Candidate's Name	Index Number	Class

SCIENCE

END-OF-YEAR MOCK EXAMINATION Set 1

DURATION : 1 hour 45 minutes

MARKS :

100

INSTRUCTIONS TO CANDIDATES

1. Answer **ALL** questions in Booklet A and Booklet B.
2. Write your answers in the brackets provided in Booklet A.
3. Write your answers in the spaces provided in Booklet B.
4. The number of marks for each question is 2 in Booklet A.
5. The number of marks is given in brackets [ ] at the end of each question or part question in Booklet B.

BOOKLET A
PART I

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) and write your answers in the brackets provided.

(60 marks)

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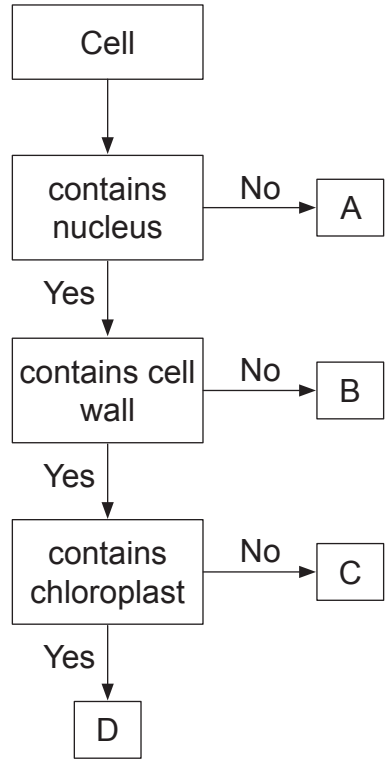
1 Study the diagram below carefully.



Which of the following cells above best represents a cell found in the root of a plant?

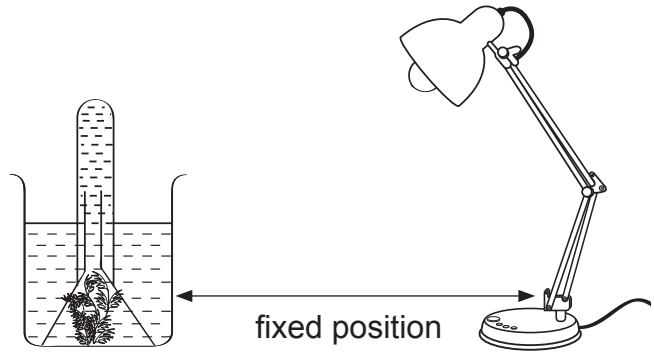
(1) A

(2) B

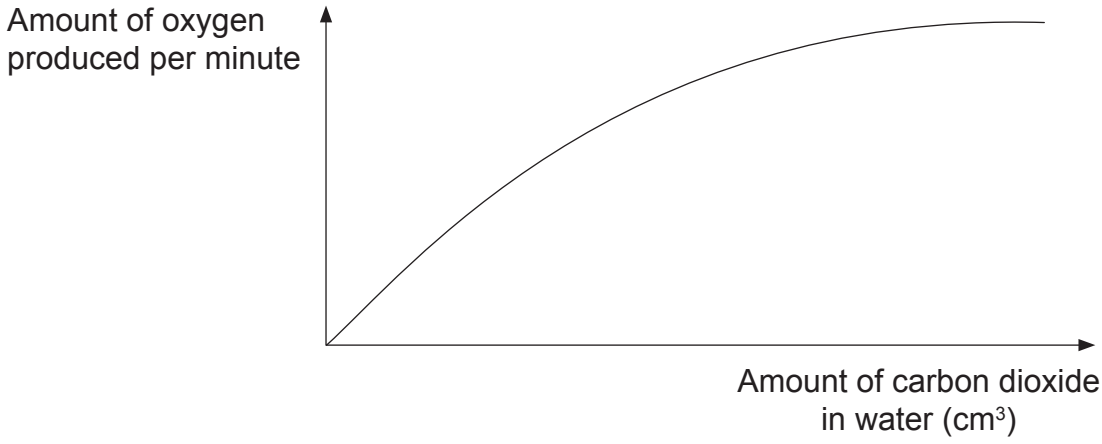
(3) C

(4) D ( )

2 Ashley conducted an experiment on a water plant by changing the amount of carbon dioxide in the water as shown below.



She then recorded her results in a graph below.



Which of the following explains the result of her experiment above?

(1) The rate of photosynthesis is not affected by the amount of carbon dioxide.

(2) The rate of photosynthesis is affected by the amount of carbon dioxide.

(3) The rate of photosynthesis is affected by the amount of oxygen in the water.

(4) The rate of photosynthesis is affected by the amount of light. ( )

3 Which of the following shows the correct path taken by blood in the human body?

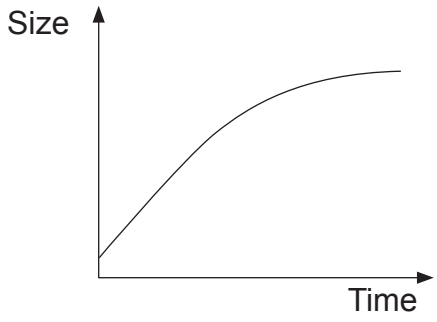
(1) lungs → heart → head → lungs → heart

(2) head → heart → head → lungs → heart

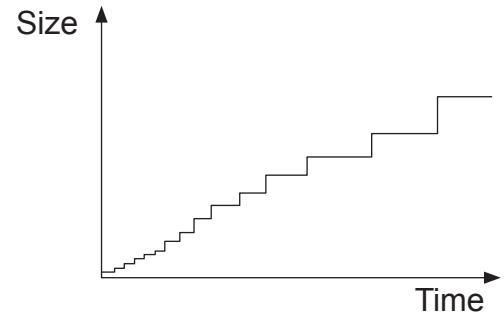
(3) lungs → head → heart → lungs → heart

(4) heart → lungs → heart → head → heart ( )

4 The two graphs below show the growth pattern of two organisms.



Graph **A**



Graph **B**

Which of the following rows matches the growth pattern in the graphs above?

