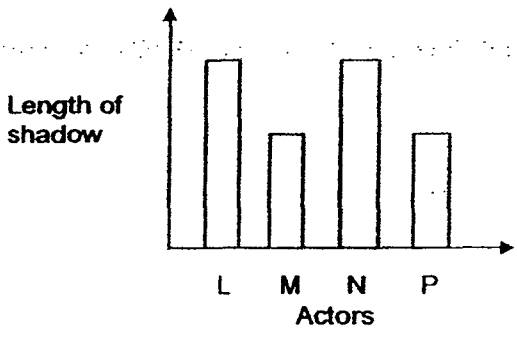


Which one of the following graphs shows the length of the shadows of actors L, M, N and P?

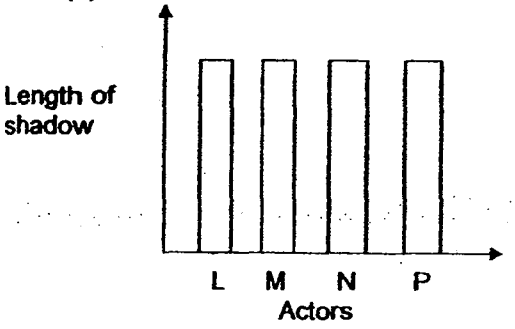
(1)



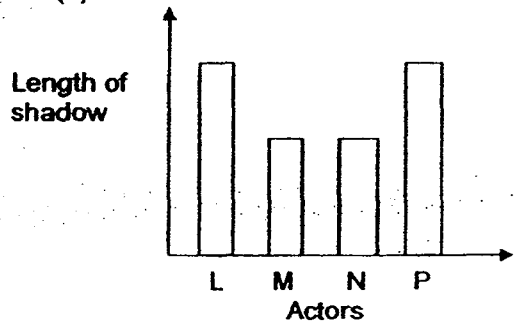
(2)



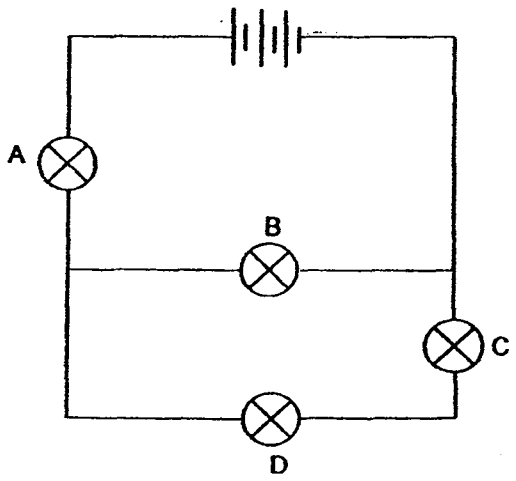
(3)



(4)



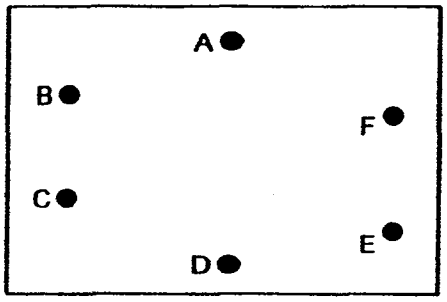
22 The diagram below shows a circuit with four identical light bulbs.



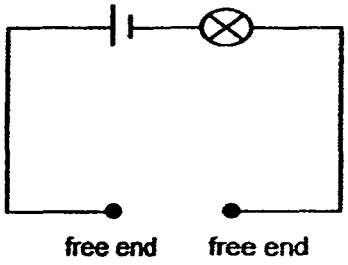
Which bulb will cause all other bulbs to be unlit when it is fused?

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

23 The diagram below shows a circuit card and a circuit tester.



circuit card



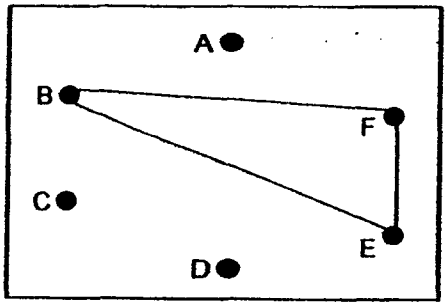
circuit tester

The table below shows what happens to the bulb when each of the following points on the circuit card is connected to one free end of the circuit tester.

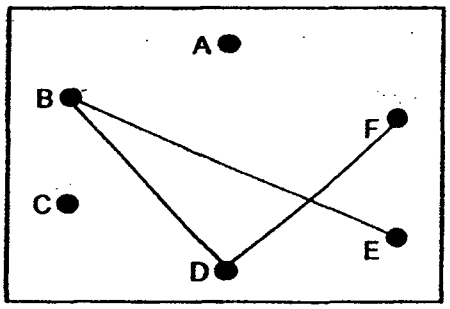
Points connected to the free ends of circuit tester	Does the bulb light up?
A and C	No
B and E	Yes
B and F	Yes
C and F	No
D and F	Yes

Based on the information given in the table above, which one of the following shows the correct arrangement of the wires on the circuit card?

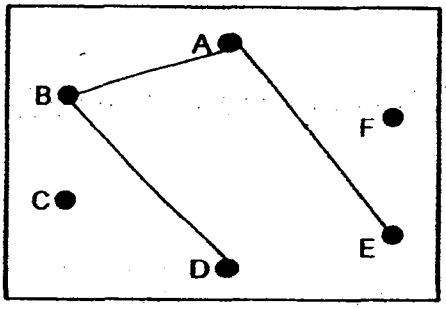
(1)



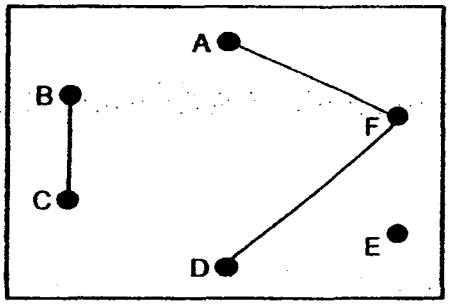
(2)



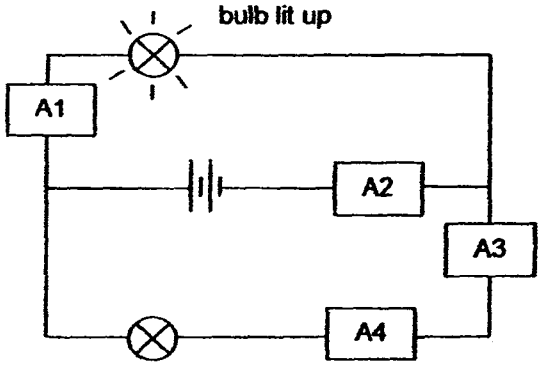
(3)



(4)

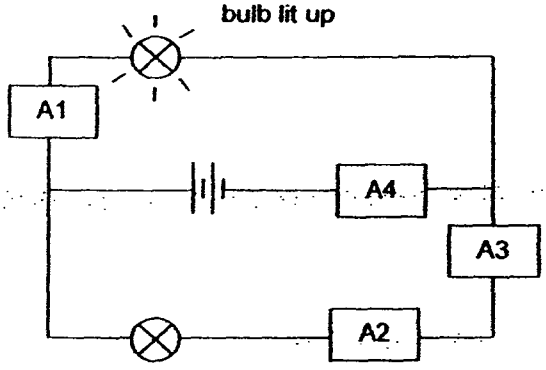


24 Yongsan wanted to find out which material is a conductor of electricity. He connected materials, A1, A2, A3 and A4, in a circuit and recorded his observations as shown in the diagram below.



bulb did not light up

Then, he rearranged the materials in the same circuit and recorded his observations as shown in the diagram below.

