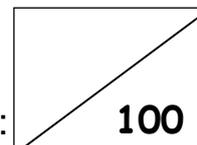


MENDAKI TUITION SCHEME
PSLE 2013
SCIENCE
PRIMARY SIX

Name : _____ ()

Class : Pri. 6 ()

Marks:



Date : _____

Duration : 1 h 45 min

Parent's Signature: _____

Sections	Marks
A: MCQs	/60
B: Structured	/40
TOTAL	/100

DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO.

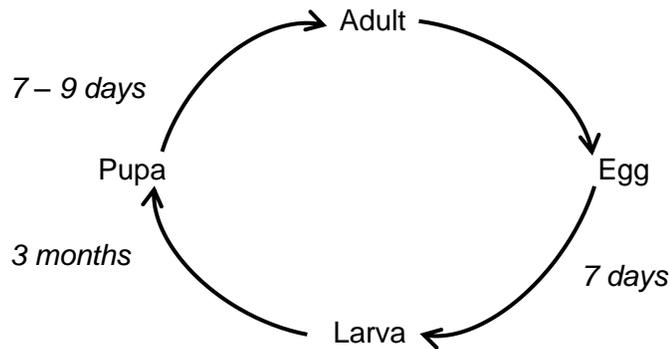
FOLLOW ALL INSTRUCTIONS CAREFULLY.

ANSWER ALL THE QUESTIONS.

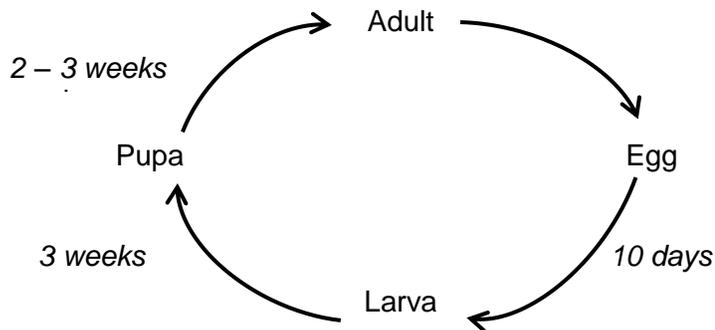
Section A (30 X 2 marks = 60 marks)

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). Write the correct answer clearly in the brackets provided.

1. The diagrams below show the life cycle of two insects, X and Y.



Life cycle of Insect X



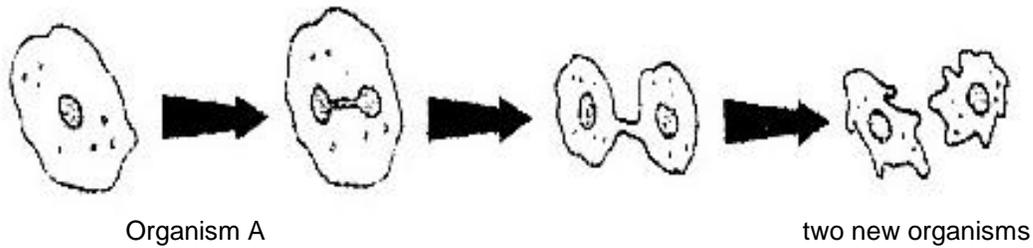
Life cycle of Insect Y

The diagrams **cannot** be used to compare _____.

- (1) how the insects reproduce
- (2) the lifespan of the two insects
- (3) the number of stages in the life cycle
- (4) the length of time it takes the egg to hatch

()

2. A scientist was observing a single-celled Organism A under a microscope.



Based on his observations, which of the following statements about Organism A is true?

- (1) Organism A reproduces by dividing.
- (2) Organism A produces reproductive cells.
- (3) Only the nucleus in Organism A divides itself.
- (4) Organism A combines with another organism to reproduce. ()

3. Rooney studied the characteristics of four different organisms A, B, C and D, which he found in his school Eco-garden and recorded his observations in the table below.

Organism	Reproduced From spores	Decomposers	Cause diseases	Produce flowers
A	✓	✓	✓	
B		✓	✓	
C	✓			
D				✓

Which one of the following organisms best represents the Bird's Nest Fern?

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

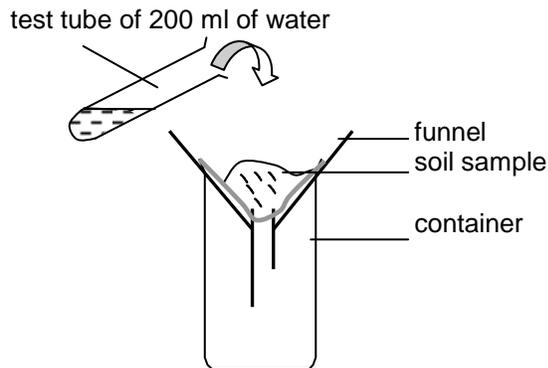
4. The table below shows the percentage of living organisms in a community.

Organisms	Role in community	Percentage
Lalang	Producer	10%
Grass	Producer	30%
Spider	Carnivore	3%
Cockroach	Omnivore	7%
Slug	Herbivore	15%
Beetle	Herbivore	15%
Millipede	Herbivore	20%
Total		100%

Based on the above data, which one of the statements is definitely **wrong**?

- (1) The spider prey on the millipede.
- (2) There are seven populations in the community.
- (3) These organisms can be found at seashore.
- (4) The number of food producers is greater than the carnivores. ()

5. Palermo collected four soil samples A, B, C and D, and set up the experiment as shown below.



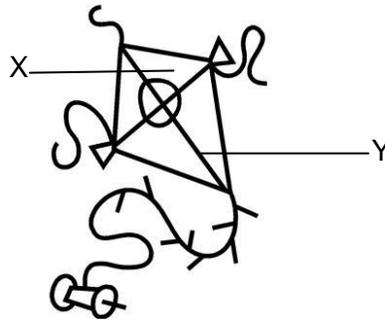
200 ml of water from a test tube was poured into each soil sample. He recorded the time taken for the first drop of water to drip into the container. After 20 minutes, he measured the amount of water that had been collected in each container and recorded the results as shown below.

Soil sample	Time taken for first drop of water to flow out (s)	Amount of water collected after 20 minutes (ml)
A	40	156
B	9	190
C	95	98
D	115	48

Which soil sample is most likely to be found in a place where a plant with needle-like leaves grows well?

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

6. Look at the different parts of a kite below.

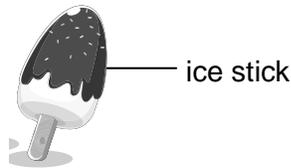


Which of the following correctly identifies the properties needed for parts X and Y of the kite to enable it to fly well?

	X	Y
(1)	Elastic	Light
(2)	Transparent	Flexible
(3)	Light	Hard
(4)	Hard	Elastic

()

7. Lina and Faris had four identical frozen ice stick. They placed each ice stick on a plate and put each plate in different corners A, B, C and D, in the classroom for half an hour.



After half an hour, they measured the volume of liquid on the plate to find out how much ice has turned to liquid.

The result is as shown below.

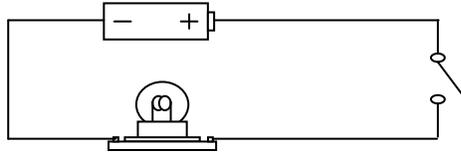
Corner	A	B	C	D
Volume of liquid on the plate (cm ³)	13	18	8	15

From the information given above, which corner is the warmest?

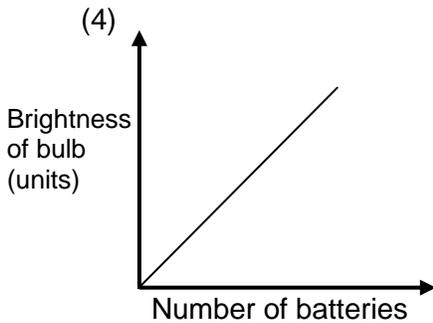
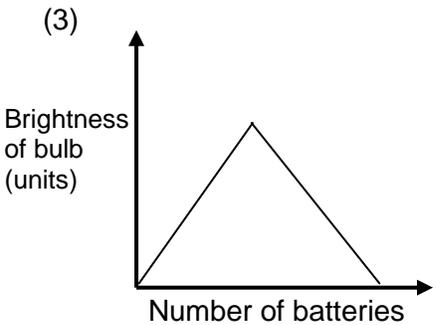
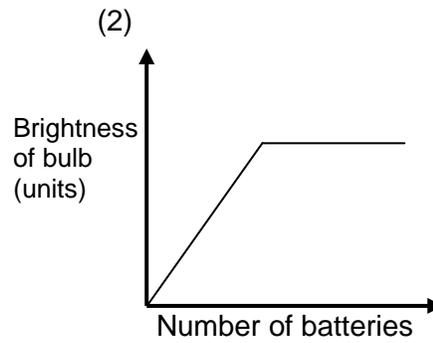
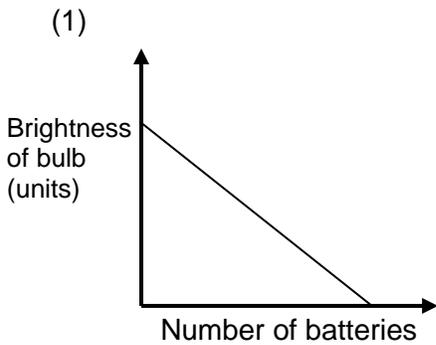
- (1) Corner A
- (2) Corner B
- (3) Corner C
- (4) Corner D

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8. Jim prepared a simple electrical circuit as shown below. He recorded the brightness of the bulb. Then, he added another battery in series and recorded the brightness of the bulb again. He continued to increase the number of batteries to the circuit.

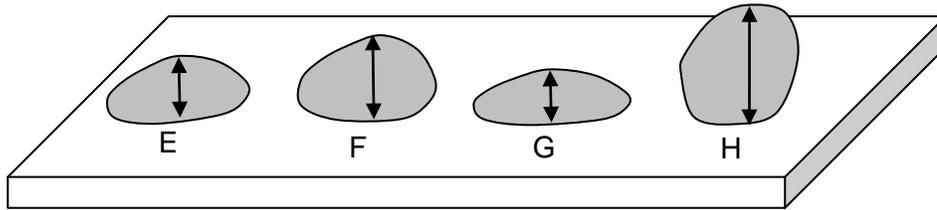


Which one of the following graphs below shows the correct representation of his recordings?



