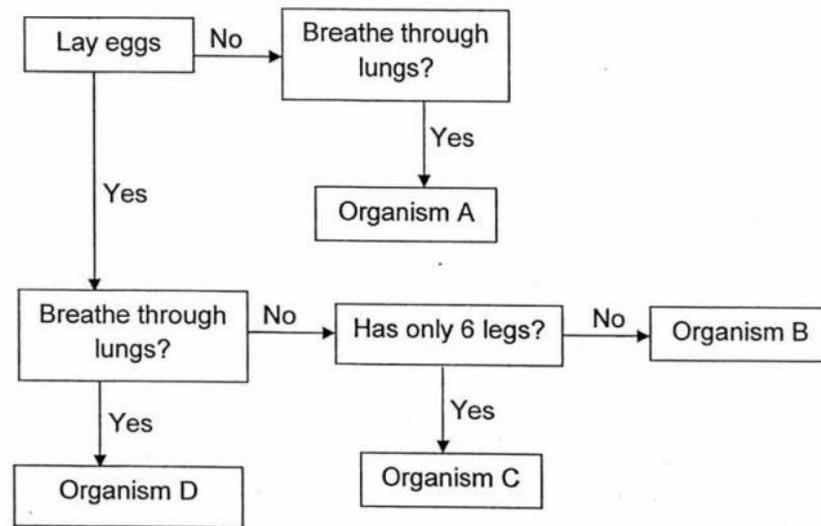


**Section A: MCQ (28 x 2 marks = 56 marks)**

For questions 1 to 30, four options are given. Choose the correct answer and shade its number (1, 2, 3 or 4) on the OAS provided.

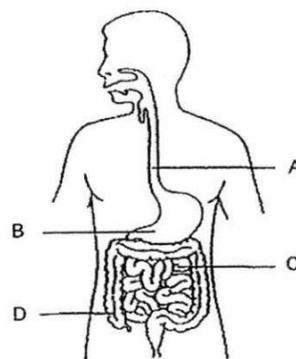
1. Study the classification chart below.



Based on the chart above, which organism is an insect?

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

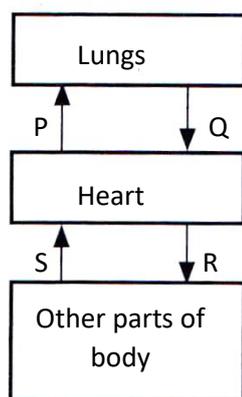
2. Study the diagram below.



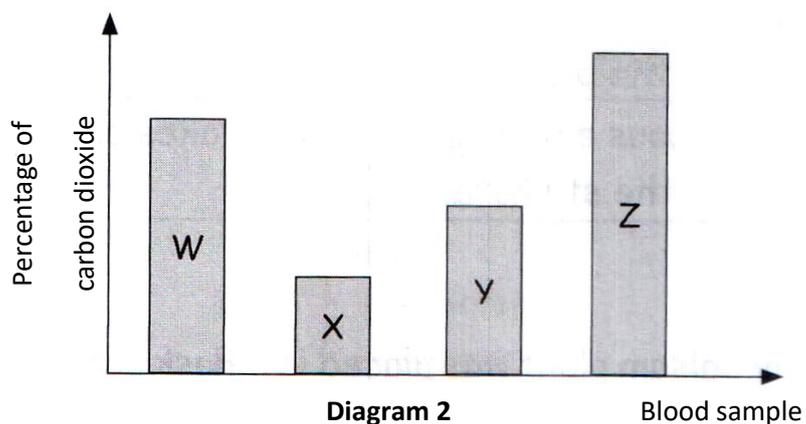
In which part(s) of the human digestive system is digestion completed?

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

3. Diagram 1 shows the movement of blood in the body. Diagram 2 shows the concentration of carbon dioxide in blood samples W, X, Y and Z taken from each of the blood vessel, P, Q, R and S.



**Diagram 1**

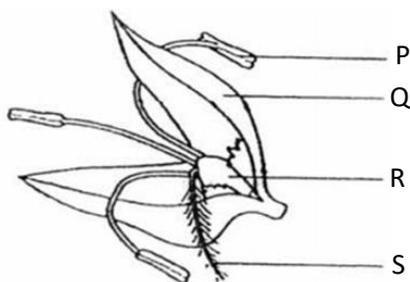


**Diagram 2**

Which one of the following matches the blood samples taken from the 4 blood vessels correctly?

	Blood vessel P	Blood vessel Q	Blood vessel R	Blood vessel S
(1)	W	Y	X	Z
(2)	X	Y	W	Z
(3)	Z	W	Y	X
(4)	Z	X	Y	W

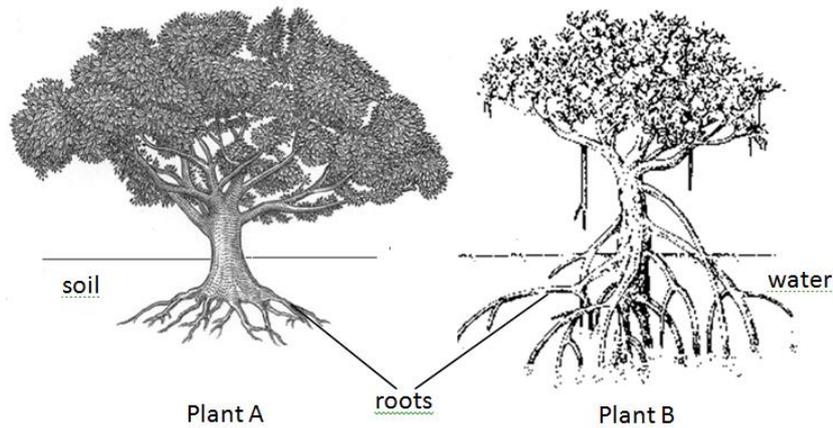
4. The diagram below shows a flower.



Which part(s) of the flower is/are not needed for pollination and fertilisation to take place?

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

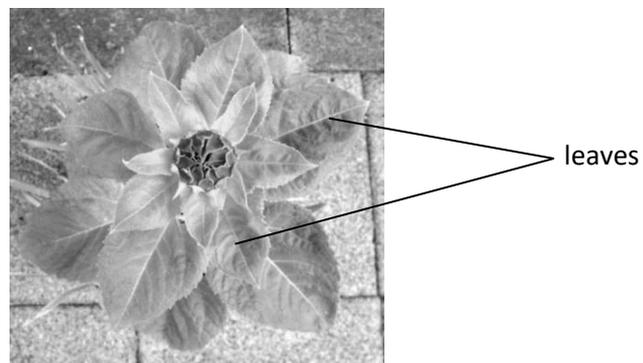
5. The diagram below shows two plants, A and B.



Which one of the following statements correctly describes the similarity between the roots of Plant A and B?

- (1) Both grow completely underground.
- (2) Both take in water and mineral salts.
- (3) Both climb on other plants for support.
- (4) Both contain chlorophyll for the plant to make food.

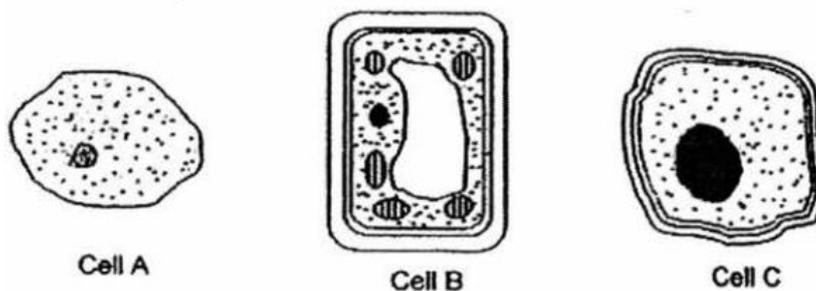
6. The diagram shows the top view of a plant.



How does the arrangement of the leaves help the plant to survive?