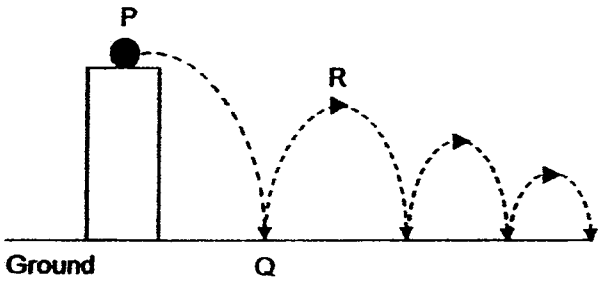


bulb did not light up

Based on Yongsan's observations, which of the following materials are conductors of electricity?

(1) A1 only
(2) A3 and A4 only
(3) A1, A2 and A3 only
(4) A1, A2 and A4 only

25 The diagram below shows a ball being dropped from P. It reached the ground at Q and then bounced to R. The ball bounced a few times before it came to a stop.

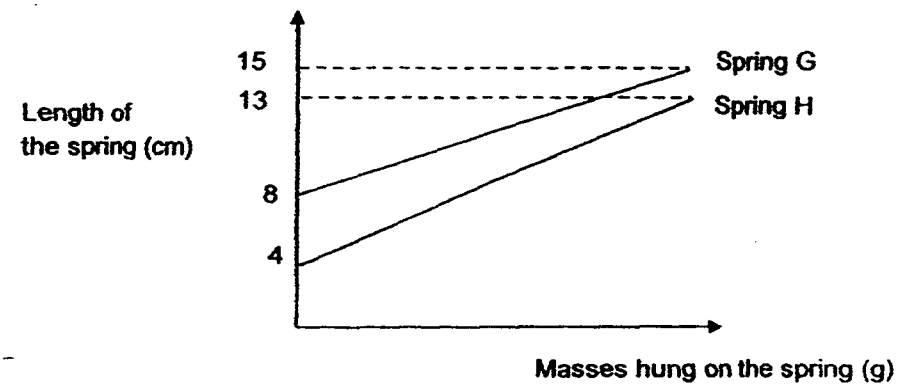


Which of the following statements are true?

A There is no force acting on the ball at Q.
B From Q to R, the kinetic energy of the ball decreases.
C Just before reaching Q, the ball has the highest amount of kinetic energy.
D At R, the ball has less gravitational potential energy compared to when it is at P.

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

26 The graph below shows how the lengths of two springs, G and H, are affected by the different masses hung on each spring.

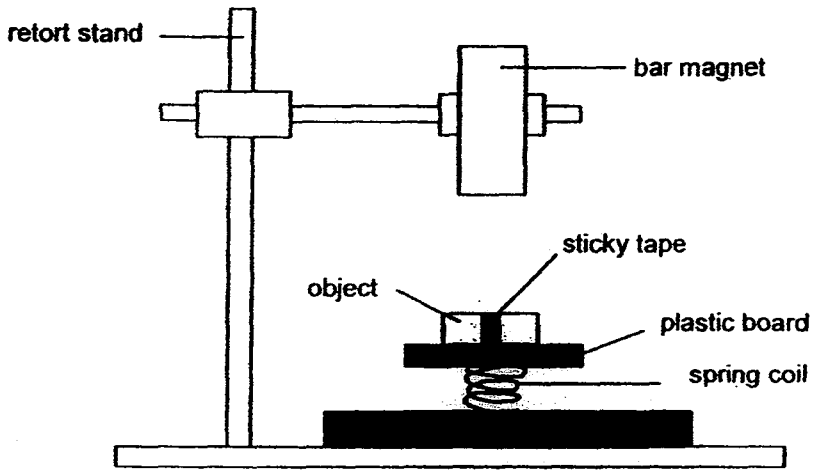


Based on the graph above, which of the following statements are correct?

A Spring H is more elastic than Spring G.
B Both springs have gone beyond their elastic limit.
C The extension of Spring G is more than the extension of Spring H.
D The original length of Spring G is longer than the original length of Spring H.

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

27 Thomas set up an experiment as shown below. The original length of the spring coil used was 7 cm. He then taped two objects, M and N, of the same size, shape and mass one at a time separately onto the plastic board.



He measured the lengths of the spring coil and recorded the readings in the table below.

Object	Length of spring coil (cm)
None	7
M	8
N	5

If object N is a non-magnetic object, which of the following forces are acting on object N?

P Gravitational force

Q Elastic spring force

R Magnetic force of attraction

S Magnetic force of repulsion

(1) R only

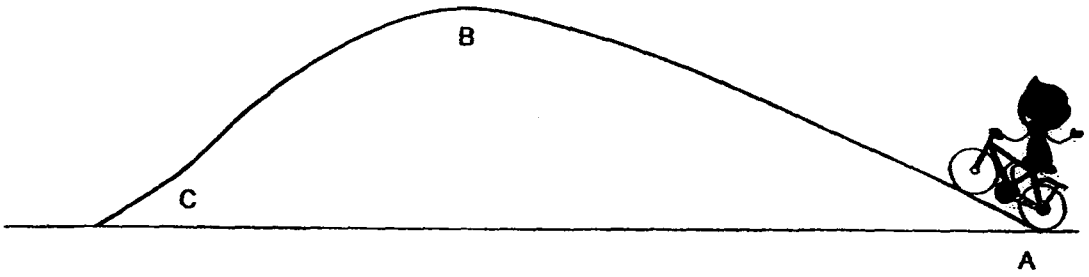
(2) P and Q only

(3) P, Q and R only

(4) P, Q and S only

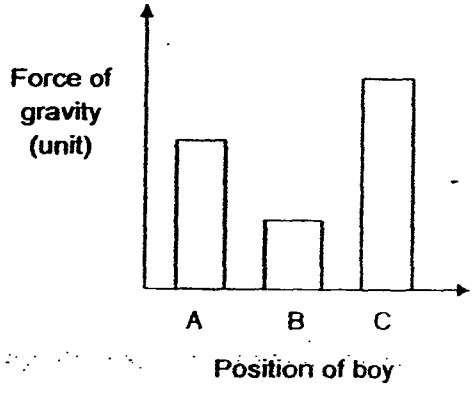
28 The diagram below shows the path taken by a boy as he cycled up a slope.

Points A, B and C are the different positions along the slope taken by the boy.