	Graph A	**Graph B**
(1)	mouse	butterfly
(2)	cockroach	fish
(3)	snake	bear
(4)	grasshopper	bee

( )

5 The diagrams below show a dolphin and a hammerhead shark.

dolphin

hammerhead shark

Which of the following statements about the two organisms is true?

(1) They both give birth to young alive.

(2) Both organisms feed their young with milk.

(3) They are both covered with scales.

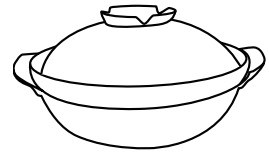
(4) They both breathe with gills. ( )

6 Eunice was told that placing pandan leaves in a pot of uncooked rice would keep the rice weevil, an insect that feeds on rice, away.

She then carried out an experiment to investigate if this was true.

In one set-up, she placed 20 rice weevils in a pot of rice with some pandan leaves. After one day, she would count the number of weevils left in the pot.

pandan leaves



pot of rice

weevil

Which of the following set-ups should she use to compare the results of her experiment correctly?

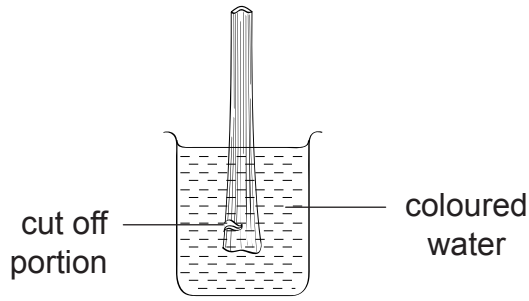
(1) Pandan leaves and 20 weevils only

(2) Pandan leaves and pot of rice only

(3) Pot of rice and 20 weevils only

(4) Pot of rice, pandan leaves and 10 weevils only ( )

7 Jonathan set up an experiment whereby he cut off a small portion of celery from the bottom of a stalk and left it in a beaker of coloured water as shown in set-up A.



Set-up A

When he looked at the top of the celery three hours later, he noticed that the celery was coloured as shown below in Diagram A.

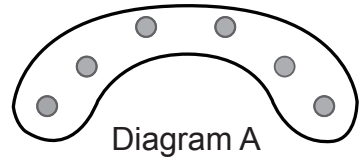
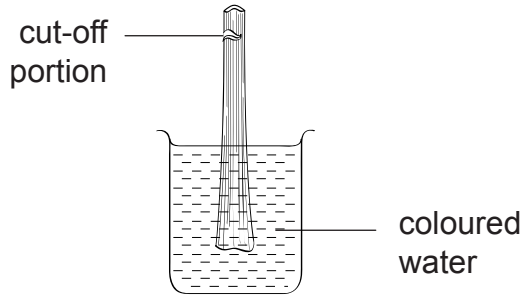


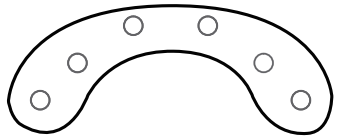
Diagram A

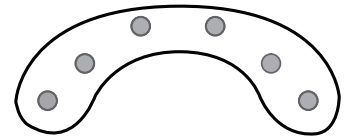
Jonathan then took another stalk of celery and cut off a small portion of the same size as set-up A but higher up the stalk as shown in set-up B.

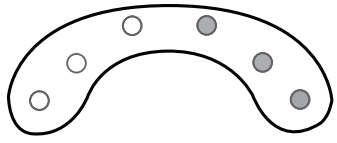


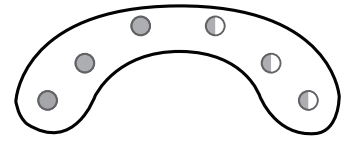
Set-up B

Which of the following shows how the top of the celery stalk would look like in set-up B?

(1) 

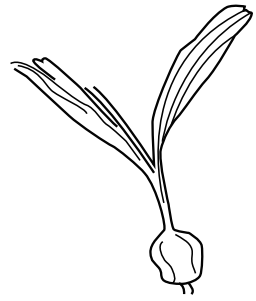
(2) 

(3) 

(4) 

( )

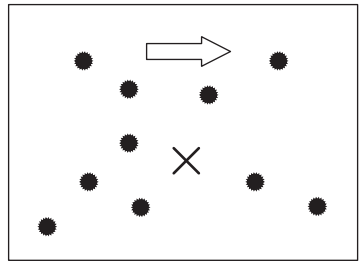
8 Xavier found a fruit as shown below while walking in the school compound one day.



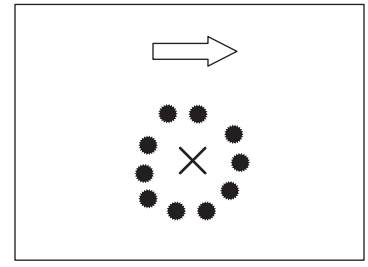
Key:
- ⇨ Wind direction
- × Parent plant
- ● Position of fruits

Based on the structure of the fruit, which of the maps best illustrates the way the fruit would be dispersed?

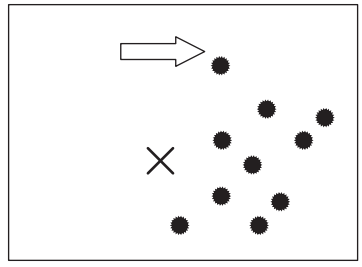
(1)



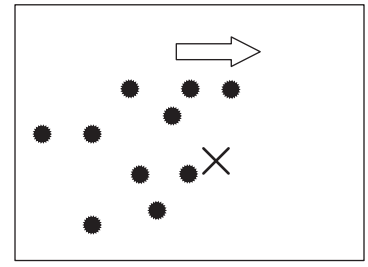
(2)



(3)