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9. Andy made four plasticine balls E, F, G and H. The balls are all of the same size and mass. He then dropped each ball from a different height onto a table top.



He recorded the heights of the balls immediately after the drop in the table below.

Height of plasticine balls after the drop (cm)			
E	F	G	H
18	15	9	23

Which of the following shows the correct order of the ball being dropped from the highest height to the lowest height?

- | | <i>Greatest height</i> | → | <i>Lowest height</i> | |
|-----|------------------------|---|----------------------|--|
| (1) | G | | E F H | |
| (2) | H | | F E G | |
| (3) | F | | E H G | |
| (4) | G | | F E H | |

()

10. Kim, Nora, Hani and Janet were at their school playground. While playing at the gymnastic bars, they realized that the bars were hot. They wanted to find out which bar was the hottest.

Kim : *All the bars feel hot to me, so there is no way that we can test which bar is the hottest.*

Nora : *We should find out the temperature of the bar so that we can make comparison.*

Hani : *One bar feels hot to me. I don't think we need to find out which bar is the hottest as I already know the answer.*

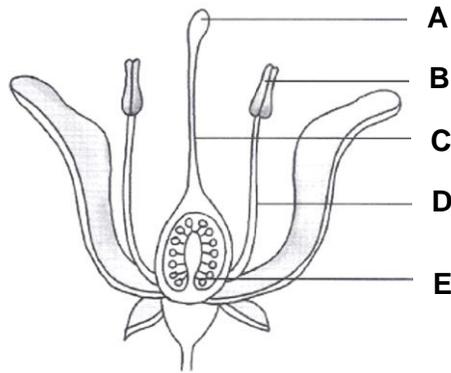
Janet : *We can take a vote on which bar we think is the hottest, in that way we can be fair.*

Who has made the correct statement on how they can find out which bar was the hottest?

- (1) Kim
 (2) Nora
 (3) Hani
 (4) Janet

()

11. Study the picture of the cross-sectional view of a flower below.

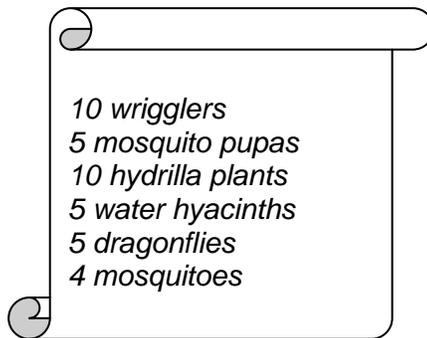


Which of the following correctly shows the path taken by a male reproductive cell when self-pollination takes place?

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

()

12. Rita wanted to find out the populations found in a pond community. She made some observations and collected some pond water samples. She noted down what she had found out below.

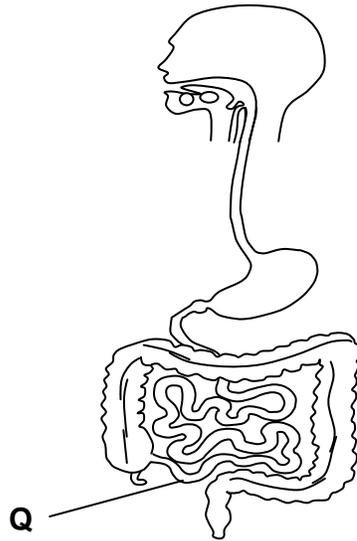


How many populations of organisms are there according to her findings?

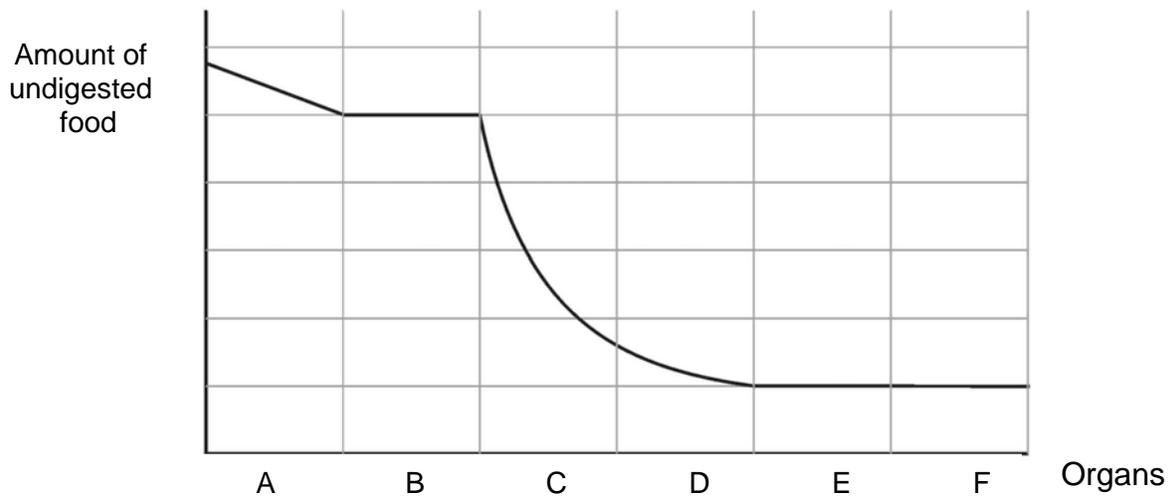
- (1) 39
- (2) 6
- (3) 5
- (4) 4

()

13. The diagram below shows part of the human digestive system.



The graph below shows the amount of undigested food at different parts of the digestive system.

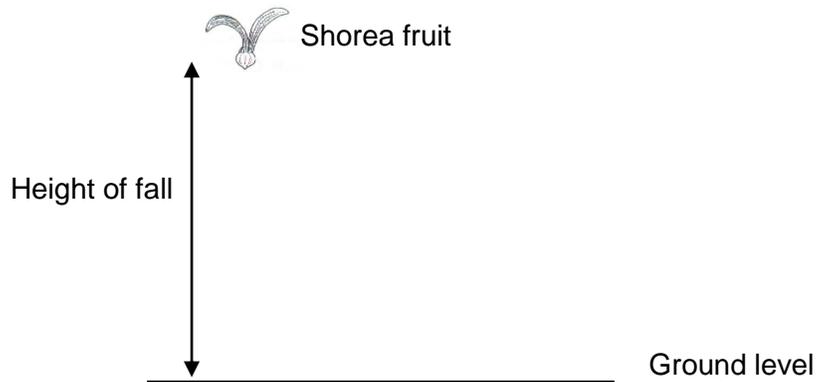


Which part of the graph above would best represent Part Q of the human digestive system?

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

()

14. Joe and his friends were investigating how the mass of a shorea fruit could affect its landing time. They wondered if attaching different number of paper clips to the shorea fruit would make a difference to the time it took to reach the ground. They dropped the shorea fruit from the same height and measured the time it took to reach the ground.



Their results are recorded in the table below.

Number of paper clips attached	Time taken for shorea fruit to reach the ground(s)			
	1 st Try	2 nd Try	3 rd Try	Average
1	1.0	1.1	0.9	1.0
2	1.0	0.9	0.8	0.9
3	0.8	0.7	0.9	0.8
4	0.7	0.6	0.8	0.7
5	0.4	0.5	0.3	0.4

Based on the above table, which conclusion is correct?

- (1) As the number of paper clips attached increases, the time taken for the shorea fruit to reach the ground remains the same.
- (2) As the number of paper clip attached increases, the time taken for the shorea fruit to reach the ground increases.
- (3) As the number of paper clip attached increases, the time taken for the shorea fruit to reach the ground decreases.
- (4) As the time taken for the shorea fruit to reach the ground decreases, the number of paper clips attached increases.

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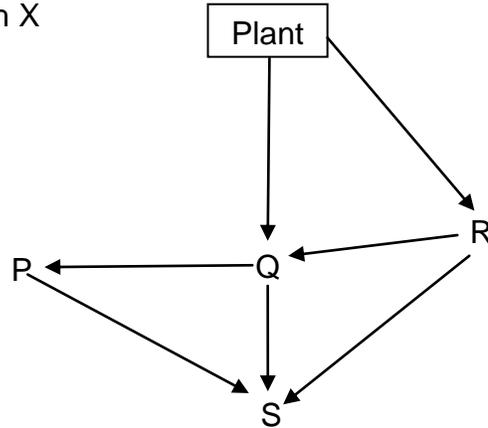
15. The diagrams show two types of teeth found in the animals of the food web below.



Teeth X



Teeth Y

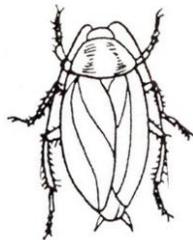


Match the animals (P, R and S) to the type of teeth (Teeth X or Teeth Y) they would have.

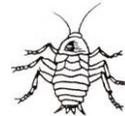
	P	R	S
(1)	X	Y	X
(2)	X	X	Y
(3)	Y	Y	X
(4)	Y	X	X

()

16. Study the pictures of an animal and its young.



Adult



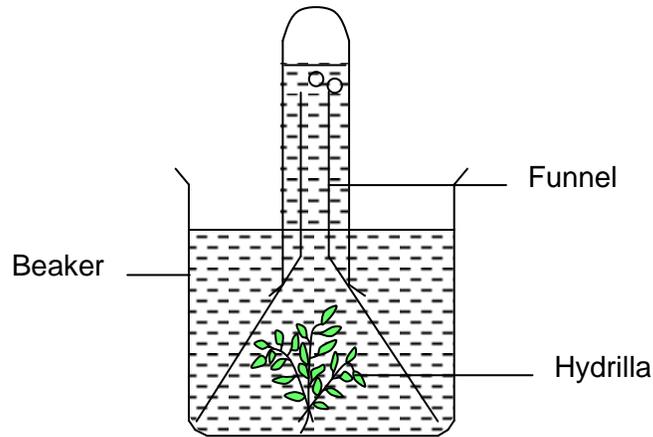
Young

In what way is the young similar to the adult? Both _____.