- (1) It helps the plant to collect more water.
- (2) It helps the plant to get the maximum amount of sunlight.
- (3) It helps the plant to prevent water loss through the leaves.
- (4) It helps the plant to attract more insects to pollinate its flowers.

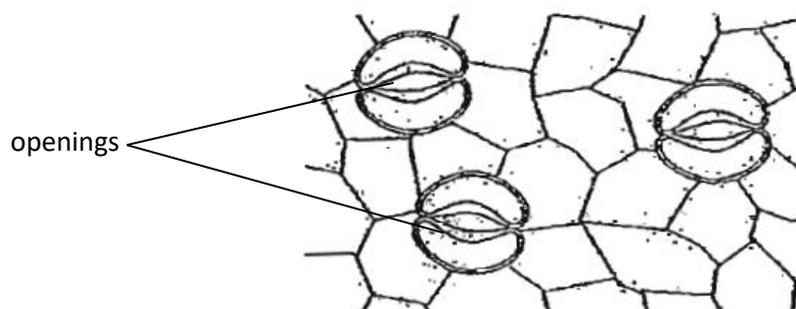
7. The diagram below shows three cells.



Which parts are found in all of the three cells?

- (1) cell wall and nucleus
- (2) cytoplasm and cell wall
- (3) cell membrane and cytoplasm
- (4) chloroplast and cell membrane

8. The diagram below shows some of the openings found on the underside of a leaf.



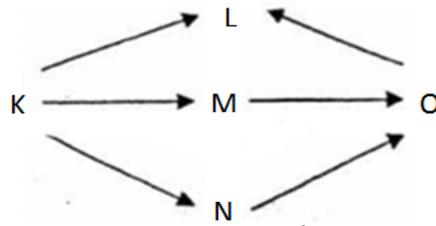
Andrew made the following statements about their functions.

- A: They take in oxygen during respiration.
- B: Water vapour is lost through these openings.
- C: They take in light energy from the Sun to make food during the day.
- D: Carbon dioxide is given out through these openings during respiration.

Which of the above statements are **correct**?

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

9. Study the food web carefully.



The population of O decreases suddenly because there was a disease that struck the population. Which of the following statement(s) correctly describe(s) how this will affect the other populations at first?

- A: The population of L will increase.
- B: The population of M will increase.
- C: The population of N will decrease.

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

10. Samuel conducted an experiment as shown below.



What would be the likely change in the amount of carbon dioxide after a few hours?

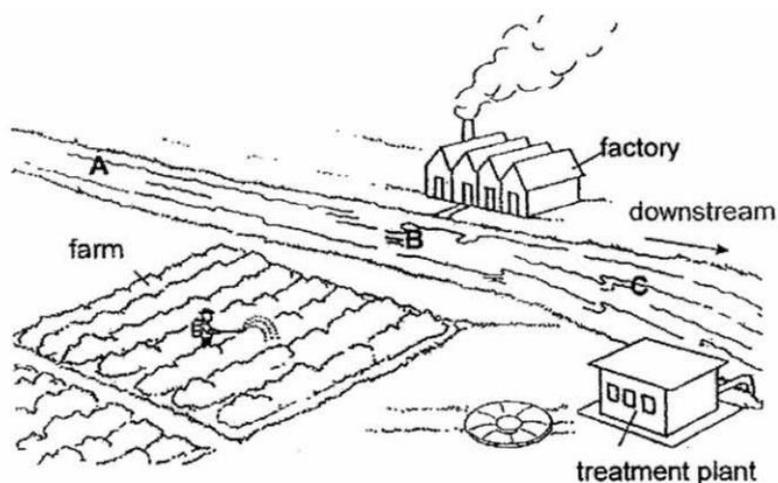
Amount of carbon dioxide in the set-up			
	A	B	C
(1)	increase	increase	no change
(2)	decrease	no change	no change
(3)	increase	no change	increase
(4)	decrease	increase	increase

11. Which of the following is/are behavioural adaptation(s) that will help an animal to escape from its predators?

- A: Moving quickly and quietly
- B: Having soft pads on its paws
- C: Body covering that is similar to its surroundings
- D: Decorating the nest with colourful pebbles and flowers

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

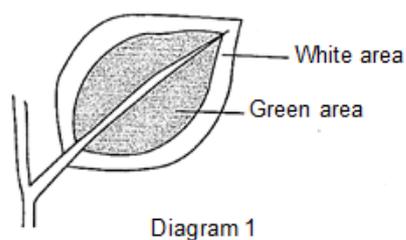
12. A scientist took samples from the river at Point A, B and C of the river.



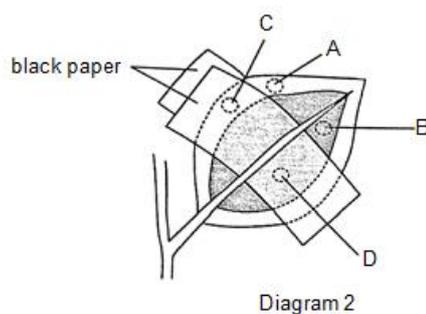
At which points will the water sample be polluted?

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

13. Diagram 1 shows a leaf on a plant. At the start of the experiment, there was no food on the leaf.



Next, the leaf was partly covered by black paper, as shown in Diagram 2.



The plant was then placed under the sun. After several hours, the leaf was plucked off and the black paper was removed. The leaf was tested for starch.

In which of the areas labelled A, B, C and D is starch mostly found?

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

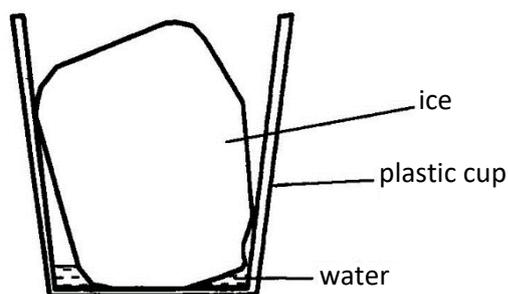
14. The table below shows the boiling and melting point of four different substances.

Substance	Melting Point (°C)	Boiling Point (°C)
A	30	65
B	15	90
C	0	5
D	5	80

At which temperature do all the substances exist in the same state?

- (1) 0°C
- (2) 10°C
- (3) 75°C
- (4) 95°C

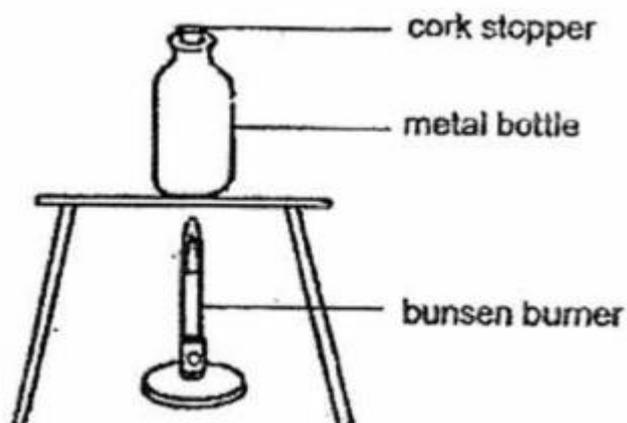
15. A block of ice was placed in a plastic cup as shown in the diagram below. The cup is placed in a garden under a hot day.



What will happen to the temperature of the melting ice, water and air around the ice after some time?