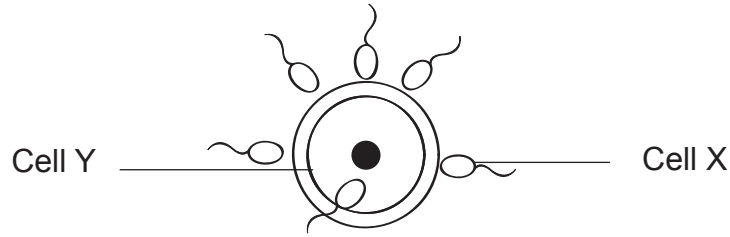


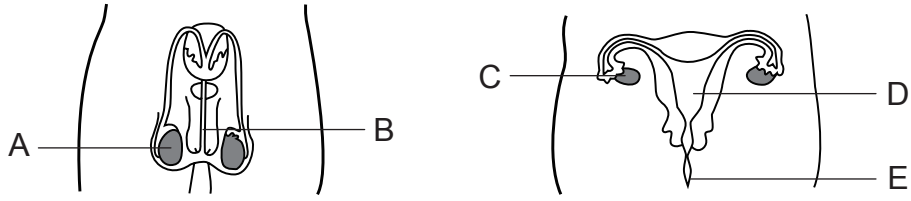
(4)



( )

9 Match the following cells to where they are produced.





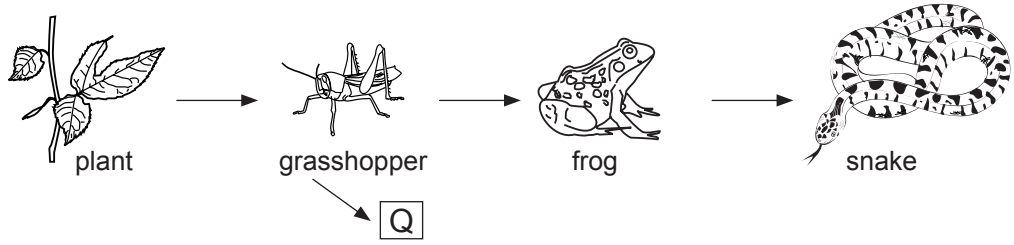
	Cell X	Cell Y
(1)	A	C
(2)	E	B
(3)	C	A
(4)	D	A

( )

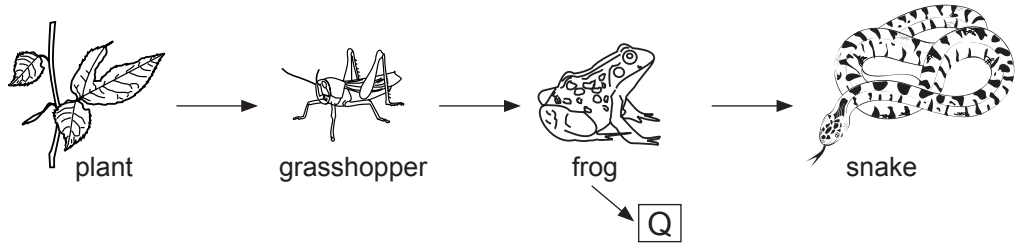
10 Sharon was observing a population of plants, grasshoppers, frogs and snakes in a field. Some new organisms, Q, were introduced to the community one day. She observed that after some time, the population of frogs started to increase while the grasshoppers decreased.

Which of the following shows the likely relationships between Q and the other organisms?

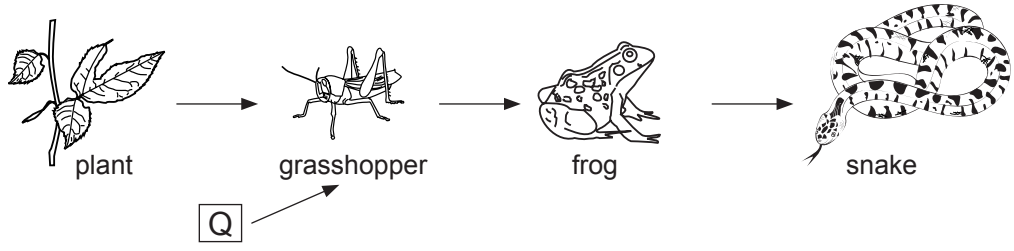
(1)



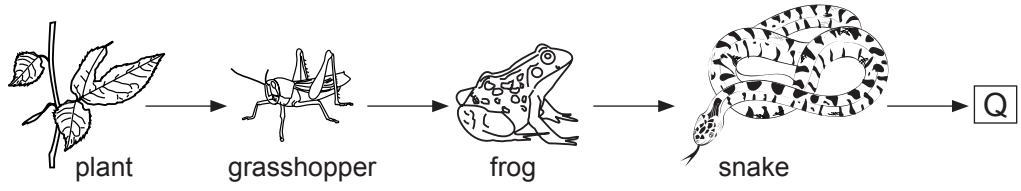
(2)



(3)

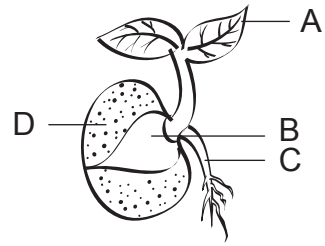


(4)



( )

11 The diagram below shows a germinated seed with its seed coat attached.



Which of the following sentences explains why the seedling grows bigger over time?

(1) Part A makes food for part B which in turn transfers food to the seedling.

(2) Part B contains stored food which is used by the seedling to grow.

(3) Part C absorbs minerals from the soil which gives the seedling energy to grow.

(4) Part D photosynthesizes to make food for the seedling. ( )

12 Study the table below carefully.

		Plants	**Fungi**
A	Make their own food	Yes	Yes
B	Carry out respiration	Yes	No
C	Reproduce by spores	No	Yes
D	Bear flowers	Yes	No

Which of the above statements are true of all plants and fungi?