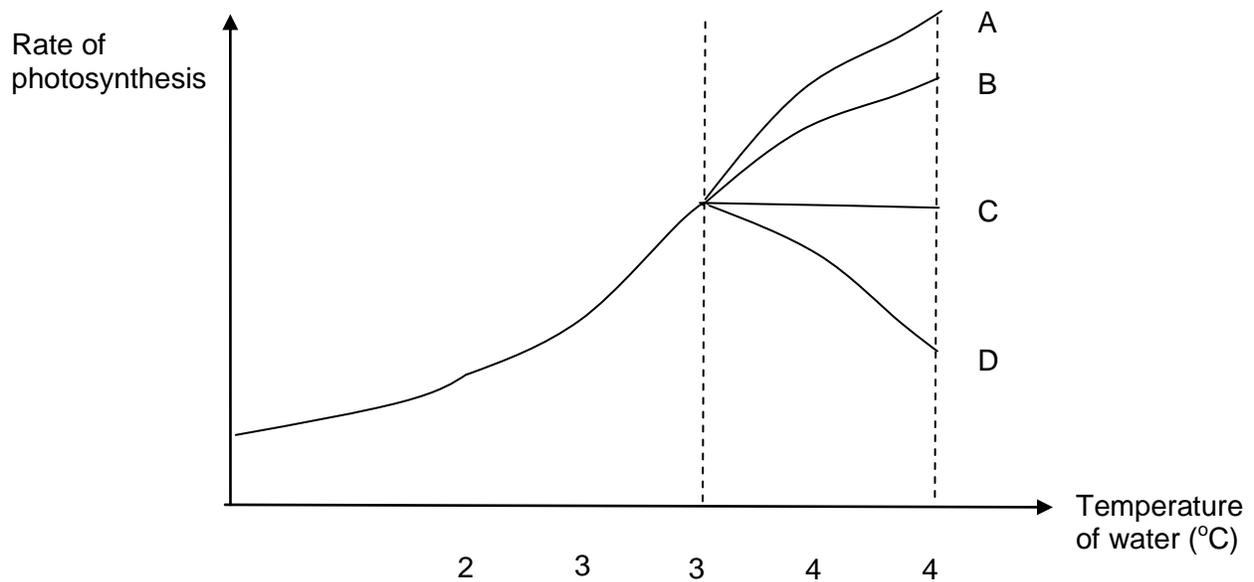
- (1) have wings
- (2) crawl and fly
- (3) eat the same food
- (4) moult several times

()

17. James carried out an experiment to find out the effect of temperature on the rate of photosynthesis of the hydrilla. He left the set-up under a light source for a few minutes as shown in the diagram below. James found out that the maximum rate of photosynthesis was reached at 35°C and any higher temperature would cause a decrease in the rate of photosynthesis.



He plotted the graph below to show the results of his experiment when the temperature of the water was at 25°C, 30°C and 35°C respectively.

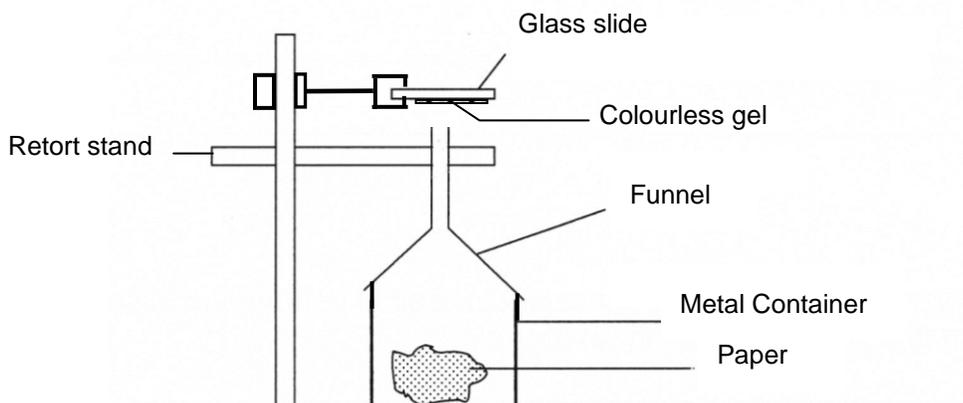


Which line graph shows the possible rate of photosynthesis when the temperature was between 35°C and 45°C?

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

()

18. Jane conducted an experiment using four substances; paper, rubber, wood and charcoal. She used the setup shown in the diagram below.



She carried out the following steps:

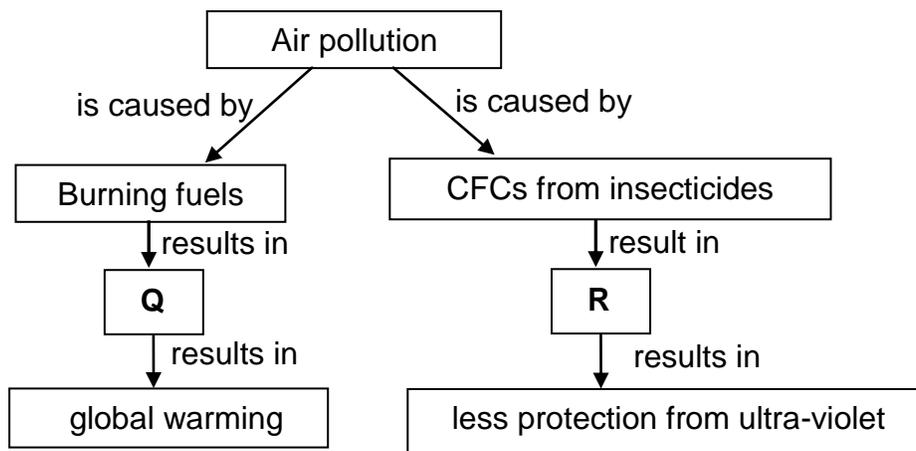
- Put the piece of paper inside the metal container.
- Add a few drops of oil to the paper.
- Light the paper and allow the smoke to escape through the funnel.
- Replace the colourless gel-coated glass slide with a similar one.
- Repeat steps (a) to (d) using the charcoal, rubber and wood in turn.

What is the aim of Jane's experiment?

- To find out which of the four substances burns the fastest.
- To find out whether the four substances are renewable resources.
- To show that the burning of the four substances can cause pollution.
- To collect the gases produced during the burning of the four substances.

()

19. Study the concept map below carefully.



What are Q and R likely to be?

	Q	R
(1)	Formation of acid rain	Greenhouse effect
(2)	Greenhouse effect	Depletion of ozone layer
(3)	Depletion of ozone layer	Formation of haze
(4)	Formation of haze	Formation of acid rain

()

20. A group of children dropped a tennis ball from a height of 100 cm onto different surfaces and measured how high the ball bounced. They recorded their results in a table as shown below.

Surface	How high the ball bounced (cm)
Glass	40
Tarmac	51
Concrete	61
Clay	47

They then chose one of the surfaces to carry out a second investigation using the same ball dropped from different heights onto this surface. They recorded the height the ball bounced in the table below.

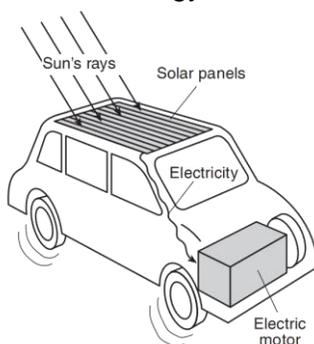
Height of drop (cm)	How high the ball bounced (cm)
50	32
100	48
150	88
200	115

Using the results of their two investigations, which surface did the children use for their second investigation?

- (1) clay
- (2) glass
- (3) tarmac
- (4) concrete

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21. The diagram below shows the main energy conversion of a moving toy car.

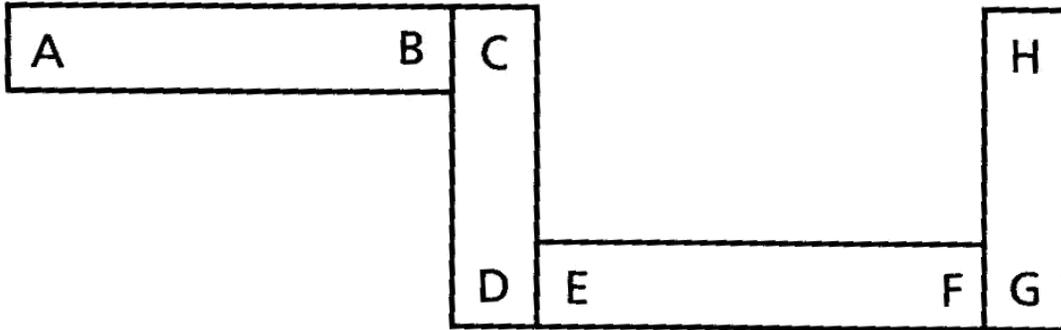


What is the sequence of the energy conversions represented in the diagram?

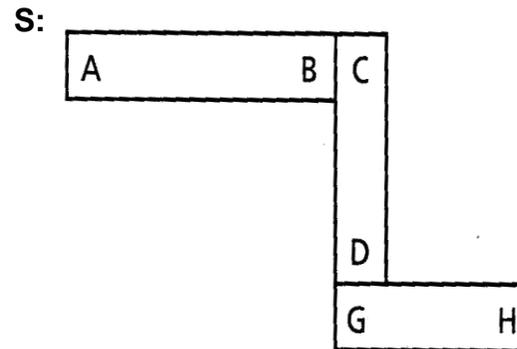
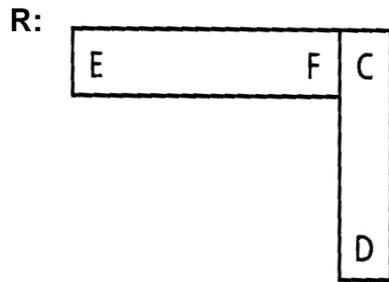
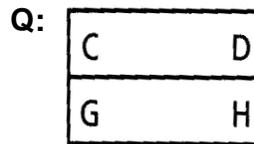
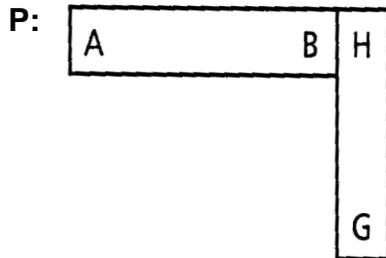
- (1) Solar energy → electrical energy → kinetic energy
- (2) Electrical energy → solar energy → kinetic energy
- (3) Solar energy → chemical potential energy → sound energy → kinetic energy
- (4) Kinetic energy → chemical potential energy → electrical energy → sound energy