Temperature of		
melting ice	water	air around the ice
(1) remains the same	increases	decreases
(2) decreases	remains the same	increases
(3) increases	remains the same	increases
(4) remains the same	decreases	decreases

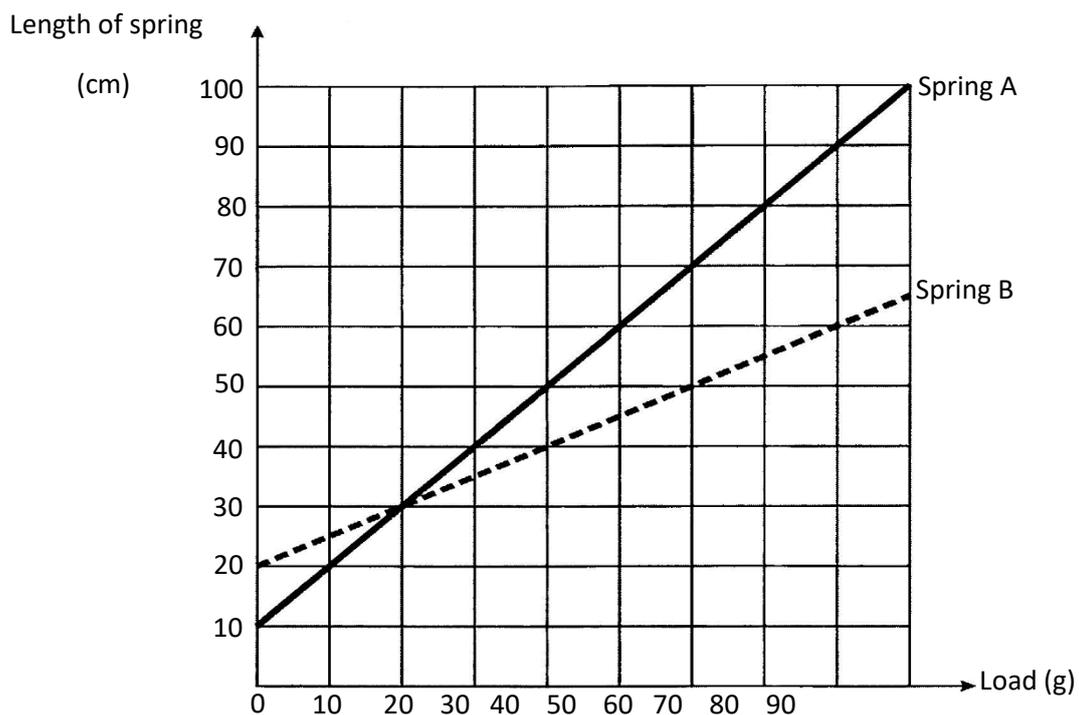
16. Meiling filled a metal bottle with water completely. She used a cork stopper on the bottle and heat it over a Bunsen burner. After a while, the cork stopper popped out of the bottle.



Which one of the following explains why the stopper popped out of the bottle?

- (1) The stopper gained heat and expanded.
- (2) The metal bottle gained heat and expanded.
- (3) The water in the bottle gained heat and expanded.
- (4) The heat from the Bunsen burner forced the stopper to pop.

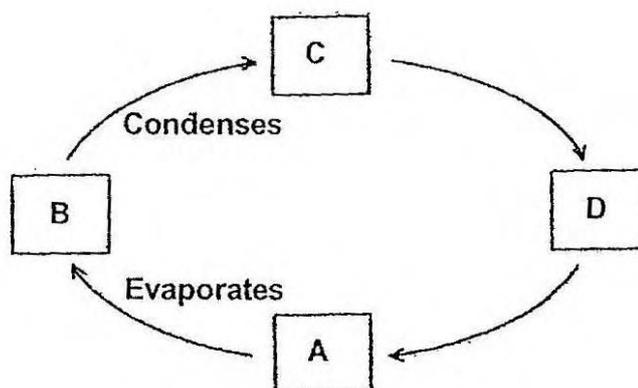
17. Marrione conducted an experiment using two springs, A and B. Various loads were hung onto each spring and the length of the springs were then recorded.



Which one of the following represents the correct conclusion that Marrione can draw from her experiment?

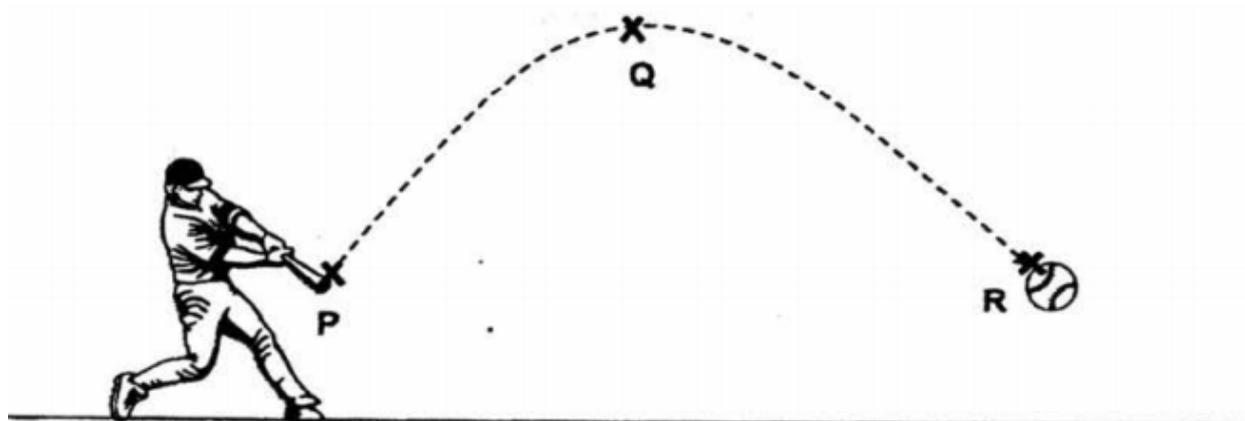
	Spring that is longer before the start of the experiment	Spring that can stretch more with the same load
(1)	A	A
(2)	B	B
(3)	A	B
(4)	B	A

18. Study the diagram below.



	A	B	C	D
1)	clouds	rain	water	water vapour
2)	water	water vapour	clouds	rain
3)	water	clouds	water vapour	rain
4)	clouds	water vapour	rain	water

19. A baseball player hit a ball during a game.

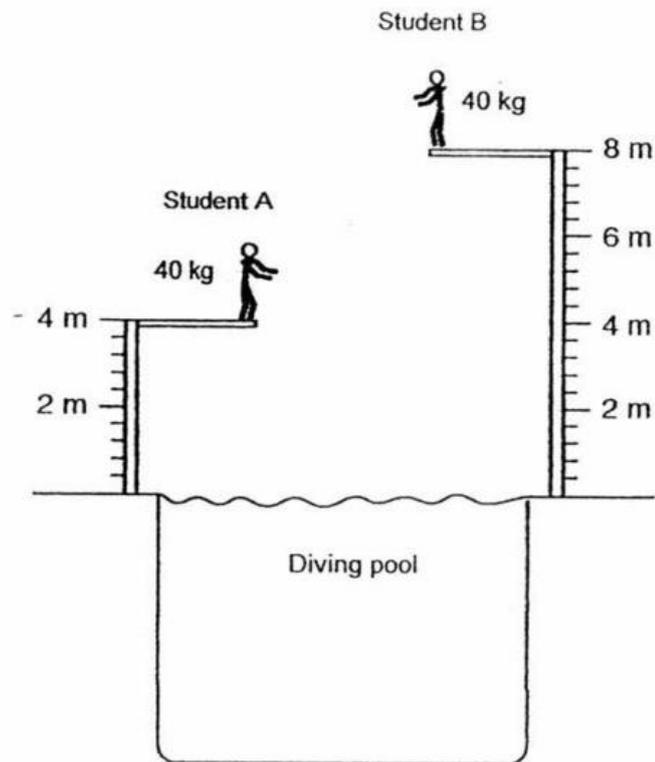


Which of the following statements correctly states the effects of forces on the ball?

- A: The ball stopped moving at Point R.
- B: The ball changed its direction at Point Q.
- C: The ball moved faster from Point P to Point Q.