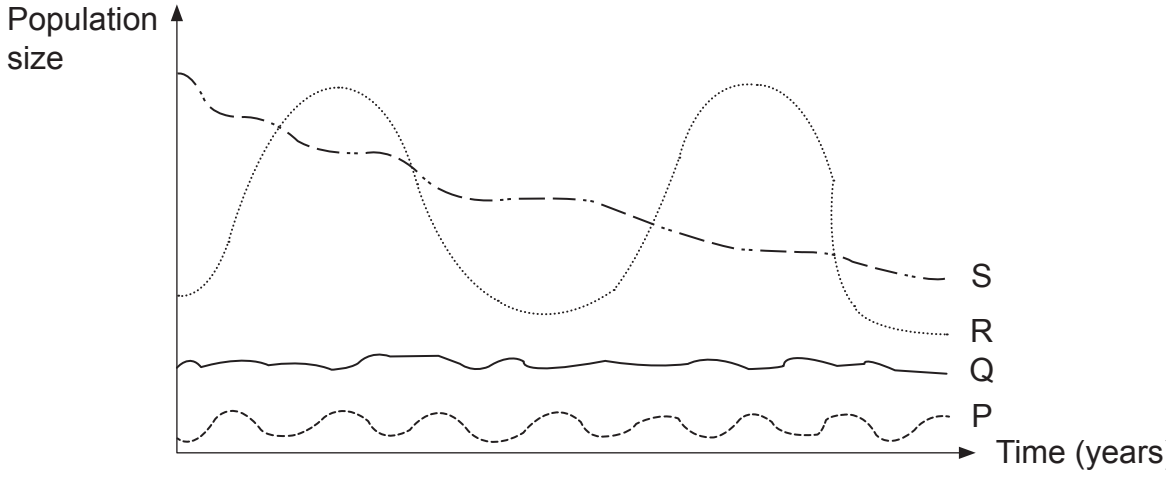
(1) A and B only

(2) C and D only

(3) B, C and D only

(4) None of the above ( )

13 The graph below shows the population of four organisms over a few years.



Which population of organisms faces the greatest danger of being extinct over the next few years?

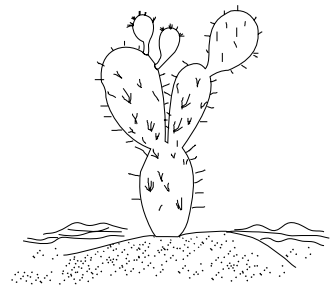
(1) P

(2) Q

(3) R

(4) S ( )

14 The diagram below shows a cactus. Which of the following is **not** a unique adaptation of the cactus to survive in the desert?



(1) Presence of water-carrying tubes to transport water

(2) Presence of needle-like leaves

(3) Presence of wide-spreading roots

(4) Presence of a thick and waxy stem ( )

15 Howard wanted to find out if the amount of carbon dioxide in pond water would affect the growth of hydrilla. Which two set-ups should he use to conduct a fair test?

Tank	Amount of pond water (m*l*)	Number of stalks of hydrilla	Number of fish
A	800	5	15
B	800	5	0
C	800	3	15
D	500	5	15

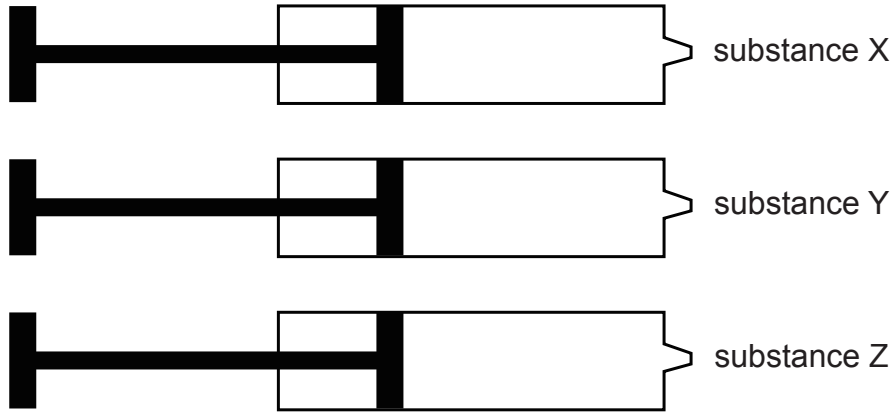
(1) A and B

(2) A and C

(3) A and D

(4) B and D ( )

16 Dylan placed equal volumes of 3 substances X, Y and Z into similar syringes.



He then pushed each plunger as much as he could and observed whether he was able to push the plunger in.

What do you think is the purpose of his experiment?

He wanted to find out which substance _____.

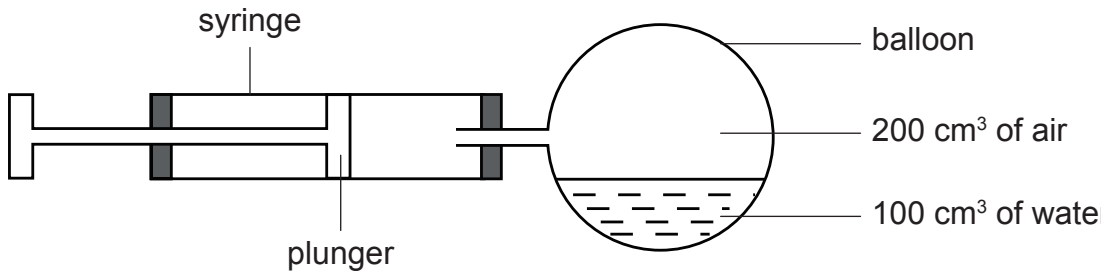
(1) occupies space

(2) has more mass than the others

(3) is harder than the others

(4) has a definite volume ( )

17 The diagram below shows a balloon containing 200 cm^3 of air and 100 cm^3 of water fitted on a syringe. When the piston is pushed in, 50 cm^3 of air is pumped into the balloon. What will be the volume of air in the balloon now?



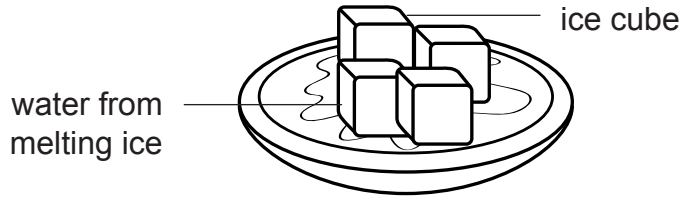
(1) 200 cm^3

(2) 250 cm^3

(3) 350 cm^3

(4) 3000 cm^3 ( )

18 A plate of ice cubes is left to melt as shown in the diagram below.



What will happen to the temperature of the air around the ice cubes, melting ice cubes and water around the ice cubes?