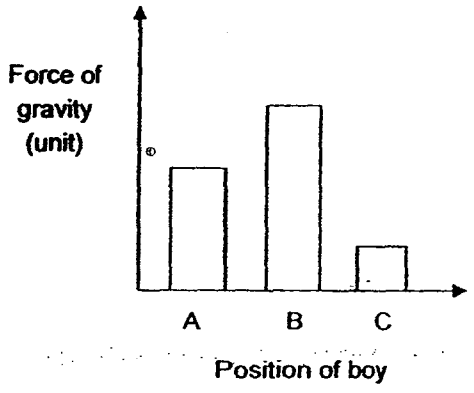


Which one of the following graphs shows the correct force of gravity acting on the boy at points A, B and C?

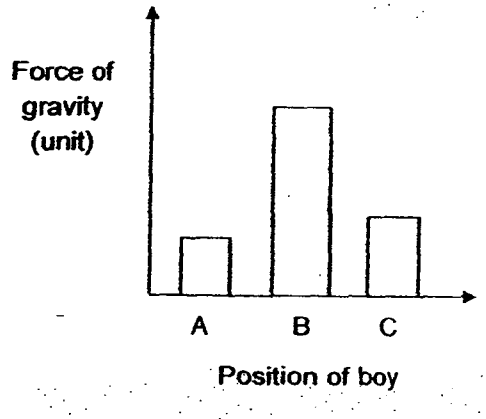
(1)



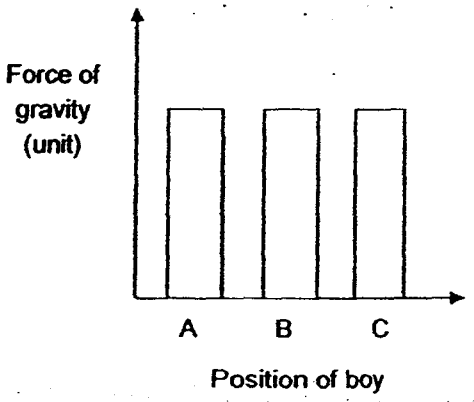
(2)



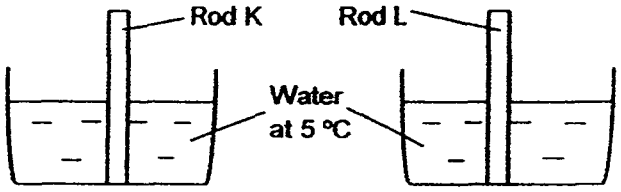
(3)



(4)



29 Shimin conducted an experiment to find out the effect of temperature on certain materials. She placed two rods, K and L, of the same size and shape but made of different materials into a container of water at 5 °C as shown below.



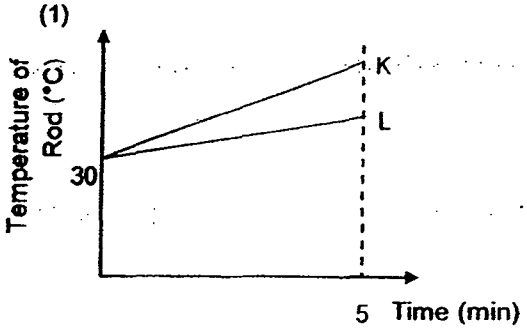
She recorded the changes in the temperatures of the rods for 5 minutes using a datalogger. She then recorded the results in the table below.

Time (min)	Temperature of K (°C)	Temperature of L (°C)
1	30	30
2	26	29
3	22	28
4	18	27
5	14	26

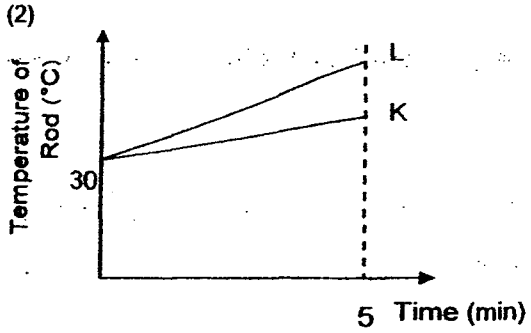
In another experiment, she placed the same rods into the same container of the same amount of water but at 90 °C instead and recorded the changes for 5 minutes again.

Which one of the following graphs shows the correct changes in the temperatures of rods K and L at the end of the experiment?

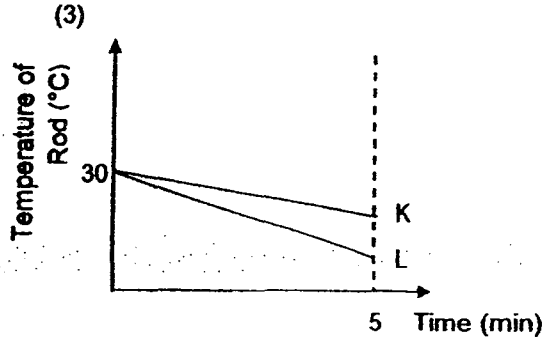
(1)



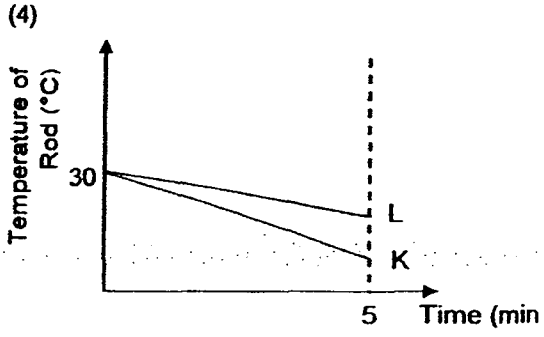
(2)



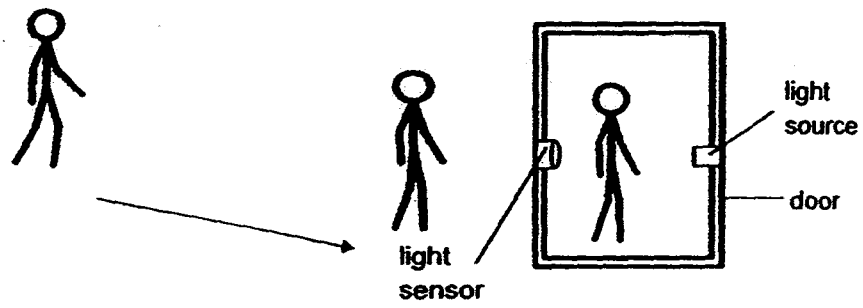
(3)



(4)

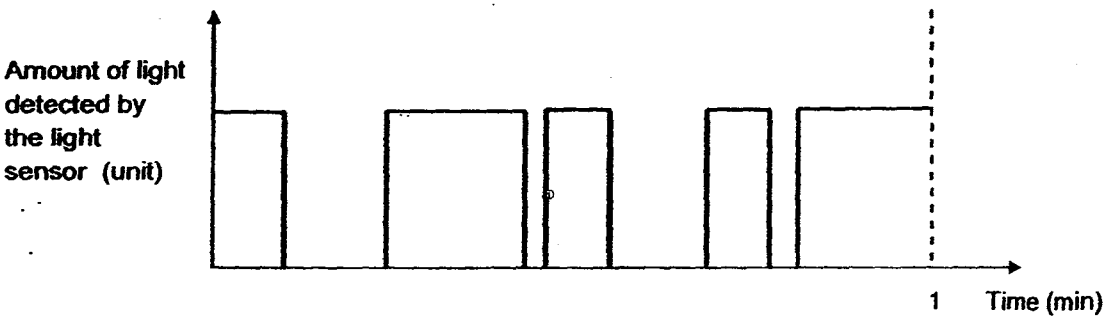


30 The set-up below uses a light sensor to count the number of people entering a room.



Only one person can pass through the doorway each time. When a person is between the light source and the sensor, his body blocks the light from reaching the sensor.