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

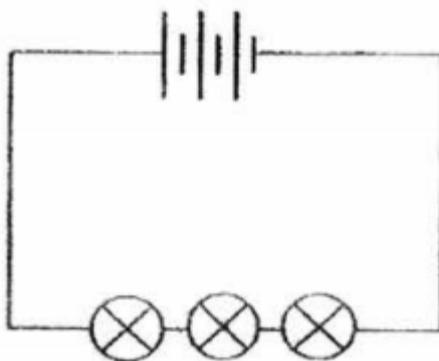
20. Two students of mass 40 kg were ready to dive into a pool.



Which of the following is a possible aim for the experiment?

- (1) To find out if the mass of a person will affect the depth of dive.
- (2) To find out if the amount of potential energy will affect the depth of dive.
- (3) To find out if the amount of water resistance will affect the depth of dive.
- (4) To find out if the amount gravitational force will affect the depth of dive.

21. Ruiyi set up a circuit using three identical batteries and three similar bulbs.

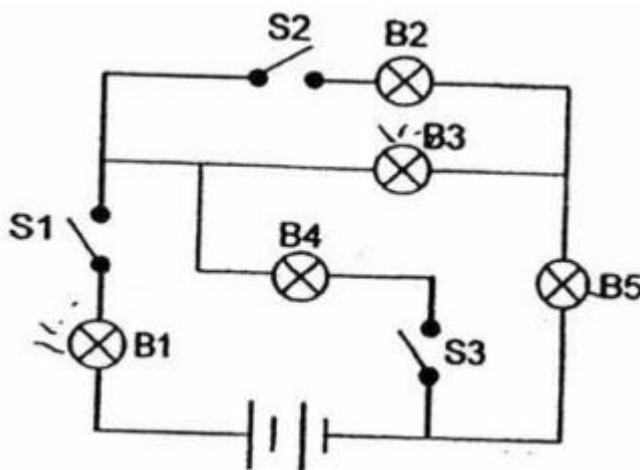


Which of the following actions will increase the brightness of the bulbs?

- A: Arrange the bulbs in parallel.
- B: Increase the distance between the each bulb.
- C: Reduce the number of bulbs in the circuit.
- D: Increase the number of batteries in the circuit.

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

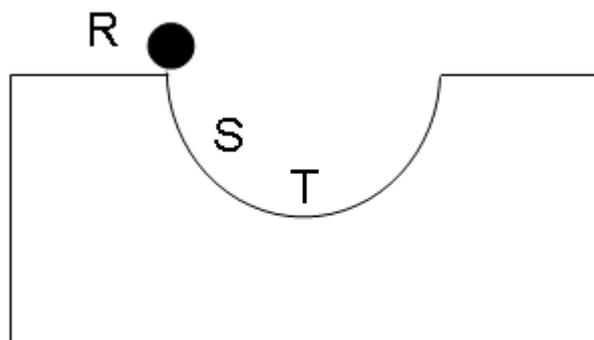
22. Study the circuit diagram below carefully.



When switch S1 is closed, which of the bulbs will light up?

- (1) B1, B2 and B3 only
- (2) B1, B3 and B5 only
- (3) B2, B4 and B5 only
- (4) B3, B4 and B5 only

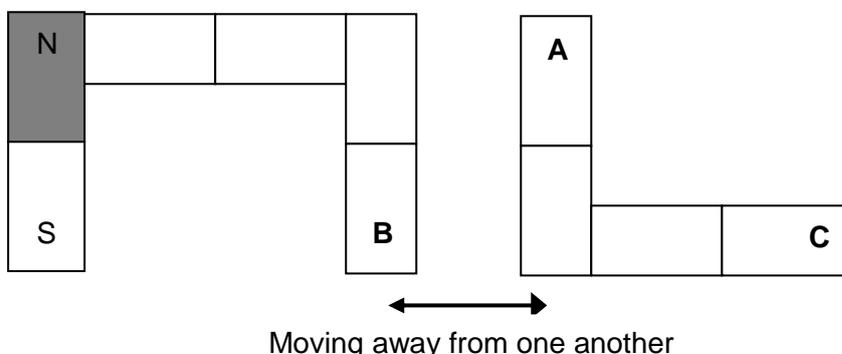
23. James conducted an experiment using a marble and a track. He placed the marble at position R and then let go, allowing it to roll down the track.



Which of the following describe the changes in potential and kinetic energy from points R to T?

	Potential energy	Kinetic energy
(1)	increases	decreases
(2)	increases	increases
(3)	decreases	decreases
(4)	decreases	increases

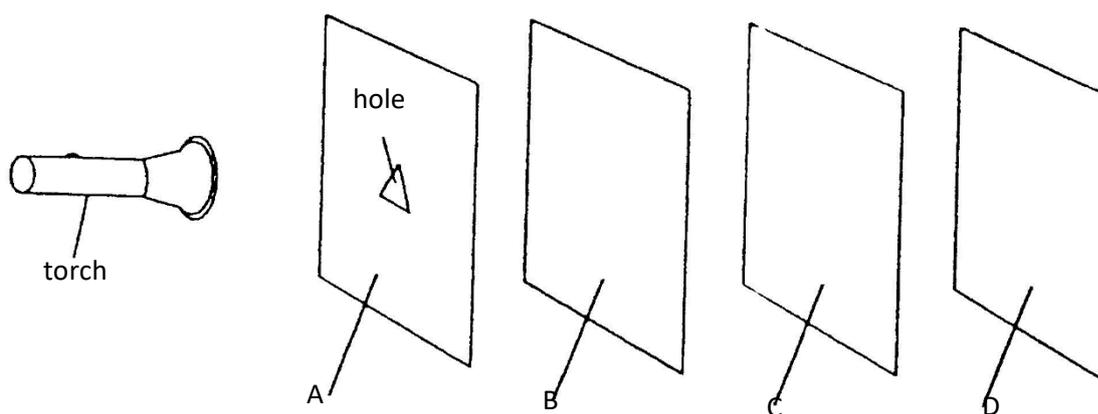
24. The diagram below shows a group of 5 identical magnets which have been arranged on a table.



Which one of the following correctly shows the poles of A, B and C?

	A	B	C
1)	North	South	North
2)	South	North	North
3)	South	South	South
4)	North	North	North

25. The experiment below is carried out in a dark room.

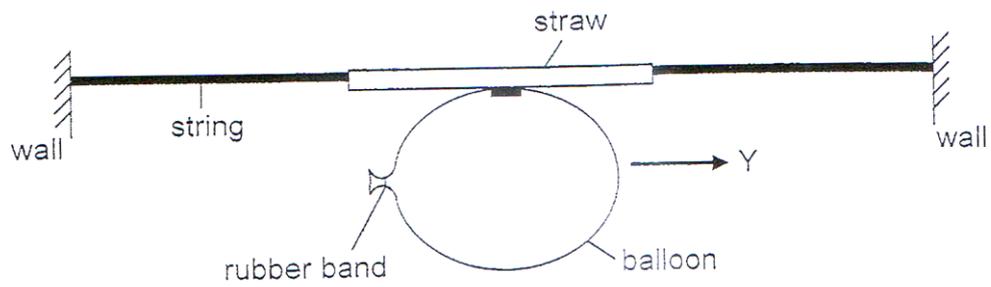


Sheets A, B, C and D are arranged in a straight line. When the torch is switched on, a bright triangular patch of light is seen in Sheet C only.

Which on of the following correctly describes the properties of the material sheets A, B, C and D are made of?

	<b>Allows light to pass through</b>	<b>Does not allow light to pass through</b>	<b>Not possible to tell</b>
(1)	A and B	D	C
(2)	A and D	C	B
(3)	B	C	A and D
(4)	B	A and C	D

26. A string is passed through a straw. A balloon is then glued firmly to the straw as shown below.

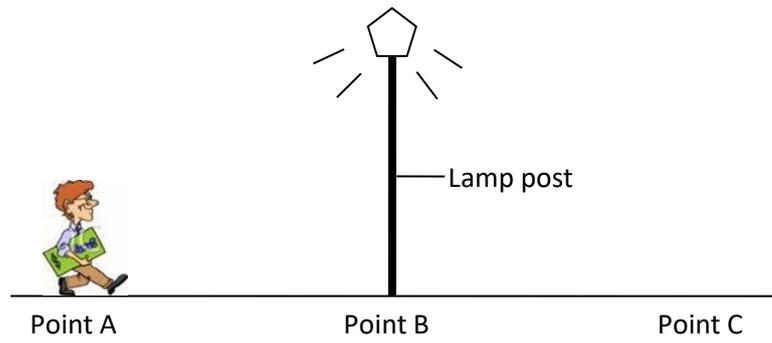


When the rubber is removed, air rushed out of the balloon, producing a force.