	Temperature of		
	air around ice cubes	**melting ice cubes**	**water**
(1)	Decreases	Increases	Remains the same
(2)	Decreases	Remains the same	Remains the same
(3)	Remains the same	Increases	Increases
(4)	Decreases	Remains the same	Increases

( )

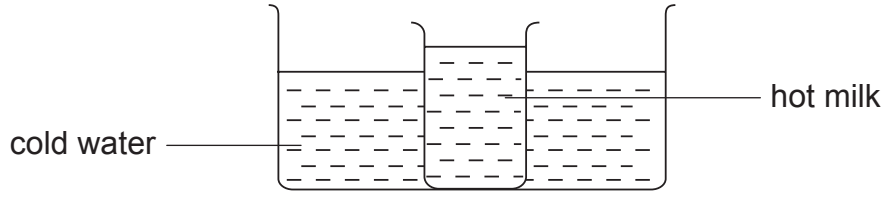
19 Substance P has a melting point of 25°C and a boiling point of 150°C.

Which of the following rows shows the state of substance P at the following temperatures?

	20°C	**60°C**	**100°C**
(1)	Liquid	Liquid	Gas
(2)	Solid	Liquid	Liquid
(3)	Liquid	Gas	Gas
(4)	Solid	Liquid	Gas

( )

20 Elin wanted to have a drink of milk but found it too hot to drink. She then placed it in a container of cold water.



After a while, _____.

(1) the hot milk gained coldness from the cold water and became cooler

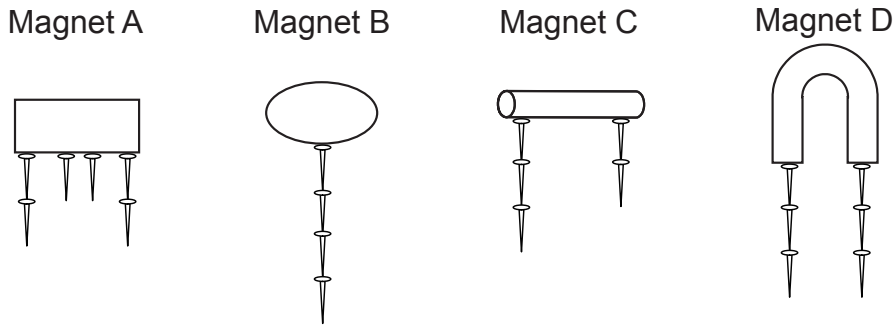
(2) the temperature of the hot milk decreases to become lower than the cold water

(3) the temperature of the cold water decreases as it loses heat to the hot milk

(4) the temperature of the cold water rises as it gains heat from the hot milk

( )

21 The diagrams below show four magnets, A, B, C and D, of different strengths. When the magnets are dipped into a pile of iron nails, they each attracted a different number of nails.



Which of the four magnets is the strongest?

(1) Magnet A

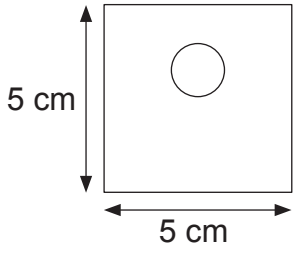
(2) Magnet B

(3) Magnet C

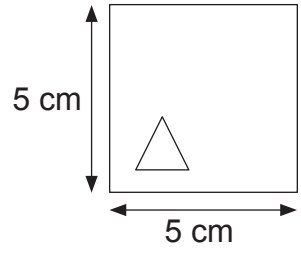
(4) Magnet D ( )

22 Shannon carried out an experiment with 3 sheets, A, B and C, which were made of different materials.

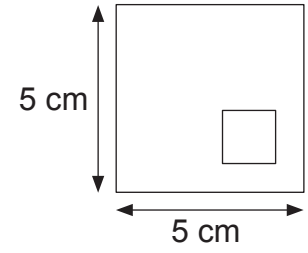
Each of the sheets had a hole as indicated in the diagrams below.



Sheet A
(clear plastic with circular hole)

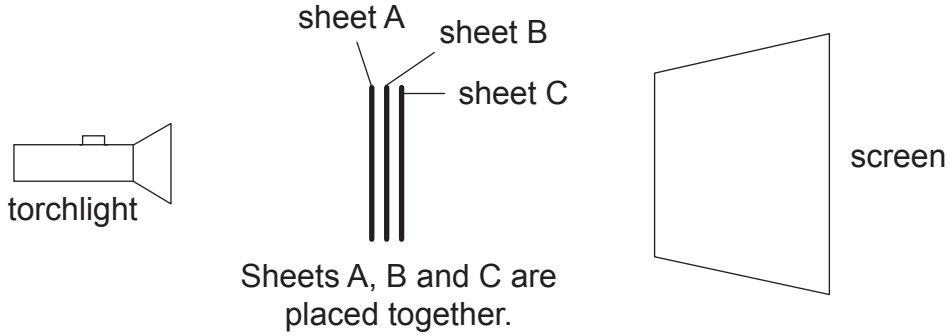


Sheet B
(cardboard with triangular hole)



Sheet C
(glass with square hole)

She placed all three sheets together in a row and turned on the light in a dark room.



Sheets A, B and C are placed together.

Which of the following shadows would she observe on the screen?

(1) 

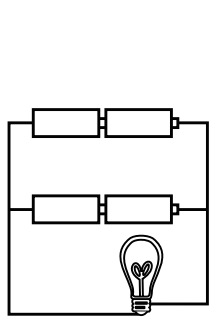
(2) 

(3) 

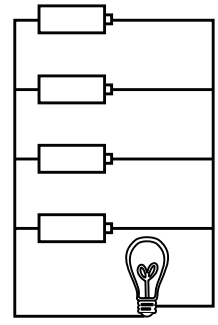
(4) 

( )

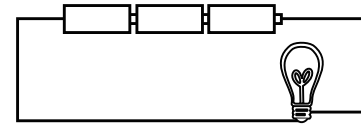
23 Study the circuits below carefully.