The graph below shows the amount of light detected by the light sensor over a period of 1 min.



Based only on the information given above, which of the following statements are true?

A All the people went through the door at the same speed.
B All the people did not go through the door at the same speed.
C Five people walked through the doorway in the 1 minute recorded.
D Four people walked through the doorway in the 1 minute recorded.

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

Index No: | | | | | | – | |

Name: _____ Class : _____ Register No: _____

COMBINED IJ SCHOOLS PRELIMINARY EXAMINATION 2016

SCIENCE
Primary 6

BOOKLET B

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

INSTRUCTIONS TO CANDIDATES

1. **Do not open this booklet until you are told to do so.**
2. **Follow all instructions carefully.**
3. **Answer all questions.**
4. **Write your answers in this booklet.**

FOR MARKERS' USE

Booklet B	/40

Parent's signature _____

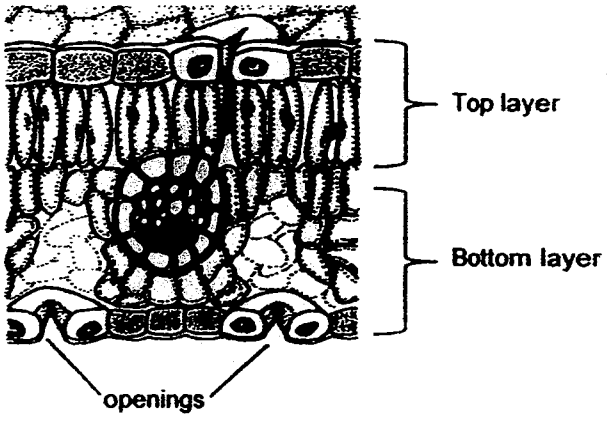
Date _____

For Questions 31 to 44, write your answers in this booklet.
The number of marks available is shown in brackets [ ] at the end of each question or part question.

(40 marks)

---

31 Jenny looked at a specimen of the cross-section of a leaf under the microscope. A diagram of what she observed is shown below.



(a) Jenny realised that the cells in the top layer of the cross-section had more chloroplasts than the bottom layer. Explain her observation. [1]

_____

_____

(b) Jenny noticed that the size of the openings as shown in the diagram became smaller when the temperature of the surroundings became higher. Explain how this helps the plant survive. [1]

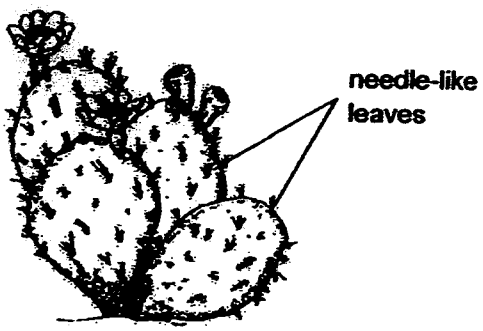
_____

_____

_____

SCORE	2

(c) Plant P has needle-like leaves.



– Explain how this feature helps it survive in its desert environment. [1]

_____

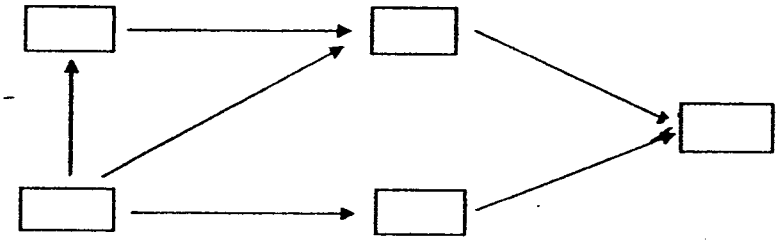
_____

SCORE	/ 1

32 A, B, C, D and E are five organisms living in the same community. Some information about them is given below.

- A eats plants but also preys on B.
- B and C eat plants only.
- D eats A and C.
- E is a food producer.

(a) Complete the food web below based on the information given above. [1]



(b) Name the organism(s) that is/are both a prey and a predator. [1]

_____

(c) There was a decrease in the population of A. However, the population of B remained the same. Explain how the decrease in A affects the number of organism C. [1]

_____

_____

(d) A large number of organism X was introduced to the community. After some time, all the other organisms decreased in number. If X only fed on one type of organism in this community, which organism did X feed on? Explain your answer. [1]

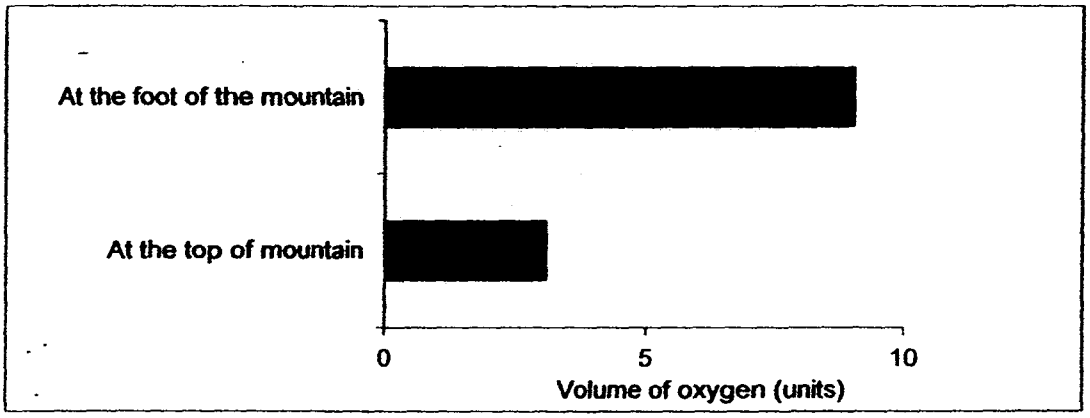
_____

_____

SCORE	
	4

33 In class, Komathy learnt that one component of blood is made up of red blood cells. Red blood cells carry oxygen to the different parts of the body.

The graph below shows the volume of oxygen inhaled per breath taken at the top of the mountain and at the foot of the mountain.



(a) People living at the top of the mountain have more red blood cells per litre of blood than those living at the foot of the mountain. Using the information from the graph above, explain how this adaptation helps them survive better. [2]

_____

_____

_____

_____

SCORE	2

Komathy also wanted to find out whether the number of hours a person jogs in a week affects the number of red blood cells in the body. She collected 5 *ml* of blood each from four persons, W, X, Y and Z.

She measured the amount of red blood cells in the blood samples and recorded the results in the table below.