()

22. The diagram below shows the arrangement of four bar magnets that attract one another.



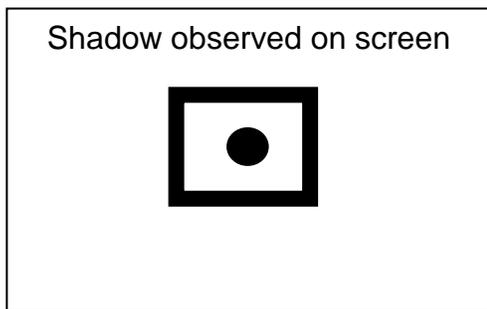
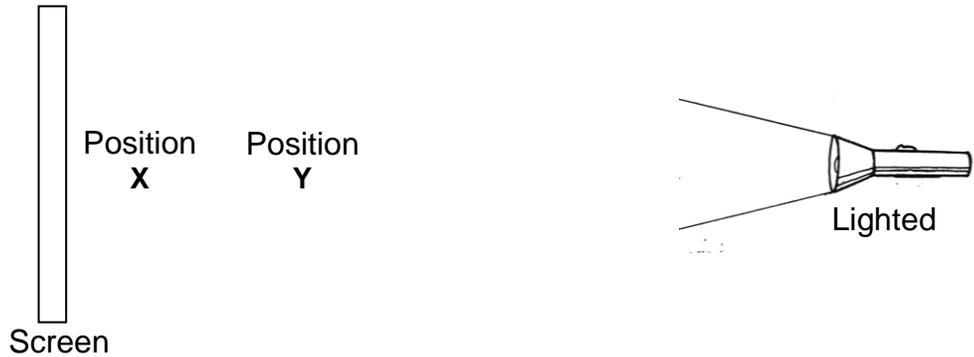
Which of the following arrangements is/are not possible?



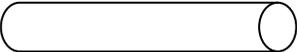
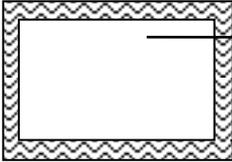
- (1) R only
- (2) P and Q only
- (3) R and S only
- (4) P, Q and S only

()

23. When Sakti placed two objects, one at position (X) and another at position (Y) in the set-up below, the shadow on the screen is observed as indicated below.



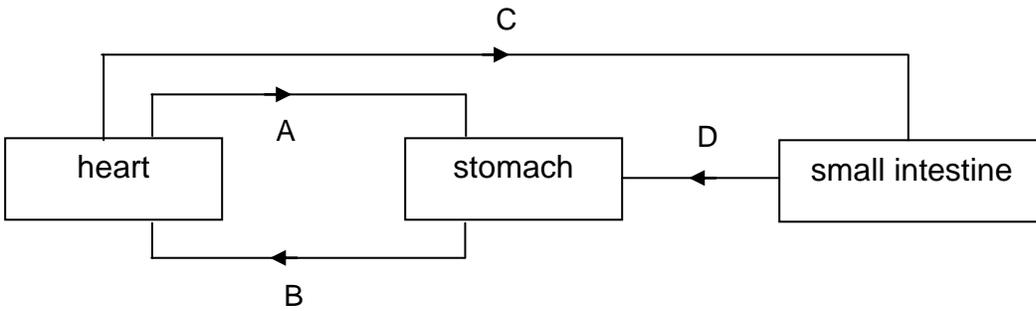
Which of the following can be the objects that Sakti used?

	 <p>Clear plastic</p> <p>Wooden frame</p>
<p>A : hollow paper tube</p>	<p>B: photo frame</p>
	
<p>C: thumbtack</p>	<p>D: cardboard</p>

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

()

24. The diagram below shows part of the circulatory system.

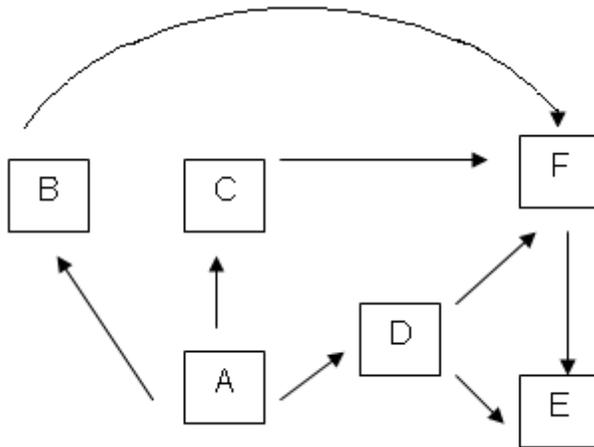


After a meal, which blood vessel A, B, C or D, will contain blood with the **most** amount of digested food?

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

()

25. Study the food web below which shows the food relationships among six organisms A,B,C,D, E and F.

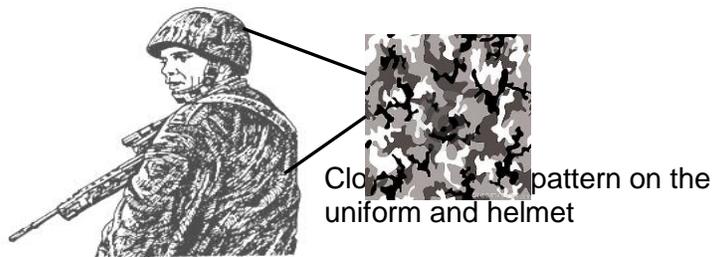


Based on the food web, which one of the following statements about the organisms is **false**?

- (1) E and F depend indirectly on A for survival.
- (2) Only some of the energy in B will be transferred to F.
- (3) Three of the organisms are herbivores and two are carnivores.
- (4) The populations of all the organisms will increase very rapidly if E becomes extinct.

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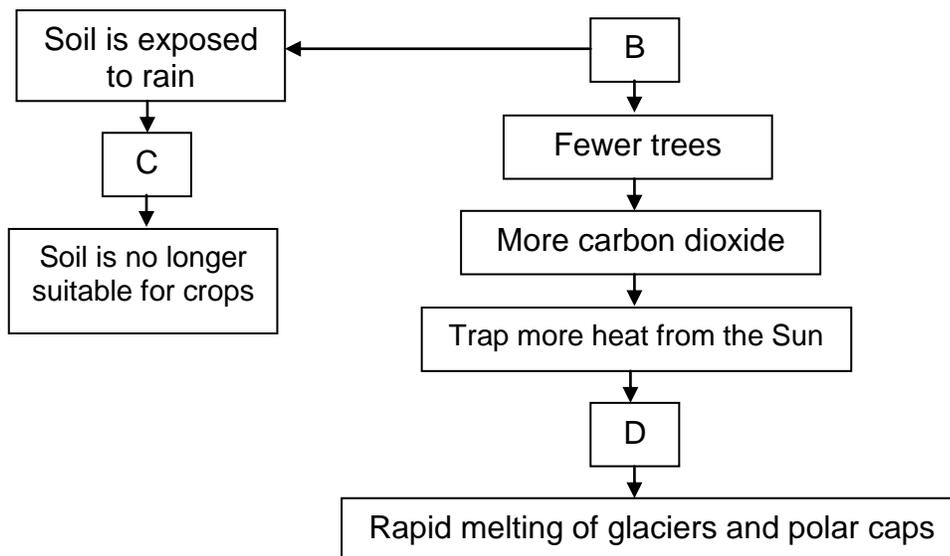
26. James is a soldier. His uniform and helmet have been specially designed with certain pattern and their colours are a mixture of dark brown, black and green. When James goes for his defence training in a jungle, he has to learn how to paint his face and hands with similar colours and pattern.



How will the pattern and colours on his uniform and helmet as well as on his face and hands help him when he is in the jungle?

- (1) He can find food easily.
- (2) He can climb the trees faster.
- (3) He is able to scare the enemies.
- (4) He is able to blend in with the surroundings easily. ()

27. The diagram below is a representation of Man's activities which can have negative effects on the environment.

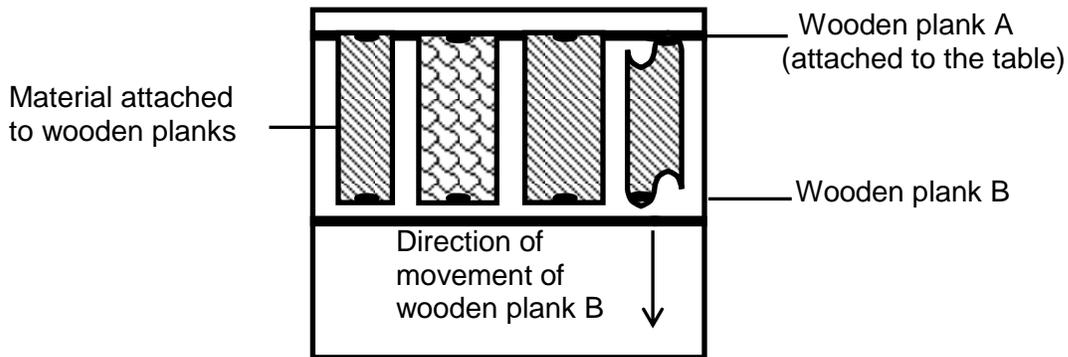


Which one of the following represents B, C and D correctly?

	B	C	D
(1)	Deforestation	Global warming	Burning fossil fuels
(2)	Global warming	Burning fossil fuels	Soil erosion
(3)	Soil erosion	Deforestation	Burning fossil fuels
(4)	Deforestation	Soil erosion	Global warming

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28. Nina cut out pieces of materials from four diving suits as she wanted to find out which material is able to stretch the most. She set up an experiment as shown below.



What changes should she make to the set-up above to enable her to get a set of reliable results?

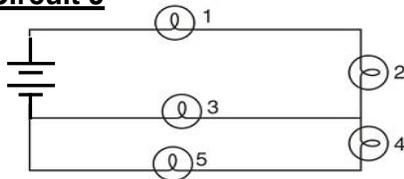
- A: All the materials used should be rectangular.
- B: The four pieces should be of the same material.
- C: The four pieces of material to be of the same width.
- D: The pieces of material should be of different length.