Circuit A



Circuit B



Circuit C

Arrange the circuits in ascending order from the least bright to the brightest.

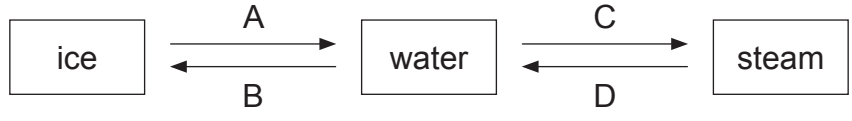
(1) A, C, B

(2) B, A, C

(3) C, A, B

(4) B, C, A ( )

24 Study the diagram below carefully.



Heat is released at processes _____.

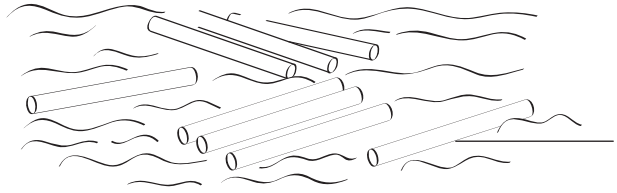
(1) A and B only

(2) A and C only

(3) B and C only

(4) B and D only ( )

25 Transportation of logs down the river makes use of the _____.



(1) kinetic energy of wind

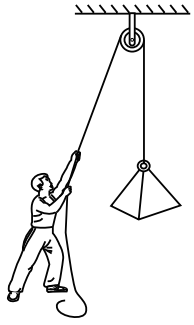
(2) potential energy of water

(3) kinetic energy of water

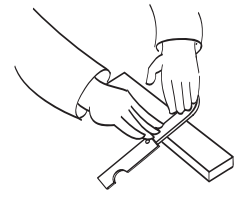
(4) potential energy of the logs ( )

26 Which one of the following is **not** an advantage of friction?

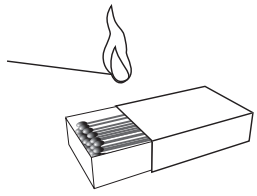
(1) Pulling a load on a pulley



(2) Sharpening a knife on a stone



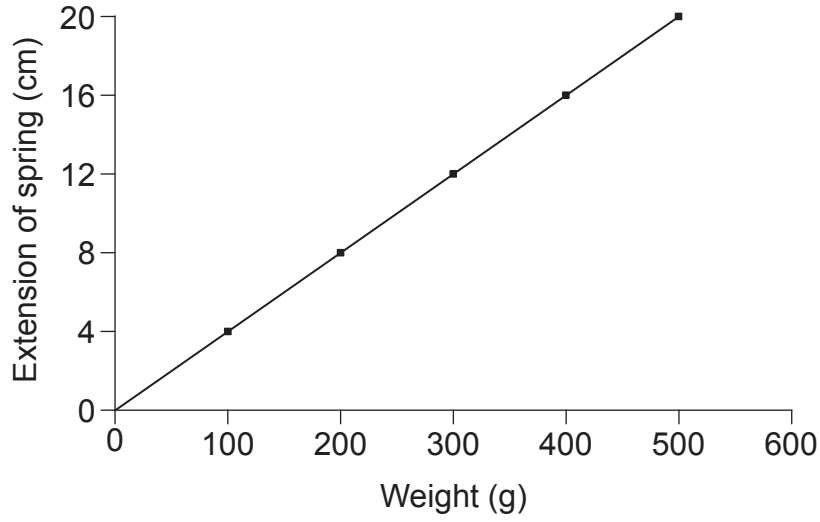
(3) Striking a match



(4) Running on a wet surface

( )

27 A 5-cm spring was used to measure various weights and the extensions made by the spring were recorded in the graph below.



What was the length of the spring when a 250-g weight was hung on it?

(1) 8 cm

(2) 10 cm

(3) 12 cm

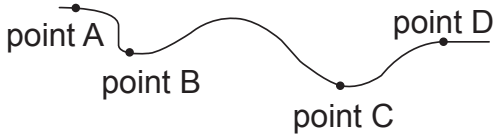
(4) 15 cm ( )

28 Nathaniel tried out a new roller coaster at a theme park. During his ride, he took note of 4 checkpoints in the roller coaster.

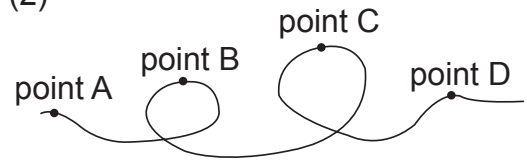
- Point A had less kinetic energy than point B.
- Point B had more kinetic energy than point D.
- Point C had more potential energy than point A.
- Point D had less potential energy than point A but more kinetic energy than point C.

Which of the following designs shows the correct checkpoints for his roller coaster ride?

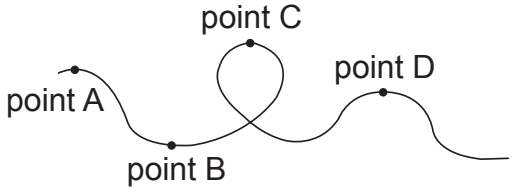
(1)



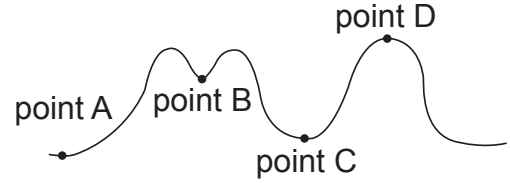
(2)



(3)



(4)



( )