Person	Number of hours a person jogs in a week	Number of red blood cells in 5 *ml* of blood
W	0	25 million
X	1	26 million
Y	3	28 million
Z	7	30 million

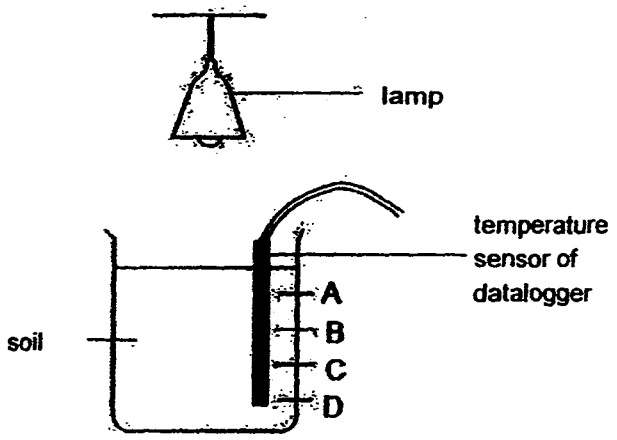
(b) Based on the results, what can Komathy conclude? [1]

_____

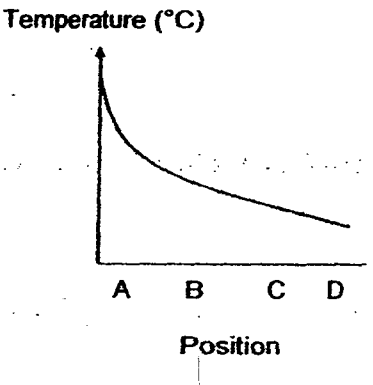
_____

SCORE	
	1

34 David conducted an experiment to see how temperature changes with the depth of soil using the set-up shown below. After the lamp had been turned on for one hour, David recorded the temperature of the soil as measured by the temperature sensor.



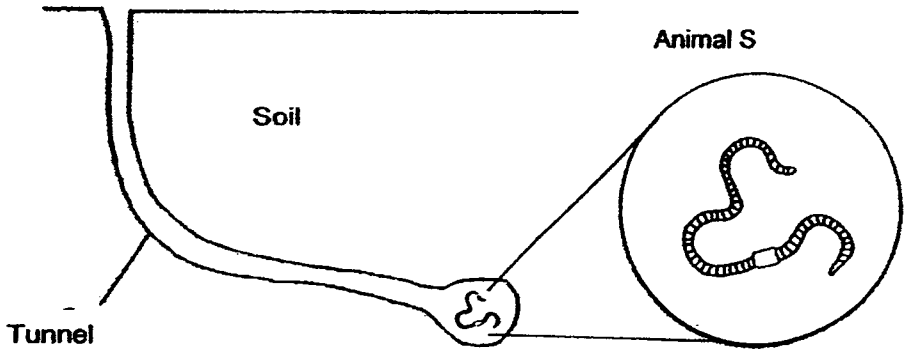
His results are shown in the graph below.



(a) Based on his results, state the relationship between temperature and the depth below the soil surface. [1]

SCORE 1

(b) Animal S lives in a desert which is hot and dry. It stays in an underground tunnel during the day.



Based on David's experiment, explain how staying underground during the day helps animal S survive the hot and dry desert environment. [1]

_____

_____

(c) Give another advantage for animal S to stay underground during the day. [1]

_____

_____

SCORE	2

35 Animal Z can only be found on a few islands in Indonesia. The skull of the adult of animal Z is shown below.

(a) Based on the picture shown above, state the type of diet the adult of animal Z is most likely to have. [1]

_____

(b) The young of animal Z lives on trees for their first few years of their lives before they come down to the ground because they are unable to defend themselves.

Explain how living on trees helps in the survival of animal Z. [1]

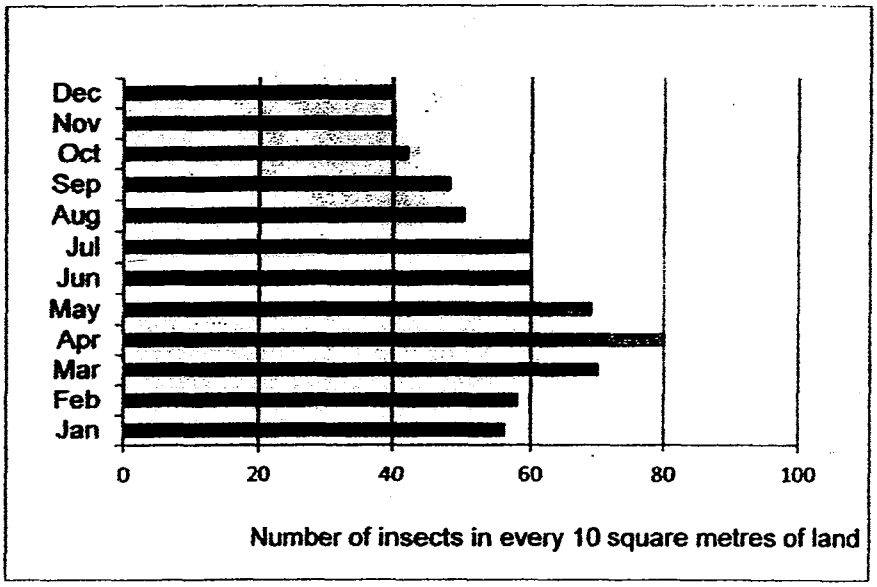
_____

_____

SCORE	2

(c) The young of animal Z eats mainly insects.

The graph below shows the population of insects in an area over the year.



The eggs of Animal Z normally hatch in April. Based on information provided in the graph, explain how this is an advantage to the young of Z. [1]

_____

_____

SCORE	1

36 Sea urchins are organisms that live in the oceans.

The sea urchin is part of the food chain shown below.

Algae ⟶ Sea urchin ⟶ Sea otter

(a) Sea urchins are sensitive to the changes in the amount of light. With reference to the food chain above, explain how this adaptation helps the sea urchin to protect itself from the sea otter during the day. [1]

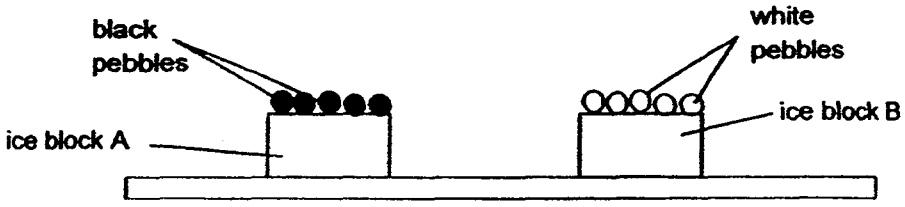
When threatened, the sea urchin points its poisonous spines towards its predator.

(b) Fish A has stripes on its body. Explain how living amongst the long spines of the sea urchin helps Fish A survive. [1]

SCORE	2

37 Edwina wanted to find out the effect of different coloured pebbles on the melting rate of ice.

She placed two similar blocks of ice, A and B, on a table. She placed five black pebbles on Block A and five white pebbles on Block B.



She recorded the time taken for the blocks of ice to melt completely in the table below.

	Block A	Block B
Time taken for ice to melt completely (min)	20	37

(a) Which block of ice melted first? Explain Edwina's observation. [1]

A glacier is a huge mass of moving ice found high up in the mountains. It is made up of layers of ice that have piled up on top of each other over thousands of years.