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

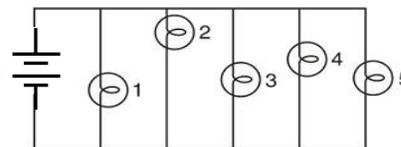
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29. The diagrams show four circuits (J, K, L and M). Each circuit shows a battery connected to five bulbs, 1, 2, 3, 4 and 5.

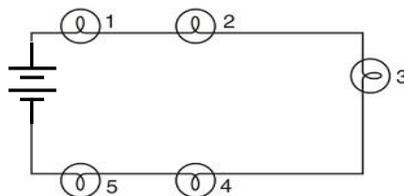
Circuit J



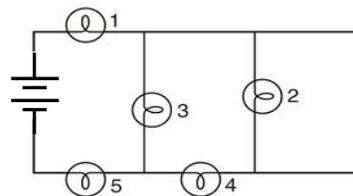
Circuit K



Circuit L



Circuit M

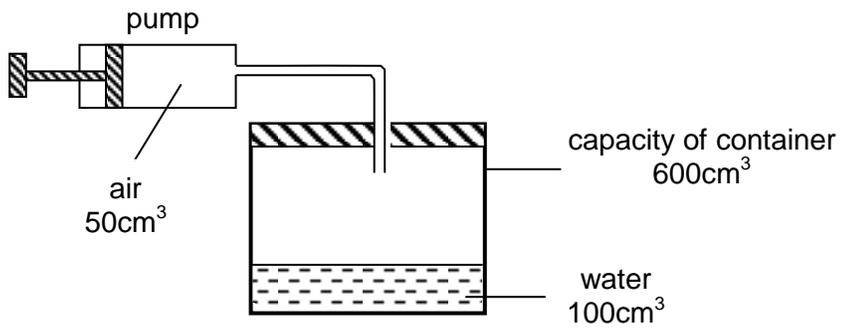


If Bulb 5 fuses, in which circuit will all the remaining bulbs still light up?

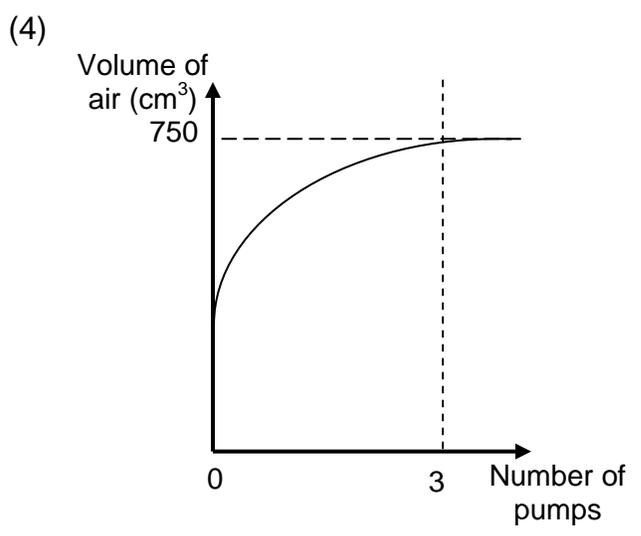
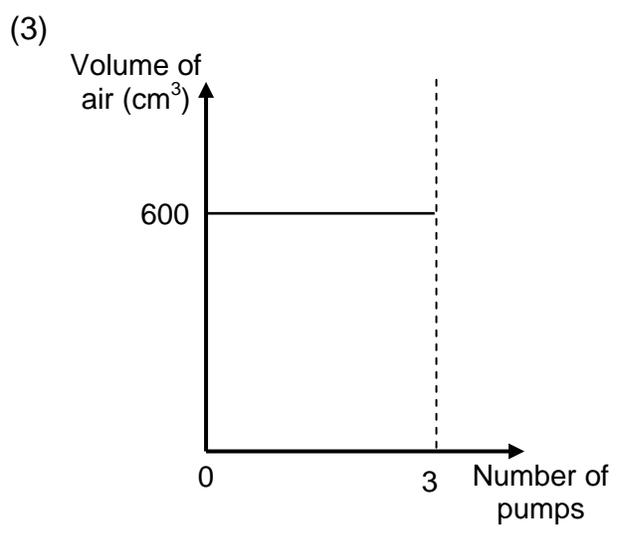
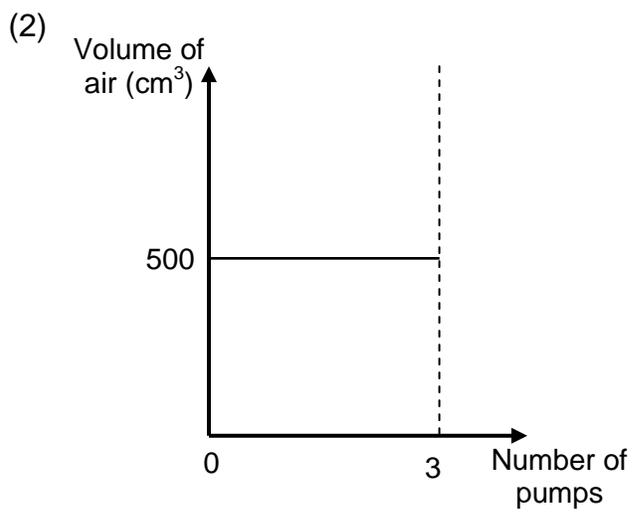
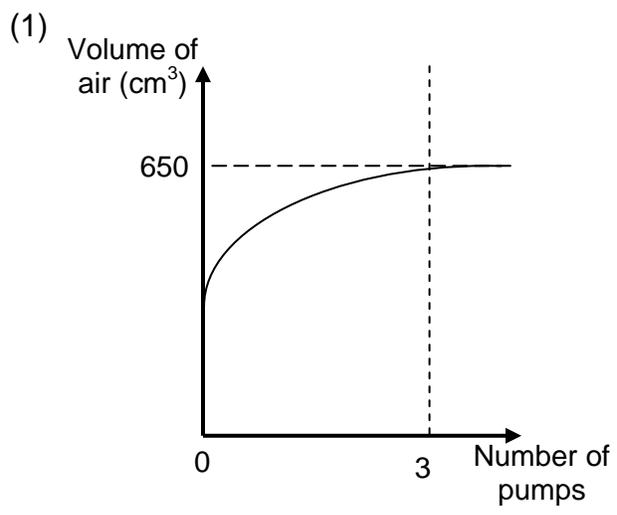
- (1) J
- (2) K
- (3) L
- (4) M

()

30. The diagram below shows a pump fitted to a container with a capacity of 600cm^3 . Each time the pump is pressed, 50cm^3 of air would enter the container. The pump was pressed 3 times in total.



Based on the information above, which one of the following graphs best represents the changes in the volume of air inside the container as the pump was pressed?

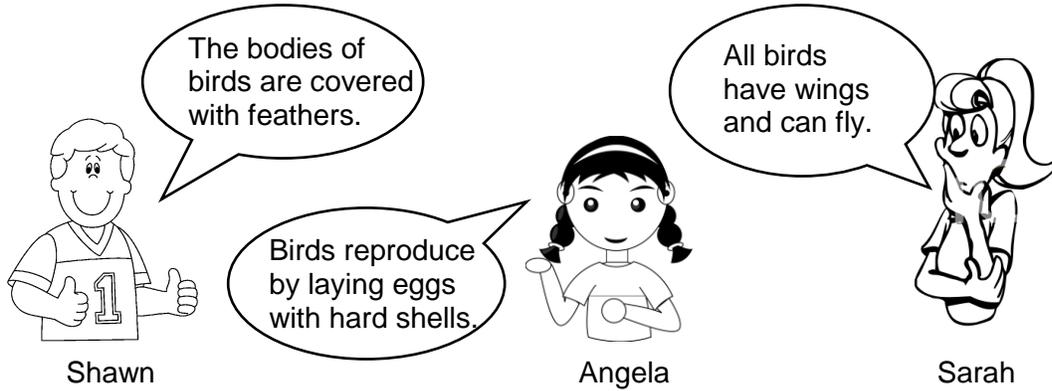


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Section B (40 marks)

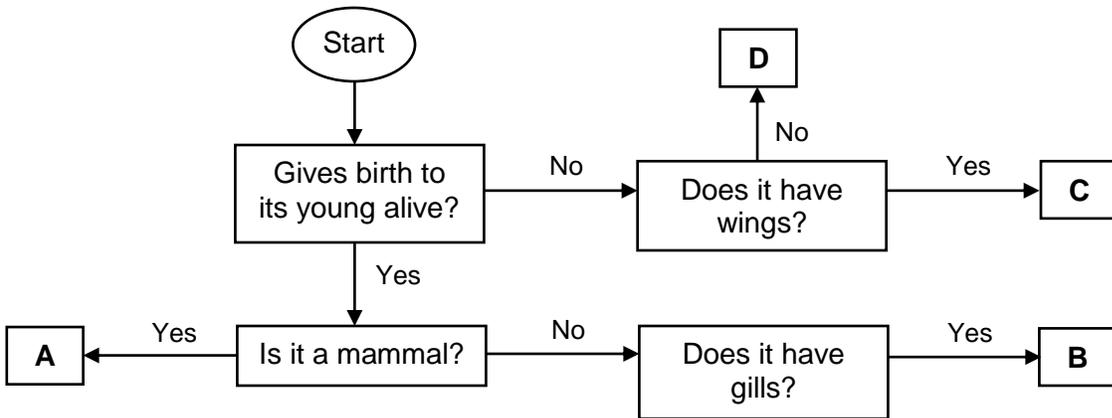
For each question from 31 to 44, write your answers in the space provided. The number of marks available is shown in brackets at the end of each question.

31. Three pupils made the following statements about birds.



(a) Whose statement(s) is / are incorrect? Explain. [1]

Study the flowchart that describes some animals.