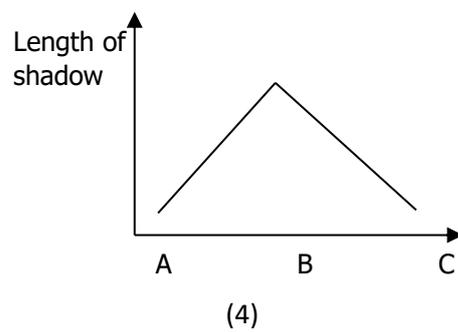
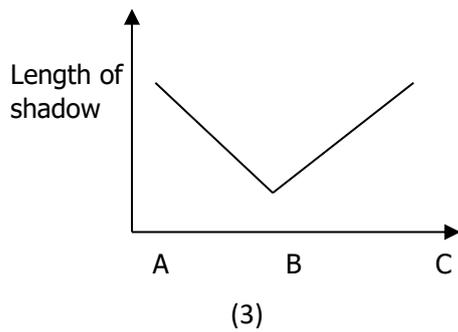
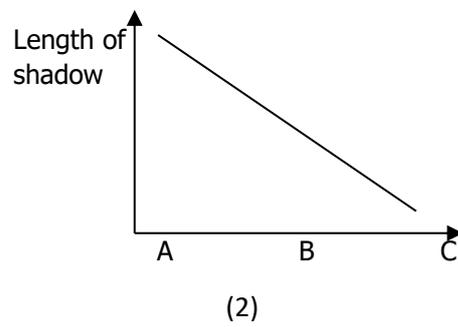
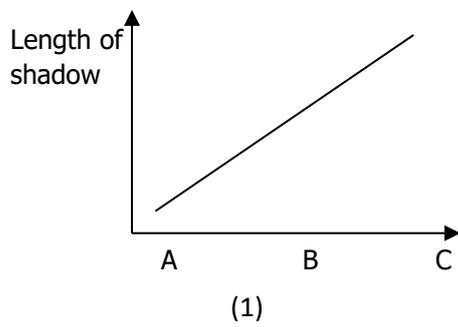
This force caused the balloon and the straw to move in direction Y because this force was greater than the \_\_\_\_\_.

- (1) weight of the straw and the string.
- (2) weight of the balloon and the string.
- (3) friction between the string and the straw.
- (4) friction between the balloon and the string.

27. The picture below shows a man walking from Point A to Point C one night.

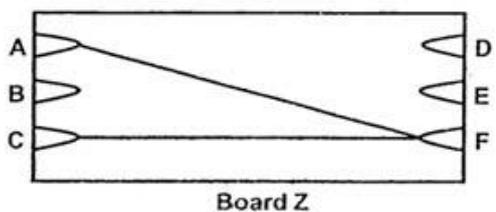
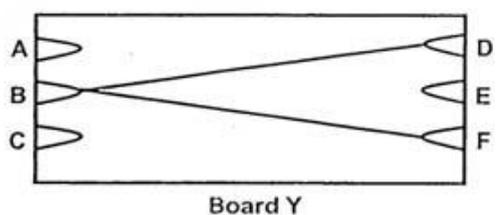
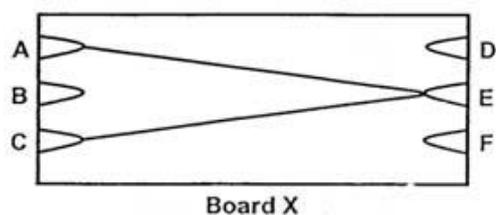


Which one of the following graphs shows how the length of the man's shadow changes from A to C?



28. Jason used a circuit tester to test a circuit board. He recorded the results in the table below.

Pairs of clips tested	Did the bulb light up?
A and C	Yes
A and D	No
B and E	No
C and F	Yes



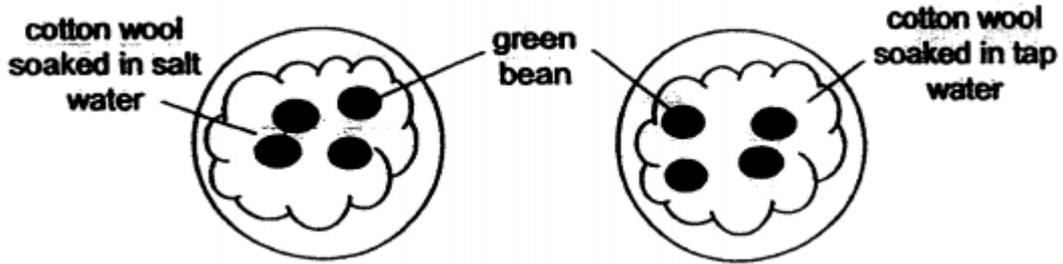
Which of the above circuit boards correctly show(s) the arrangement of wires connected to the clips?

- (1) Board X only
- (2) Board Z only
- (3) Board X and Y only
- (4) Board Y and Z only

**Section B – (44 marks)**

**Write your answers for Questions 29 to 41 in the spaces provided.**

29. Bobby wanted to investigate whether green beans germinate better in salt water than in tap water. He set up the experiment as shown below.



Both set-ups were placed in the cupboard and he watered the green beans with the same amount of salt water or tap water daily.

- (a) What would Bobby observe if he wanted to conclude that the green beans germinate better in salt water than in tap water? [1]

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- (b) Other than water, what are the other conditions need for seeds to germinate? [1]

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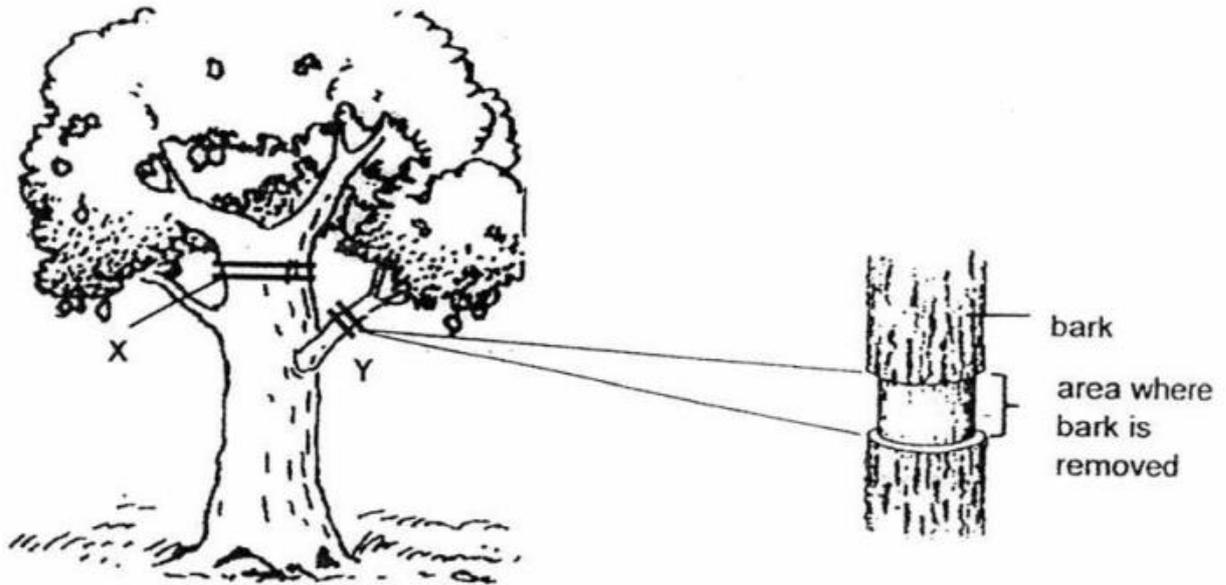
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- (c) How would using the same amount of water ensure that a fair test had been conducted? [1]

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30. Divesh removed two different parts of a tree. He removed the outer ring on the main trunk and the lower branch. Only the food carrying tube were removed. The two cuts were indicated as X on the main trunk and Y on the branch as shown below.