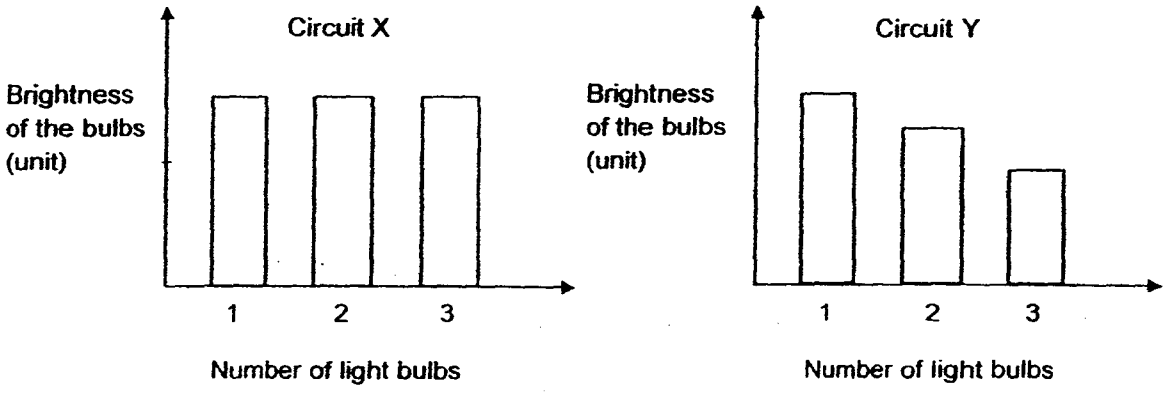
Sometimes, the glaciers move past rock walls and bits of dark-coloured rocks fall off and land on the glacier below.

(b) Using the information in part (a), explain how these bits of dark-coloured rocks that fall off and land on the glacier will cause the sea levels to rise faster. [1]

SCORE	
	2

38 Melissa set up two different electrical circuits, X and Y, using identical light bulbs and two identical batteries each. Next, she measured the brightness of the light bulbs as she added more bulbs to each circuit while keeping the number of batteries the same.

Based on the readings recorded, Melissa plotted the graphs as shown below to compare the brightness of the bulbs in the two circuits.

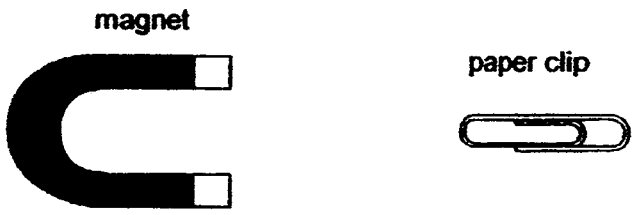


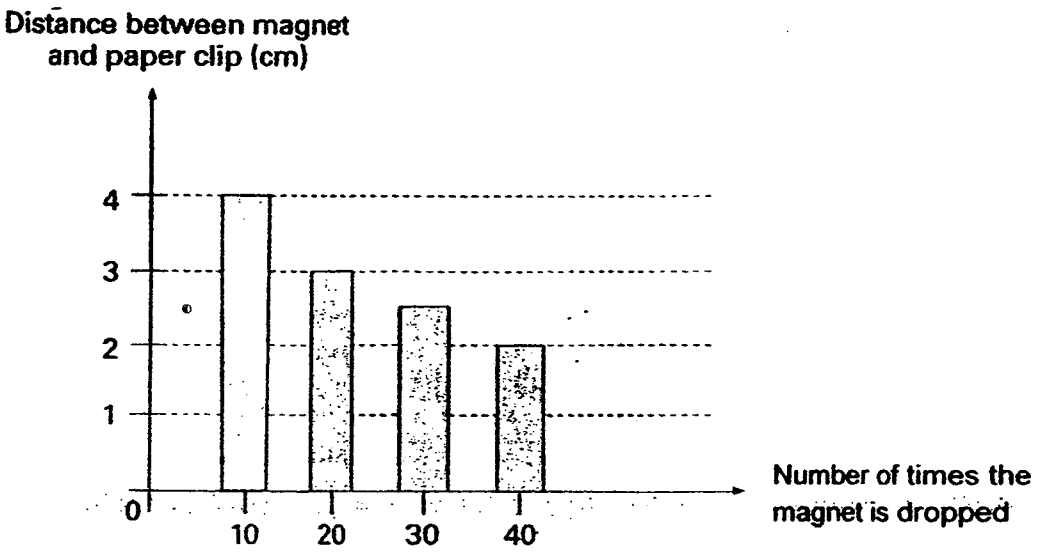
Based on the graphs above, draw circuit diagrams to represent circuits X and Y, using only 2 bulbs and 2 batteries in each circuit. [2]

Circuit X	Circuit Y

SCORE 2

39 Alexis conducted an experiment to find out how the strength of a magnet is affected when it is dropped. She counted the number of times a magnet was dropped and measured how close the magnet must get to a paper clip in order to attract it. The graph below shows the results of her experiment.





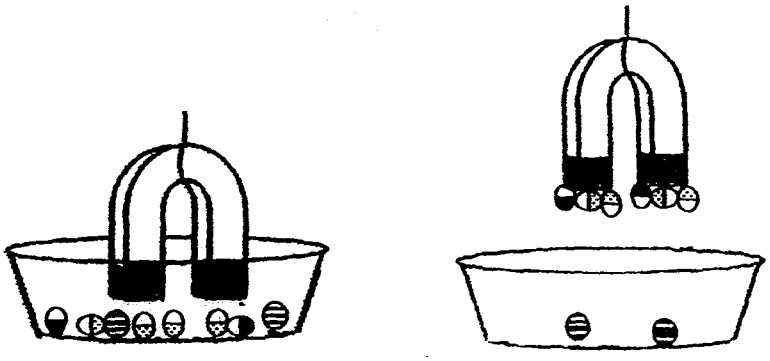
(a) What can Alexis conclude about the relationship between the number of times a magnet is dropped and the strength of the magnet? [1]

_____

_____

SCORE	1

39b. Alexis lowered the magnet into a container of balls and lifted the magnet after five seconds. The diagram below showed what she observed.



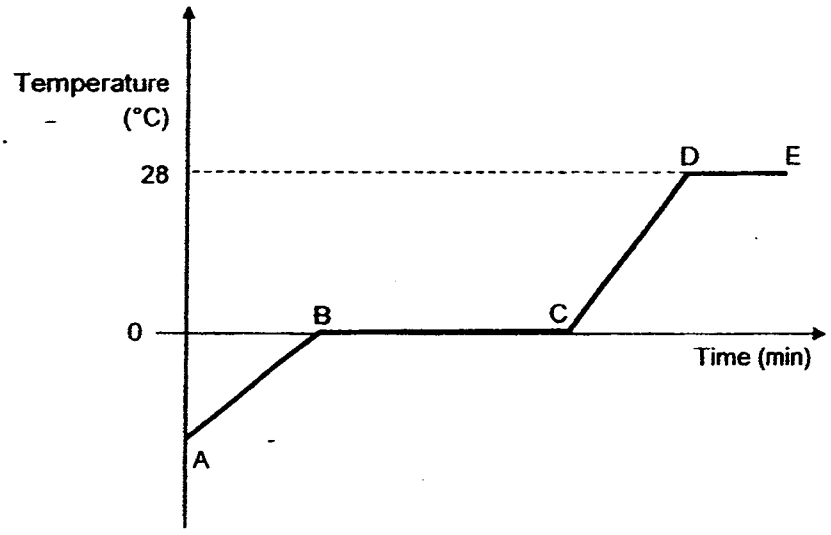
Tick the correct box to show the properties of the balls in the container. [2]

	Magnet	Magnetic material	Non-magnetic material
●			
⊖			
⊜			

SCORE	2

40 Some ice cubes were taken out of the freezer and left on the table.

Joel drew a graph after observing the ice cubes for a while.