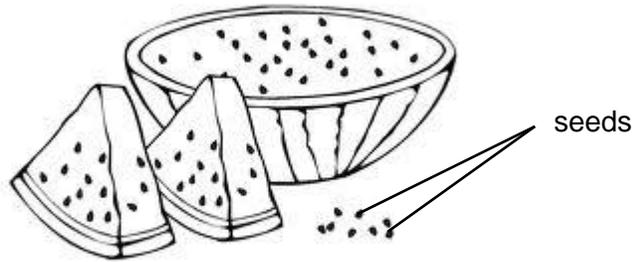


(b) Match the following animals to the correct letters. [1]

Swordtail

Whale

32. Kelvin cut open a watermelon and observed that it contained many seeds.

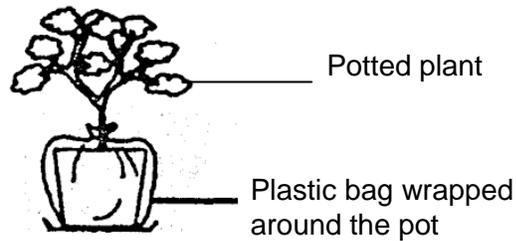


(a) Based on this observation, he concluded that the watermelon flower produced many pollen grains. However, his teacher said that his conclusion was wrong. Why is his conclusion incorrect? [1]

(b) The watermelon is juicy and the seeds are small and hard. Describe how the seeds can be dispersed by animals over a wide area. [1]

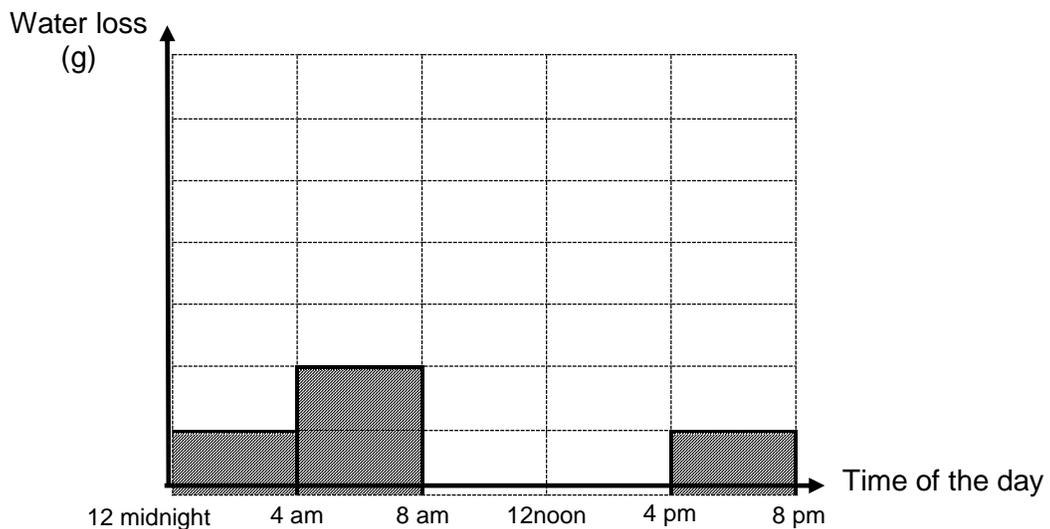
(c) Explain why it is important for seeds to be dispersed. [1]

33. Sharon set up the experiment below to study the loss of water from a potted plant between 12 midnight till 8pm the next day. The set-up was left in the garden where it can receive sunlight between 6 am to 6 pm.



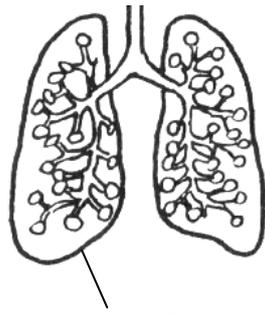
- (a) Indicate by shading the bar graphs to show the amount of water lost by the potted plant between 8am to 4pm on a day with little wind and strong sunlight throughout the day.

[1]

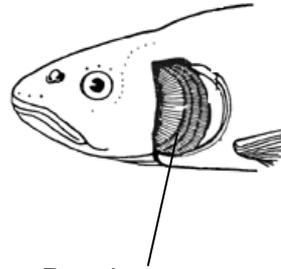


- (b) Sharon was told that the potted plant will lose water less quickly when there are fewer leaves. Explain why she said so. [1]

34. The diagrams below show the respiratory organs of human and fish.



Respiratory organ of human, J



Respiratory organ of fish, K

(a) Name the respiratory organs labelled J and K.

[1]

J - _____

K - _____

(b) Both organs receive a large supply of blood. What characteristic of the organs allow them to do so?

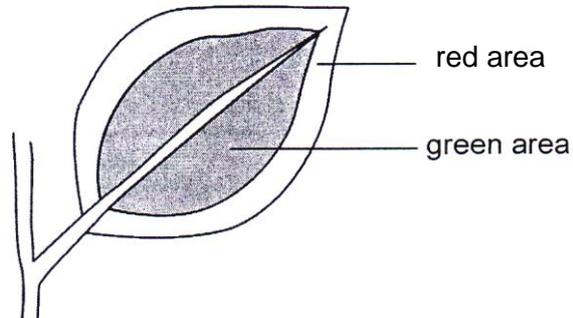
[1]

(c) Bingbing is having her 1.6 km run and she is breathing harder as she runs. Explain how breathing harder helps her in carrying out her activity.

[1]

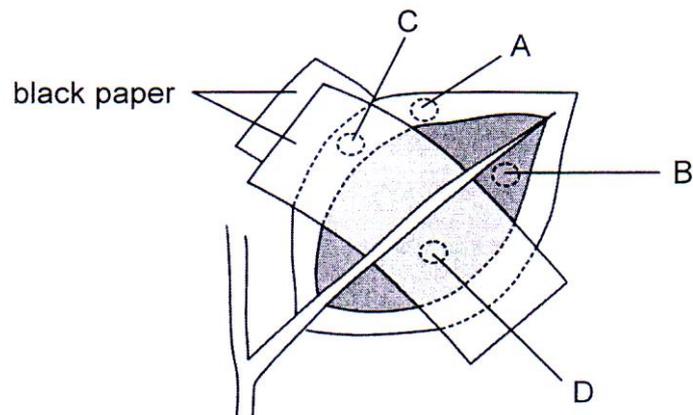
35. Diagram 1 shows a leaf on a plant used in an experiment for photosynthesis. Both the red and green areas contain chlorophyll. At the start of the experiment, there was no starch on the leaf.

Diagram 1



Next, the leaf was partly covered by black paper as shown in Diagram 2 below. The plant was then put in the garden, exposed to sunlight. After a few hours, the leaf was plucked off and the black paper was removed.

Diagram 2



The leaf was tested for starch using iodine solution. Iodine will turn dark blue in the presence of starch and remains brown in the absence of starch.

- (a) Indicate the colours of regions A, B, C and D in the table below.

[1]

Region of leaf	Colour of iodine solution test (Circle)
A	Dark blue / Brown
B	Dark blue / Brown
C	Dark blue / Brown
D	Dark blue / Brown

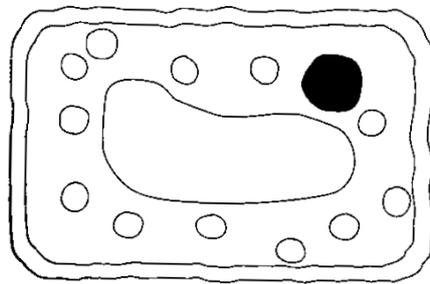
Continue with parts (b) and (c) on the next page

- (b) The experiment was repeated using another leaf which was completely covered with a layer of oil. The leaf was then subjected to the same test as above.

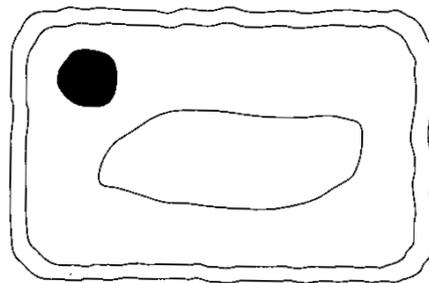
Which region (A, B, C or D) will the iodine turn dark blue? Explain.

[1]

- (c) The diagram below shows two cell specimens (X and Y) which were taken from different parts of the plant on the above experiment. They were observed under a microscope.



Cell X

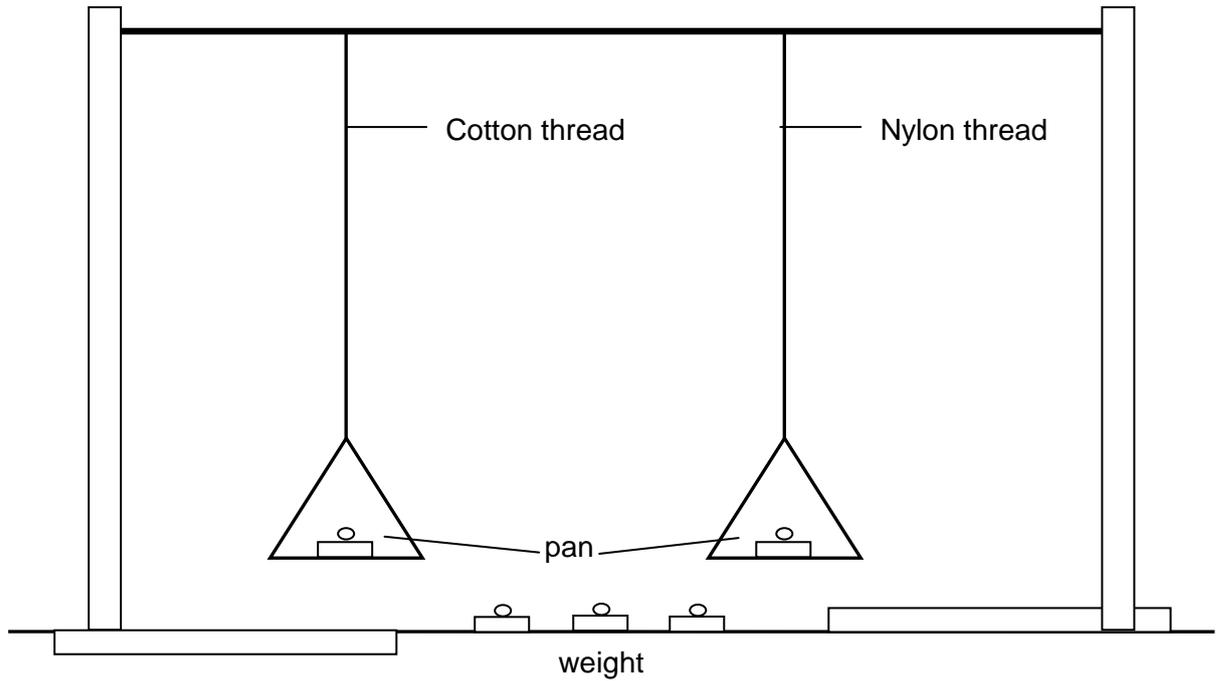


Cell Y

Which of the cells (X or Y) was taken from the root of the plant? Explain.