- (a) After a few weeks, both branches above the cuts X and Y produced fruits. The branches above cut X produced bigger fruits. Explain why the fruits were bigger in size above cut X than Y. Explain your answer. [2]

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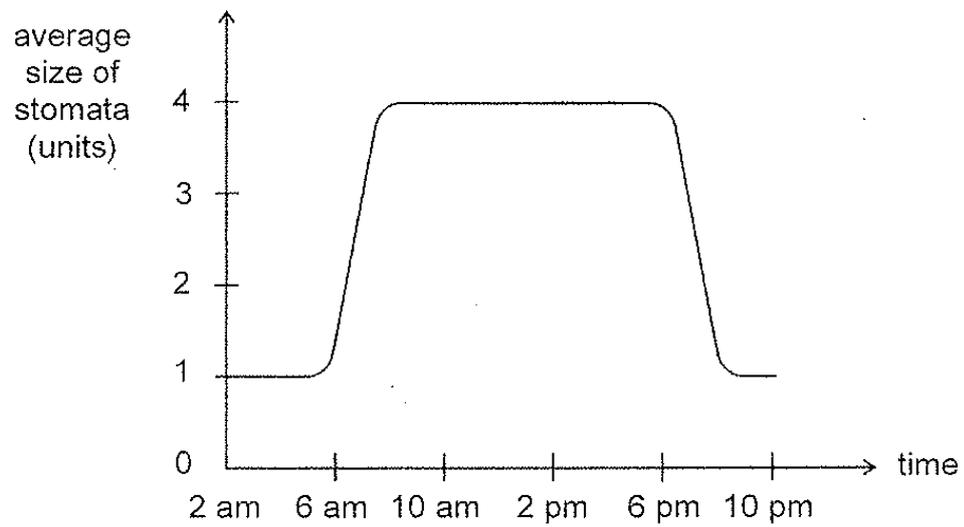
- (b) Divesh planted a tree in his garden. During winter, he noticed that his tree had shed all its leaves. However, during spring, the tree had leaves again.

Explain how the tree could grow leaves again. [1]

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31. Leaves have tiny openings called stomata on their surfaces. David measured the changes in the size of the stomata of a plant placed by the window at different times of the day. He plotted his results as shown below.



- (a) Based on his results, what is the effect of light on the size of the stomata? [1]

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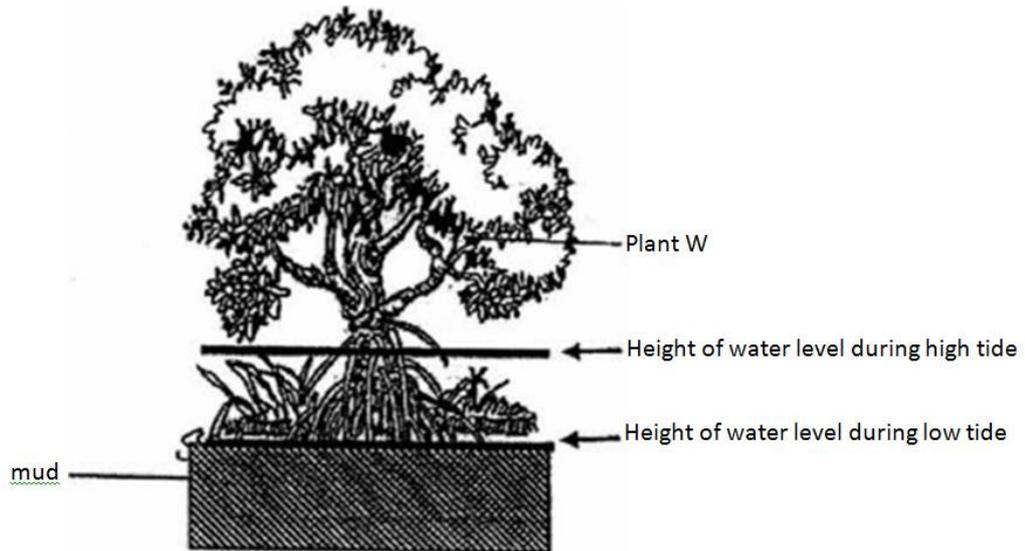
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- (b) How does the increase in the size of the stomata help to increase the rate of photosynthesis? [1]

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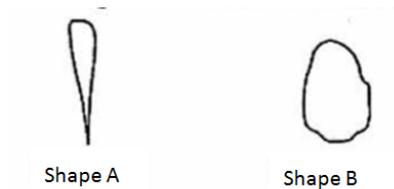
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32. The diagram below shows the water level in a swamp during the high and low tide. Plant W lives in the swamp. The adult of Plant W grows in the mud.



The seeds of Plant W did not fall when it is ripe. The seeds will start to germinate in the fruit while it is on the parent plant. The fruits of Plant W will then drop during the low tide when the seeds have already germinated. Then the seeds will continue to grow under the parent plant.

The fruit of Plant W hangs downwards on adult Plant W.



(a) Explain why Shape A works better than Shape B as the seed of Plant W. [2]

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(b) Explain how germinating seeds on the tree is an advantage to the plant. [1]

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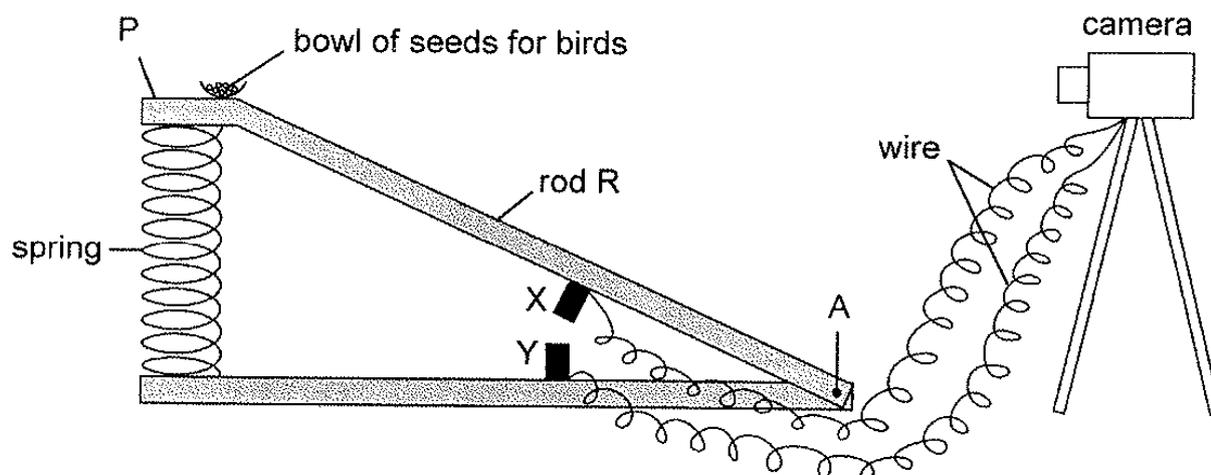
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(c) The dropping of the seeds below parent plant is a disadvantage. Explain why. [1]

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33. Ahmad uses the set-up shown below to take photographs of birds automatically. R is a rod that is pivoted at A. The contacts, X and Y, are connected to a special camera by wires so that when X touches Y, the camera will take a photograph of the object at P.