(a) Name the process taking place between line BC. [1]
Indicate whether there is heat gain or heat loss during that process.

Process	Heat gain / Heat loss

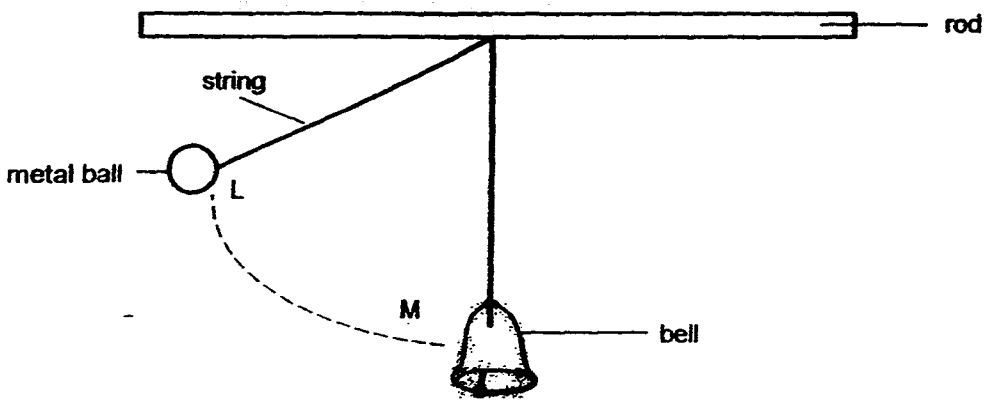
(b) In another experiment, Joel took some ice cubes out from the freezer and put it in a refrigerator with the temperature set at 1°C. He predicted that the ice would not melt. Do you agree with his prediction?
Explain your answer. [1]

_____

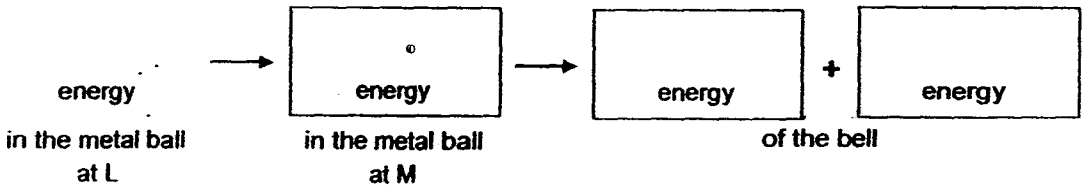
_____

SCORE	2

41 Yvonne hung a metal ball from a string and released it from Position L. The ball swung downwards and hit the bell.



(a) State the main energy changes that took place when the ball was released at Position L. [2]



(b) Will the bell sound louder when the metal ball is released at Position L or at M? Explain your answer. [1]

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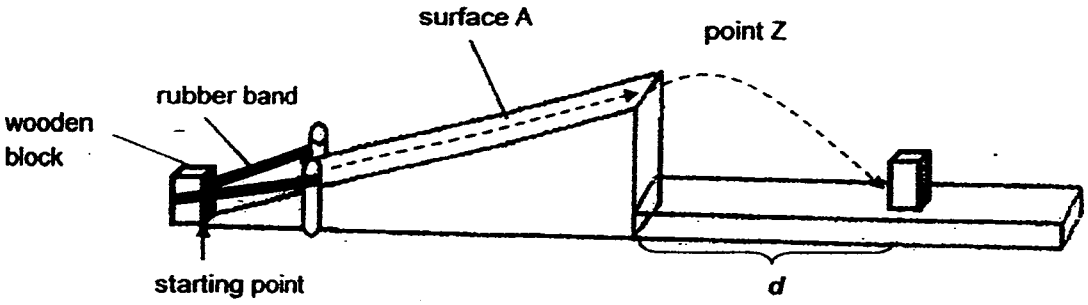
SCORE	/ 3

42 Gina wanted to find out the distance travelled by a rectangular wooden block after it leaves the surface of a ramp. She released the rubber band and the wooden block moved along the surface of the ramp until the edge of the ramp, point Z. The block leaves the ramp at point Z, and lands a distance away. She measured the distance, *d*, between the base of point Z and where the block landed.

She repeated the experiment with two other surfaces, B and C. The starting point remained the same.



Surface	Distance *d* (cm)
A	20
B	55
C	30

(a) Based on the table, which surface, A, B or C produced the least friction? Explain your answer. [1]

_____

_____

(b) Gina used the same wooden block throughout the experiment. Give a reason to explain how using the same wooden block helps to make the experiment a fair test. [1]

_____

_____

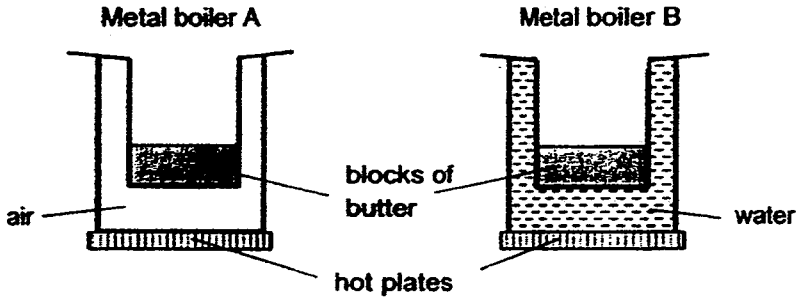
SCORE 2

(c) Huiling wanted to find out the relationship between the area of contact of the wooden block with the surface and the distance between Point Z and where the block landed, *d*

Using the same rectangular wooden block, how should Huiling modify Gina's experiment? [2]

SCORE	/ 2

43 Wendy placed identical blocks of butter into two identical metal boilers, A and B. She heated the boilers over hot plates. An equal amount of heat was supplied to heat them.



Wendy recorded her observations in the table below.

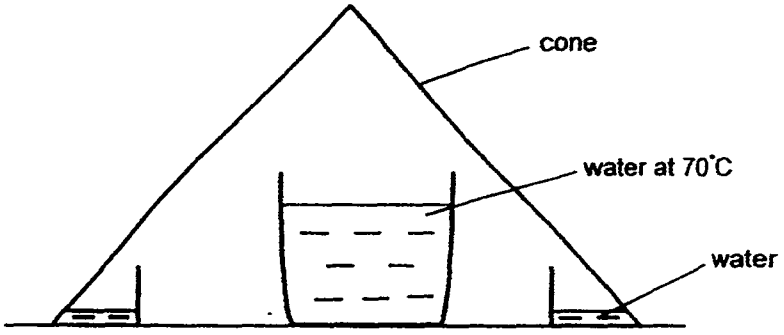
Metal boilers	Time taken for the butter to melt completely (min)
A	5
B	3

(a) Based on the results, explain Wendy's observation. [2]

(b) The boiler can be used to keep soup hot after it has been removed from the heat source. Give a reason why Wendy should use a ceramic boiler instead of a metal boiler for this purpose. [1]

SCORE 3

44 Halimah placed a metal cone over a beaker of water at 70 °C. The following experiment is conducted in a room of temperature 30 °C.