29 Which of the following activities is a cause of acid rain?

(1) A farmer spraying insecticides on his crops

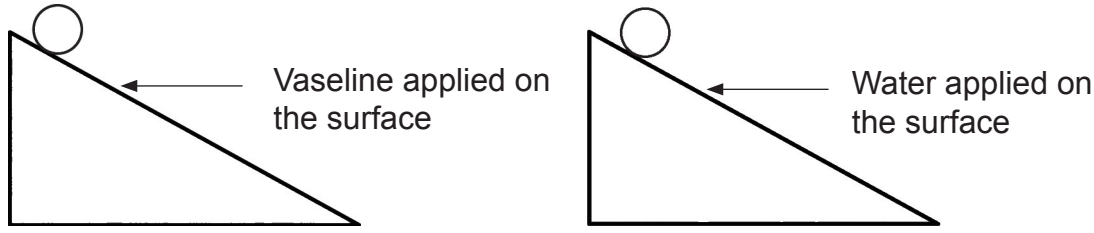
(2) Smoke produced from burning paper

(3) Dust particles released from cement factories

(4) Gases produced from power stations using coal ( )

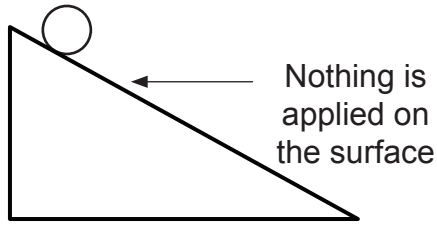
30 Helen wanted to find out if lubricants added on a ramp would affect the distance travelled by a ball on the ramp.

The following diagrams show each of her set-ups.

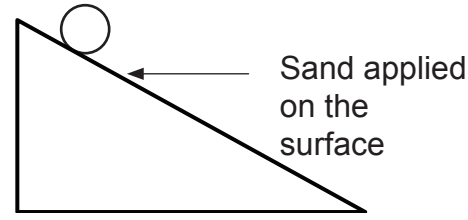


Which of the following set-ups should be used, in addition to the ones above?

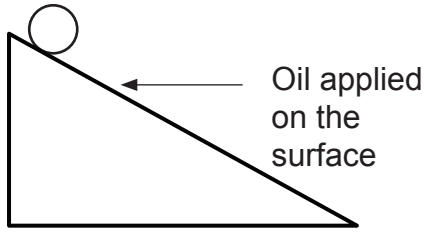
(1)



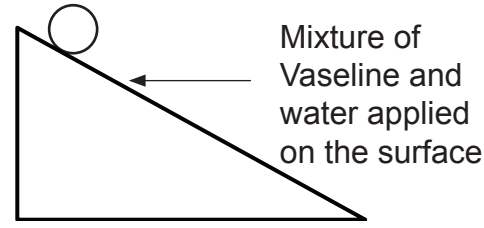
(2)



(3)



(4)



( )

BOOKLET B
PART II

For questions 31 to 44, write your answers in the spaces provided.

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

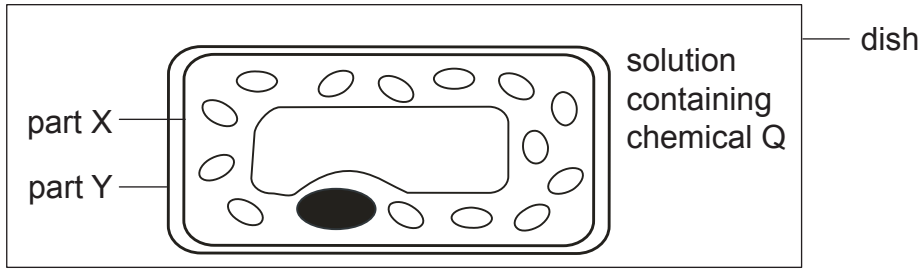
(40 marks)

---

31 Kaitlin conducted an experiment to find out the function of various cell parts.

She placed the plant cell below in a dish with a solution containing chemical Q. When she checked the cell an hour later, she found that chemical Q did not enter the cell.

She then removed some parts of the cell and repeated the experiment.

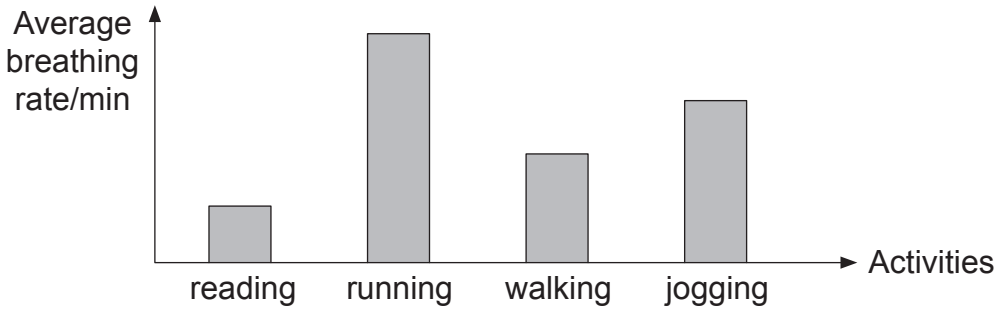


(a) The table below shows only part of her results. Complete it to show the results when the various parts of the cell were removed. [1]

	Cell part removed	Results
(i)	None	Chemical Q is not found in the cell.
(ii)	Part X removed only	
(iii)	Part Y removed only	

(b) Give a reason for your answers in **(ii)** and **(iii)**. [2]

32 The graph below shows the average breathing rate of the same person doing various activities for a period of 10 minutes.