[1]

36. Kaiwen wants to find out whether cotton thread or nylon thread is stronger. He sets up an experiment as shown below.

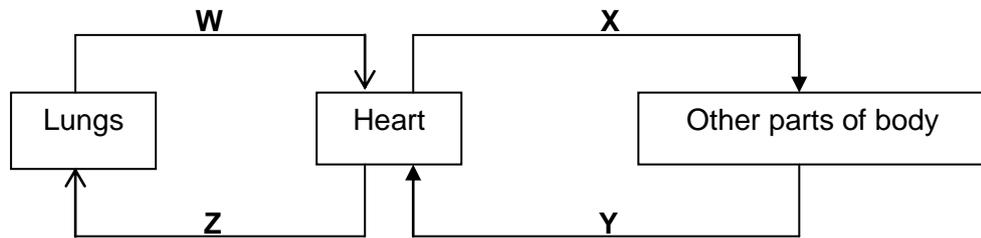


- (a) Based on the diagram, state two variables that Kaiwen had kept constant in order to make the comparison a fair one. [1]
- (i) _____

- (ii) _____

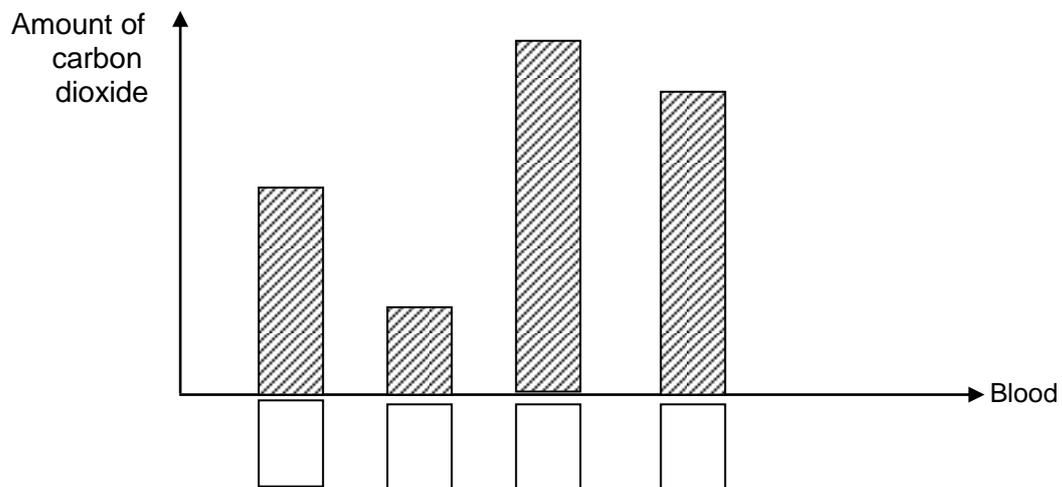
- (b) Kaiwen concluded that the nylon thread is stronger. What observation did he make to conclude this? [1]
- _____

37. The diagram below shows the directions of blood in a human body. Arrows W, X, Y and Z represent the flow of blood to different parts of the body.



- (a) The graph below shows the amount of carbon dioxide in the blood that flows to the different parts of the body. **Complete** the boxes below by writing W, X, Y and Z.

[1]



- (b) Edward did the following experiment to find out if exercise affects his pulse rate.

- Step 1 Ran on the spot for one minute.
- Step 2 Counted his pulse rate immediately after running
- Step 3 Recorded the result.
- Step 4 Continued to count and record his pulse rate at every one minute interval until it returned to normal.

His teacher told him that he should record his pulse rate at the start of the experiment.

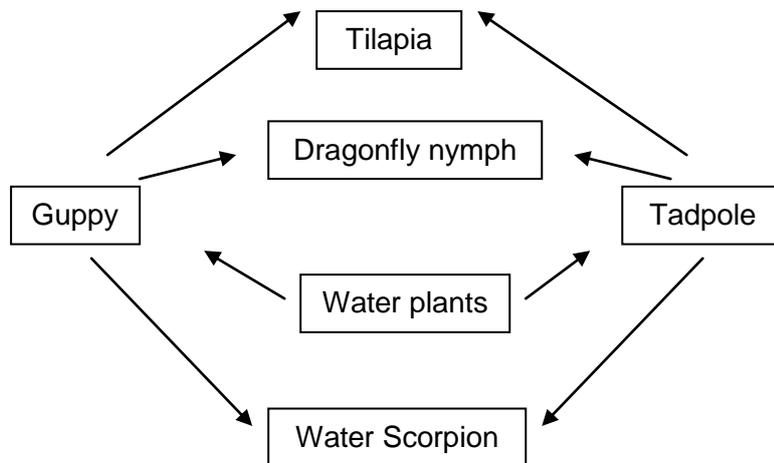
How does this help him to reach a conclusion in his experiment?

[1]

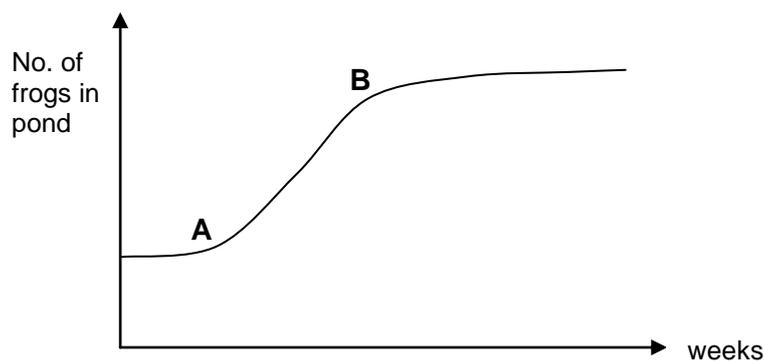
- (c) Explain why Edward's pulse rate returned to normal as observed in Step 4.

[1]

38. Andre constructed a food web based on some aquatic organisms he found in a pond.



(a) He also noticed that there were some frogs in the pond and decided to record the number of frogs over a period of time.



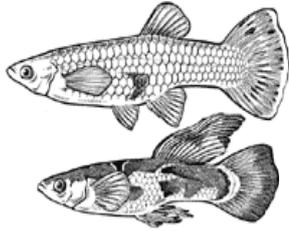
Which **two** events are the possible causes for the change in the population of frogs from A to B? Tick in the boxes provided below.

[1]

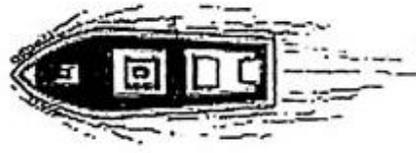
No.	Likely events	Tick (✓)
1.	A significant decrease in the water level of the pond.	
2.	A significant decrease in the number of guppies in the pond.	
3.	A significant decrease in the number of dragonfly nymphs in the pond.	
4.	A significant decrease in the number of disease-causing organisms that kill the prey of the frogs.	

Continue with parts (b) and (c) on the next page

(b) Andre noticed that the guppies and the boat are similar in structure.



Guppies



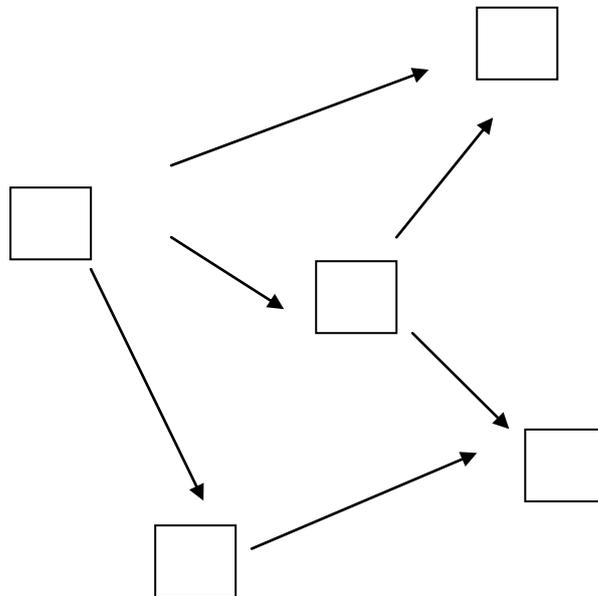
Boat

Explain how the similarity enables them to move in water.

[1]

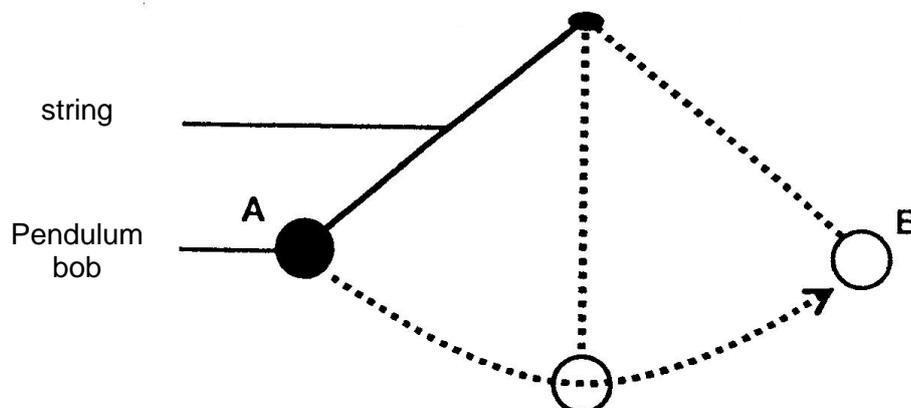
(c) Study the following information about these organisms, V, W, X, Y and Z. **Write** the correct letters (V, W, X, Y and Z) in the boxes below to show the inter-relationships of the organisms in the food web. [1]

- V is an omnivore.
- W is the only producer.
- X and Z are herbivores.
- Y feeds on X and Z only.
- V feeds on Z.



39. A group of pupils carried out an activity to find out how long it would take a pendulum bob to make a complete swing by swinging from A to B and back to A. They repeated the experiment with strings of different lengths and pendulum bobs of different weights.