After some time, she observed some water collected at the base of each cone as shown above. She measured the volume of water collected at regular intervals for a period of time.

Time after start of experiment (min)	Total volume of water collected (cm^3)
1	10
2	15
3	18
4	20

(a) Halimah observed that the rate at which the volume of water collected decreased after some time. Explain her observation. [1]

_____

_____

(b) Using the same set-up as shown above, what difference in results will she observe if she used water at 5 °C instead of 70 °C? Explain your answer. [2]

_____

_____

_____

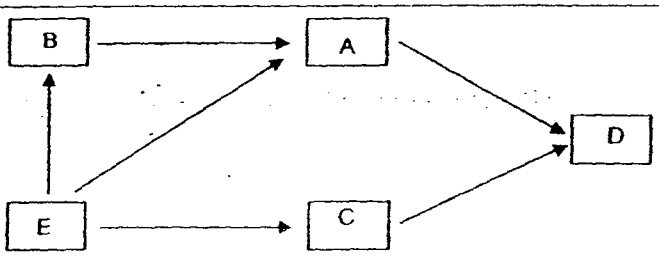
End of Paper

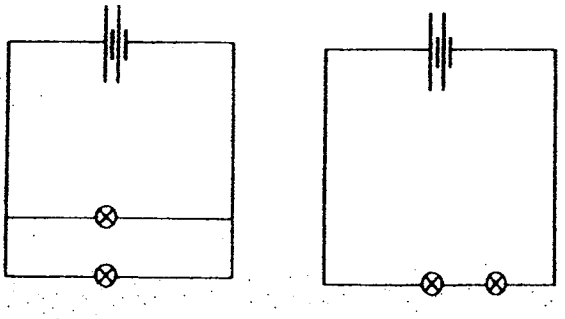
SCORE	/ 3

Primary 6 Preliminary Examination 2016

Science

BOOKLET B

Qn	Acceptable answers
31	
(a)	The cells in the top layer are closer to the sun. With more chloroplasts, they are able to trap more sunlight to make food.
(b)	When the temperature of the surroundings is higher, having smaller the openings in the leaves will minimize water loss through these openings.
(c)	The needle-like leaves reduces the exposed surface area to the surrounding. This reduces water loss through the stomata.
32	
(a)	
(b)	Organism A
(c)	When there are fewer organisms A, the population of organism D will have less food and will eat more organism C. Thus, the population of organism C will decrease. OR When there is fewer organism A, the population of organism E will increase. The population of organism C will have more food and thus, the population of organism C will increase.
(d)	Organism E When there is fewer Organism E, there will be lesser food for B and C, thus leading to fewer A, B,C and D.
33	
(a)	On the top of the mountain, a smaller volume of oxygen is inhaled in each breath. With more red blood cells, they can carry more oxygen to different parts of the body at any one time.

(b)	The more times a person exercise in a week, the number of red blood cells in the blood of the person increases.
34	
(a)	As the depth of the soil increases, the temperature decreases.
(b)	By staying underground, Animal S can keep cool / will not over heat / avoid heatstroke.
(c)	By hiding underground in the day, Animal S is less likely to be detected / seen by its predators.
35	
(a)	Animal Z eats meat .
(b)	Living on trees protects the young of Animal Z from being eaten by the predators / adults of Z.
(c)	The young hatches in April when there is the greatest number of insects. This ensures that the young has enough/sufficient food to grow and develop.
36	
(a)	When the sea otter swims near the sea urchin, light is blocked / a shadow is cast. The sea urchin will be able to detect the presence of the sea otter.
(b)	The patterns of Fish A help it to camouflage against the urchin spines and thus, is not easily spotted by its predator
37	
(a)	Block A melted first. The black pebbles are darker coloured and absorb more heat, thus more heat is conducted from the surroundings to the block of ice , causing the ice block to melt faster.
(b)	The dark-coloured rocks absorb more heat and conduct more heat to the glacier to melt faster, leading to a faster rise in the sea levels.
38	
	 Circuit X Circuit Y
39	
(a)	The more the number of times a magnet is dropped, the weaker the magnet.

(b)

	Magnet	Magnetic material	Non-magnetic material
	✓		
		✓	
			✓

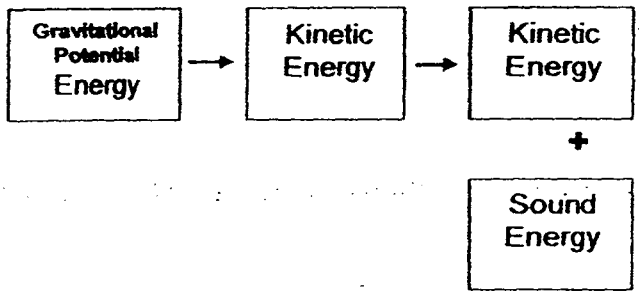
40

(a) Melting
Heat gain

(b) No, 1°C is a higher temperature than the melting point of ice, 0°C. Hence, ice will melt.

41

(a)



(b) Position L. Position L is at a higher height than Position M. The ball at Position L has more gravitational potential energy which is converted to more kinetic energy], hitting the bell at a greater impact, causing the bell to sound louder.

42

(a) Surface B. The wooden block that moved on surface B landed the furthest

(b) A heavier wooden block will travel a shorter distance as there is increased friction between the surfaces in contact. / A lighter wooden block will travel a longer distance as there is less friction between the surfaces in contact.

(c) Do not change the surfaces of the ramp.
Use the same block but with different surface area in contact with the surface of the ramp

43

(a) Water is a better conductor of heat than air.It gained heat faster from the hot plate and transferred heat to the block of butter faster thus melting the blocks of butter more quickly.

(b)	Ceramic is a poorer conductor of heat than metal so it will lose heat slower to the surroundings,keeping the food hot for a longer period of time. OR Metal is a better conductor of heat than ceramic so it will lose heat faster to the surroundings and will not be able to keep the food hot for a longer period of time.
44	
(a)	The metal cone gained heat resulting in a smaller temperature difference between the cone and the water vapour, hence the rate of condensation will be slower.
(b)	Water droplets will form on the outer surface of the beaker instead of the underside of the metal cone. The water in the beaker is colder than before at 5 °C so the beaker has a cooler surface. The water vapour from the surrounding came into contact with the cooler surface of the beaker and condensed to form water droplets.

Section A

Q1	2	Q6	2	Q11	2	Q16	3	Q21	2	Q26	1
Q2	2	Q7	3	Q12	4	Q17	4	Q22	1	Q27	2
Q3	4	Q8	3	Q13	2	Q18	4	Q23	2	Q28	4
Q4	1	Q9	3	Q14	3	Q19	4	Q24	4	Q29	1
Q5	3	Q10	4	Q15	3	Q20	3	Q25	3	Q30	4

END