- (a) Explain how this set-up enables the camera to take a photograph of a bird when it lands on P to eat the seeds. [2]

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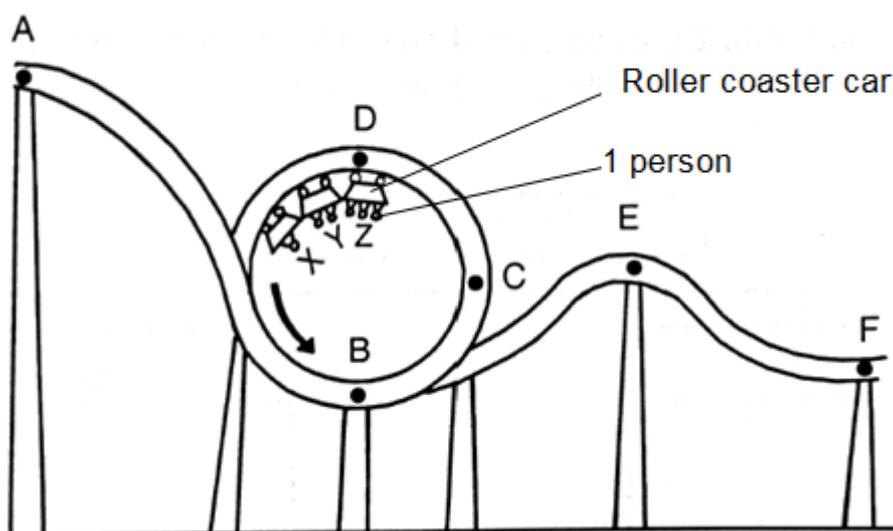
- (b) Ahmad placed the set-up in his garden. He noticed that small birds have been feeding on the seeds at P. However, no photographs of the small birds were taken by the camera although it was working properly.

Describe one change that Ahmad can make to the set-up so that the camera will take photographs of small birds as well. [1]

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34. The diagram shows some people in 3 roller coaster cars moving up and down on the track. Everyone on the roller coaster is of the same size, height and mass.



(a) Compare the amount of kinetic energy of the cars at Point B and C. [1]

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---

(b) At which point will the roller coaster cars have the most gravitational potential energy? [1]

---

(c) Which car will have the most kinetic energy if cars X, Y and Z are moving separately at the same speed? Explain your answer. [1]

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(d) Explain why Point A must be the tallest part of the roller coaster ride. [2]

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35. Joyce was given an unknown Object M. He was also given some apparatus as shown below.



Object M



iron nail



magnet

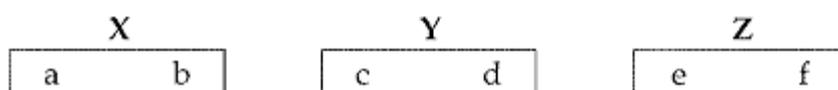
- (a) Suggest what Joyce could do to conclude whether Object M is a magnet or not. Explain your answer. You need not use all of the above apparatus. [2]

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Joyce used three bars, X, Y and Z. The ends of three bars were brought close to each other and the observations are recorded in the table below.



	a	b	c	d	e	f
a			attract	attract	attract	repel
b			attract	attract	repel	attract
c	attract	attract			attract	attract
d	attract	attract			attract	attract
e	attract	repel	attract	attract		
f	repel	attract	attract	attract		

Based on the observations in the table, what could each of the three bars be? [3]

X: \_\_\_\_\_

Y: \_\_\_\_\_

Z: \_\_\_\_\_

36. Ahmad conducted an experiment by heating three similar rods made of metals, A, B and C, for 30 minutes. He recorded the lengths of each rod before and after heating in the table below.

Rod	Length before heating (mm)	Length after hearing (mm)
A	350	357
B	350	360
C	350	354

(a) Based on the results above, which rod (P, Q or R) is a good conductor if heat? Explain your answer. [1]

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(b) In another experiment, Ahmad heated a thicker metal rod R of length 354 mm for 20 minutes. Would the length of the rod after heating be **less than**, **equal to** or **more than** 354 mm? Give a reason for your answer. [1]

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Ahmad observed that the wires on the poles along the road were hung loosely.



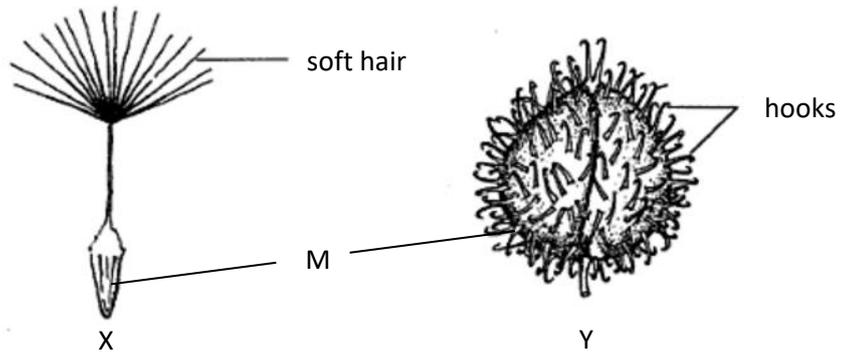
(c) Explain the advantage of the wires were hung loosely especially on cold days. [2]

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37. The diagram below shows two fruits, X and Y.



(a) What is Part M in both fruits? [1]

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(b) Suggest and explain how each of the fruits might be dispersed. [2]

Fruit X

Method of dispersal: \_\_\_\_\_

Explanation:

---



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Fruit Y

Method of dispersal: \_\_\_\_\_

Explanation:

---



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38. Lyn conducted an experiment below. She used three parachutes, X, Y and Z. She attached an identical 15g load on each of the parachute and released them from the same height.



She took down the time taken for each parachute to land on the ground and recorded her results in the table below.

Parachute	Diameter (cm)	Average time taken to land on the ground (s)
X	10	8
Y	30	18
Z	20	12

(a) What was the aim of Lyn's experiment? [1]

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(b) Based on the results of his experiment, what relationship between the diameter of the parachute and the time taken? [1]

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(c) State the force(s) that was acting on the parachute while it was floating in the air. [1]

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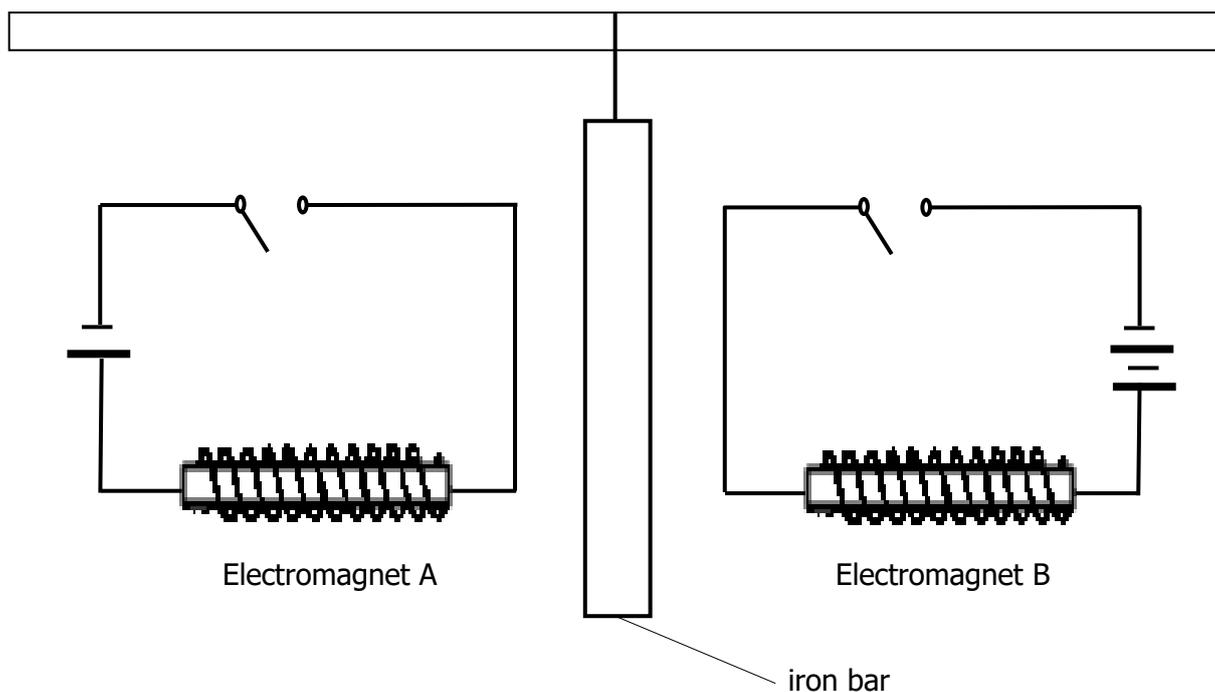
(d) When a parachutist jumps from a plane, he opens his parachute. How does the parachute help him to land safely? [1]