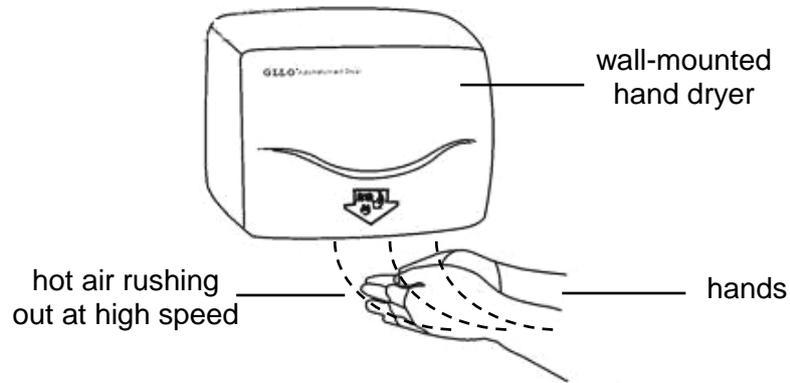
The table below shows the results of their experiment.



Length of string (cm)	Time taken to complete 10 swings (sec)		
	Bob weighing 50g	Bob weighing 200g	Bob weighing 250g
35	12.1	12.1	12.1
65	16.2	16.2	16.2
100	20.1	20.1	20.1
145	23.7	23.7	23.7

- (a) State a force acting on the pendulum as it swings. [1]
- _____
- (b) Based on the information in the table, does the mass of the bob have any effect on the time taken to complete 10 swings? How can you tell from the table? [1]
- _____
- _____
- (c) What can be done to make the pendulum bob stop moving immediately while it is swinging? [1]
- _____
- (d) State the type of energy which the pendulum bob possessed at Position A at the start of the experiment. [1]
- _____

40. After washing her hands, Mary placed her wet hands under the wall-mounted hand dryer as shown below. A hand dryer usually gives out hot air at a high speed. She found that her hands dried up in 15 seconds, much more quickly than when she did not use the hand dryer.



- (a) Give two reasons why the hand dryer helps to dry the hands in a shorter time.

[2]

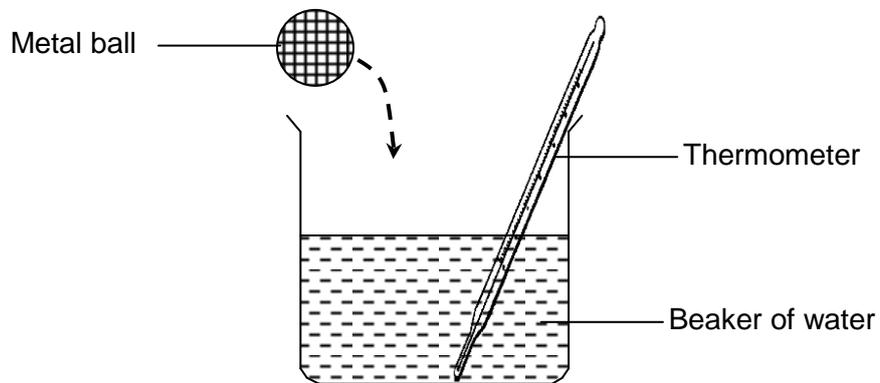
Reason 1:

Reason 2:

- (b) Besides shaking her hands, suggest another way by which Mary can dry her hands more quickly under the hand dryer.

[1]

41. Ramesh took a metal ball from the freezer and put it into a beaker of water with a temperature of 50°C . The room temperature was 29°C .



(a) Write down one observation about what happened to the water level and another about the temperature of the water as a result. Explain why they happened.

[2]

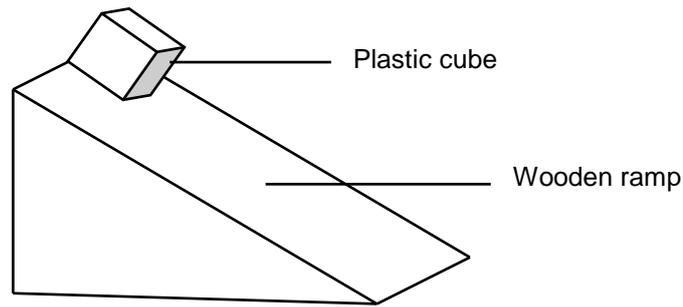
(i) Water level:

(ii) Temperature of water:

(b) What would be the temperature (measured in degree celsius) of the water five hours later?

[1]

42. When a solid plastic cube was placed at the top of the ramp below, it slid to the bottom. The time taken for the cube to reach the bottom of the ramp was recorded.



The experiment was repeated with different amounts of talcum powder spread on the ramp and the results were recorded in the table below.

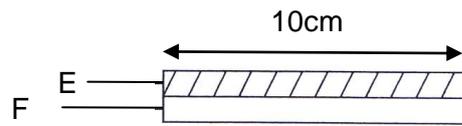
Amount of talcum powder spread on the ramp surface (teaspoons)	Time taken by the cube to reach the bottom of the ramp (in seconds)
0	9
1	8
2	6
3	3

- (a) What was the aim of the experiment? [1]

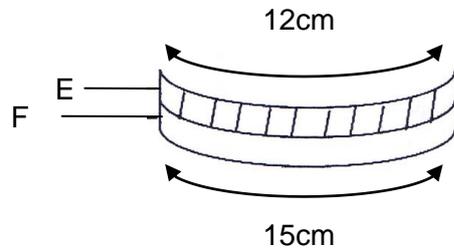
- (b) State the relationship between the amount of talcum powder spread on the ramp surface and the time taken by the cube to reach the bottom of the ramp. [1]

- (c) Explain why the addition of the talcum powder affects the time taken by the cube to reach the bottom of the ramp. [1]

43. The bimetallic strip below is made up of two types of metal E and F as shown below.

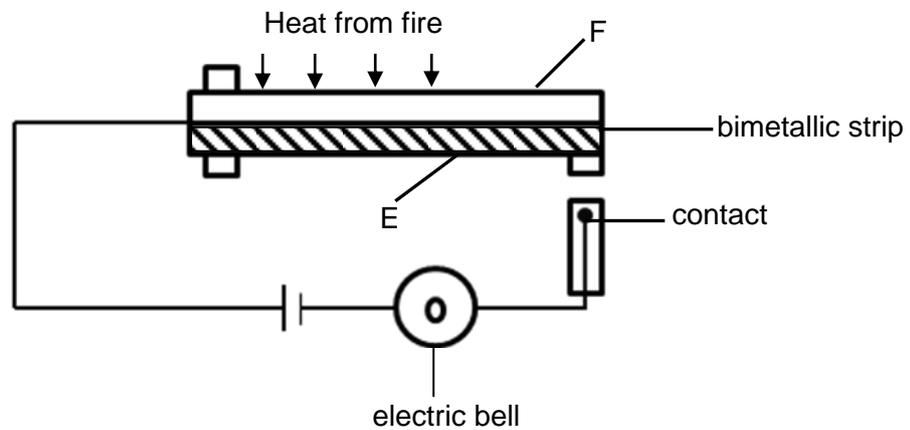


After the bimetallic strip is heated, it bends as shown below.



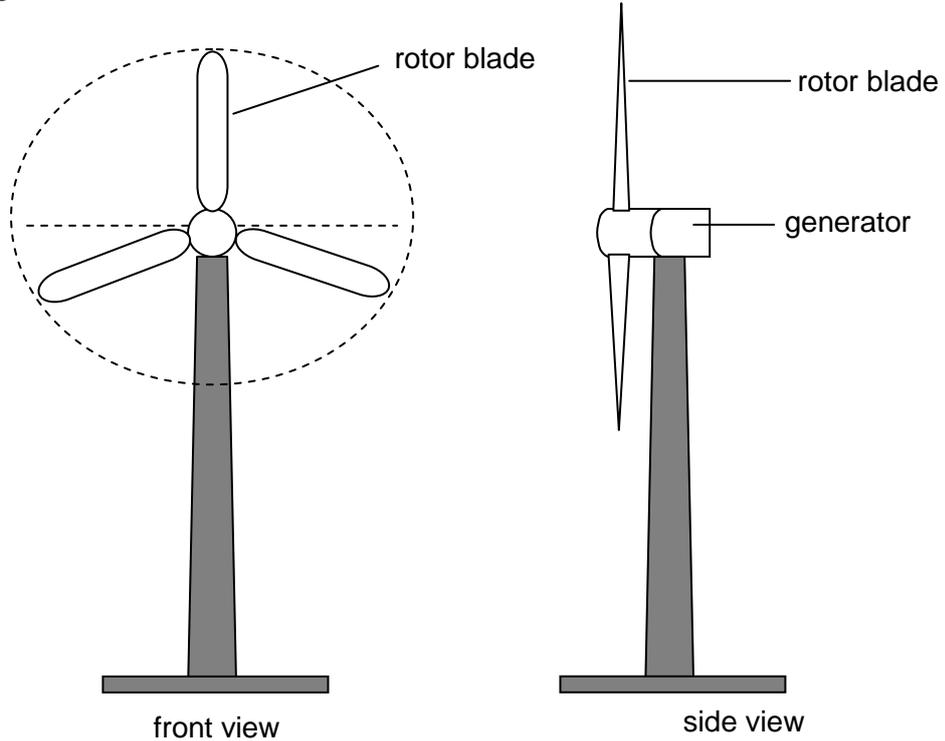
(a) Which metal, E or F is a better conductor of heat? Explain your answer. [1]

(b) The diagram below shows a fire alarm which makes use of bimetallic strip to work.



Explain how the heat from the fire will activate the fire alarm. [2]

44. The diagrams below show the side view and front view of a wind turbine.



The following table shows the amount of electricity generated by wind turbines with different blade lengths.

Blade length of wind turbine (m)	Amount of electricity generated (kilowatt)
20	150
40	600
50	1500
80	2200

(a) State the main energy changes that take place in a wind turbine. [1]



(b) Based on the information provided in the table above, how does the blade length of the wind turbine affects the amount of electricity generated? [1]

(c) What will happen to the amount of electricity generated if two more rotor blades are added to the wind turbine above? Explain your answer. [1]

End of Paper
Please check your work carefully.