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39. Salim conducted an experiment and suspended an iron bar freely in between two

electromagnets. He used identical steel rods for both circuits.



- (a) What would you observe to the iron bar when both circuits are closed? Give a reason to your answer. [1]

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- (b) Salim replaced the iron bar to an aluminium bar and switched on both electromagnets. What would he observe? Explain your answer. [1]

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- (c) What could Salim do if he wants the iron bar to be attracted to the electromagnet A? [1]

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40. Alex breathed into a mirror and noticed a "mist" forming on the surface of the mirror.

- (a) Explain why the 'mist' is formed on the mirror. [2]

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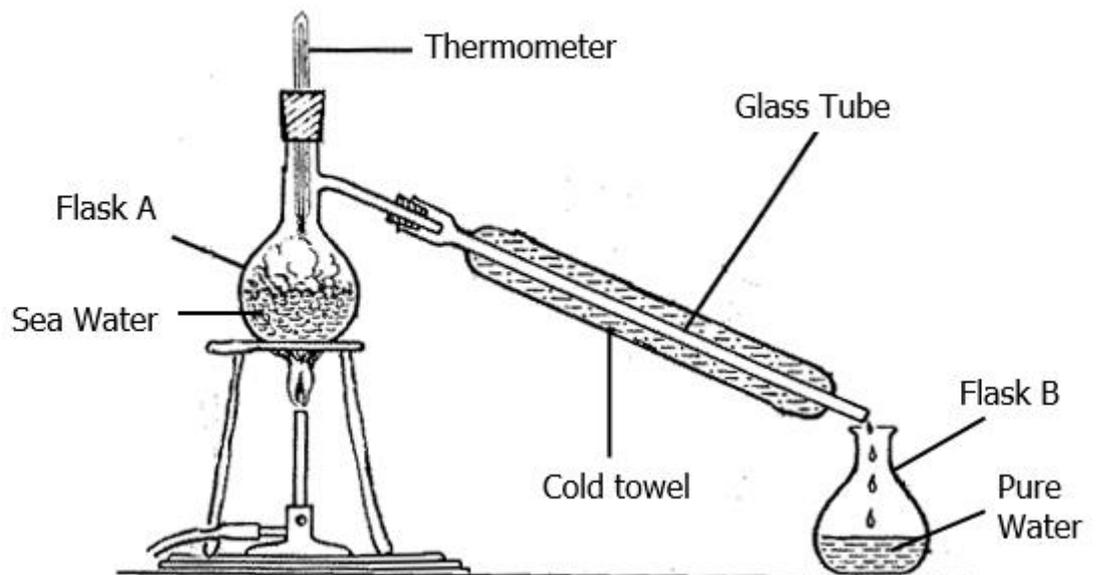
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- (b) As he continued to breathe repeatedly onto the mirror, he observed that the mist could no longer be formed. Explain why. [1]

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Alex conducted an experiment as shown below. A cold towel keeps the glass tube cool by wrapping around the glass tube.



- (c) Explain how pure water is collected in flask B. [2]

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**Answer Key**

## Section A

1.	3	6.	2	11.	1	16.	3	21.	3	26.	3
2.	1	7.	3	12.	3	17.	4	22.	2	27.	3
3.	4	8.	3	13.	2	18.	2	23.	4	28.	2
4.	2	9.	1	14.	4	19.	1	24.	2		
5.	2	10.	4	15.	1	20.	2	25.	4		

## Section B

29.	a.	The green beans soaked in salt water would germinate first.	1m
	b.	oxygen and warmth	1m
	c.	Use the same amount of water ensures that the any difference in the time taken for the green beans to germinate is only due to the type of water used in the experiment and not due to the amount of water.	1m
30.	a.	Food made by the leaves above cut X cannot be transported downwards, were transported to the fruits above X.	2m
	b.	The plant uses its stored food for respiration and begins to grow new leaves again.	1m
31.	a.	As the intensity of light increases, the size of the stomata increases.	1m
	b.	It allows more carbon dioxide to be taken in by the plant.	1m
32.	a.	Shape A is sharper than Shape B and it will go deeper into the mud.	2m
	b.	The seeds germinate on the parent plant have less chance of being swept away where this is no air, warmth and water to germinate.	1m
	c.	The young plants will compete with the parent plant.	1m
33.	a.	The bird pushes down rod R and X and Y meets. It closes the circuit.	2m
	b.	Use a spring that can be compressed more easily	1m
34.	a.	There is more kinetic energy at point B than at point C.	1m
	b.	Point A	1m
	c.	Car Z. It has the greatest mass.	1m
	d.	The roller coaster will have enough gravitational potential energy to be converted to kinetic energy (in order to complete the ride.)	2m
35	a.	Place Object X near to the end/pole of the magnet. If the magnet repels, then the object is a magnet. If the magnet attracts, then object is not a magnet but a magnetic object.	2m
	b.	X: magnet Y: Any magnetic material/ object / iron / steel/ nickel/ cobalt	3m

		Z: magnet	
36.	a.	A. It expanded the most.	1m
	b.	less than The thicker rod takes a longer time to expand as compared to a thinner rod.	1m
	c.	On cold days, the wires loses heat and contracts. This prevents the wires from snapping during cold days.	2m
37.	a.	seed	1m
	b.	<b>Fruit X</b> Method of dispersal: By wind Explanation: The soft hairs are light enough to be carried by wind.  <b>Fruit Y</b> Method of dispersal: By animals Explanation: The hooks like structure can hook onto the animals' fur and be dispersed when they are dropped at another location the animal goes to.	2m
38.	a.	To find out if the diameter of the parachute will affect the time taken for the parachute to fall to the ground.	1m
	b.	The longer the diameter of the parachute, the longer the time taken for the parachute to fall to the ground. or The shorter the diameter of the parachute, the faster the time taken for the parachute to fall to the ground.	1m
	c.	gravity / gravitational force / air resistance	1m
	d.	The upward force acting on the parachute enable the parachutist to float slowly down and have a soft landing.	1m
39	a.	The iron bar would be attracted to Electromagnet B. When both circuits are closed, both steel bars got electromagnetised. But Electromagnet B has stronger magnetism than Electromagnetic A as circuit B has more voltage than circuit A as circuit B has more batteries than circuit A. With stronger magnetism, electromagnet B is able to attract the iron bar.	1m
	b.	Nothing will happen as aluminium is not a magnetic material. Hence it will not be attracted to either electromagnet when the circuits are turned on.	1m
	c.	Increase the number of batteries in the circuit.	1m
40.	a.	The water vapour from his breath touched the cooler surface of the mirror and condensed to become water droplets.	2m
	b.	The surface of the mirror is as hot as the water vapour from his breath.	1m
		Water in flask A evaporates into hot steam. It comes into contact with the cooler glass surface, loses heat and condenses to form water droplets.	2m