(a) What relationship can you conclude regarding the energy required for the activities above and the average breathing rate? [1]

_____

_____

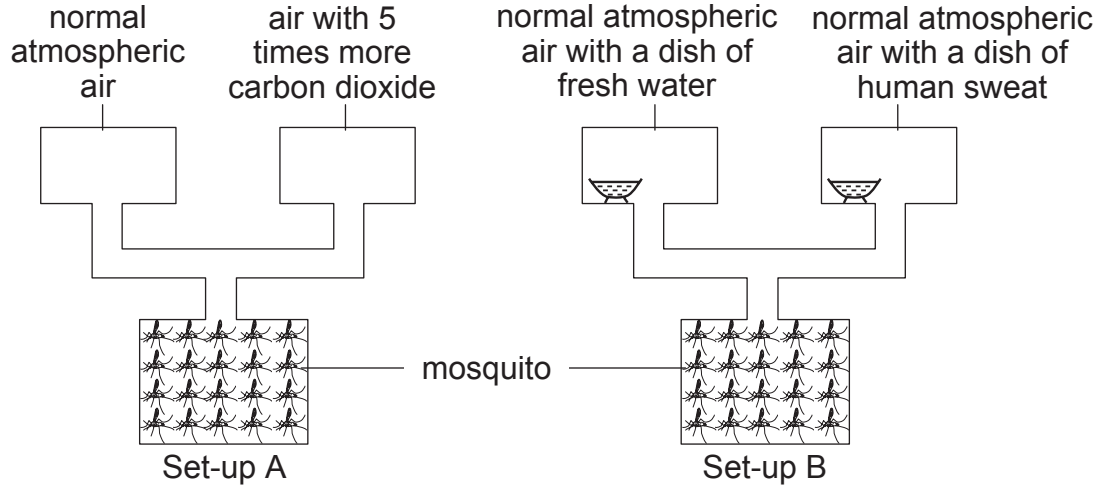
(b) Explain why our breathing rate changes when doing activities of different energy levels. [1]

_____

_____

Kelvin conducted an experiment to find out the conditions that female mosquitoes prefer.

He placed 20 female mosquitoes each in two set-ups, A and B, as shown below. After 10 minutes, he counted the number of mosquitoes in each chamber of the two set-ups.



The table below shows the results of his experiment.

		Number of mosquitoes
Set-up A	Normal atmospheric air	2
	Air with 5 times more carbon dioxide	18
Set-up B	Fresh water	3
	Human sweat	17

(c) What conclusion can Kelvin make about the conditions female mosquitoes are attracted to from the above experiment? [1]

Set-up A: _____

_____

_____

Set-up B: _____

_____

_____

(d) Reo had just completed his homework ofter working on it for the past 1 hour while Arthur had just finished playing soccer for the same period of time.

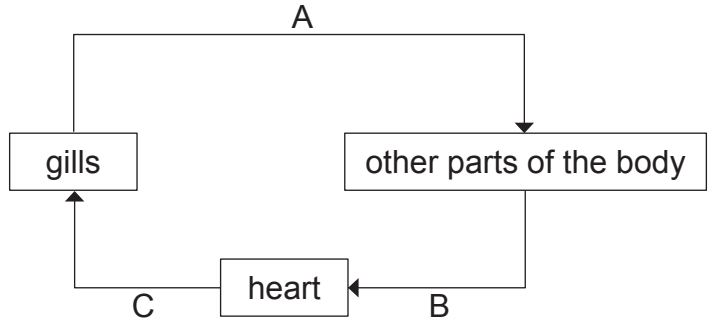
Predict which of the boys above is likely to be bitten more by mosquitoes if they are in the same room with mosquitoes in it. Give a reason for your answer. [1]

_____

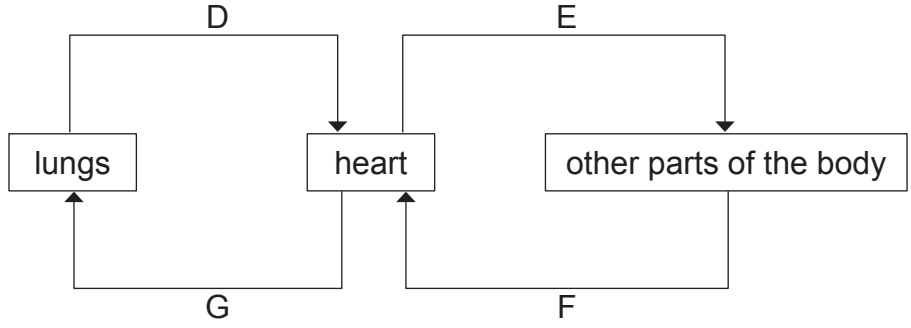
_____

33 The diagrams below show the circulatory system of a fish and a man.

(Circulatory system of a fish)



(Circulatory system of a human)



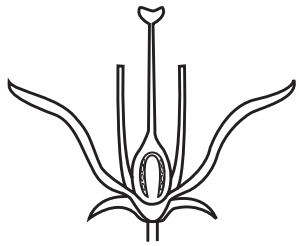
(a) The blood vessels above are labelled with letters. State which blood vessel(s), A to G, are rich in carbon dioxide. [1]

(b) What is the difference between the type of oxygen taken in by the fish and the human? [1]

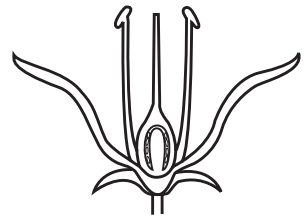
(c) Besides the difference in respiratory organs, identify another difference between the two circulatory systems based on the diagrams above. [1]

34 The diagrams below show 3 brightly-coloured flowers, A, B and C, from the same plant.

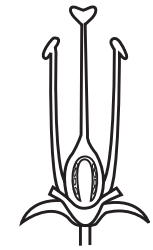
In an experiment, a certain part of each flower was removed as shown below.



Flower A
anther removed



Flower B
stigma removed



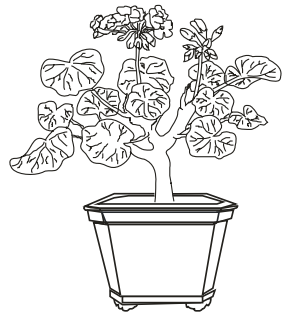
Flower C
petals removed

(a) If pollen were scattered on top of each flower, which flower(s) would not be able to bear fruit? [1]

(b) Give a reason for your answer in **(a)**. [1]

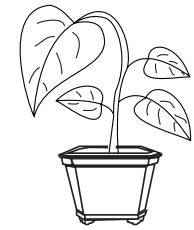
(c) How does removing the petals in flower C affect the flower? [1]

35 Geraldine conducted an experiment to find out if plants need water to grow as shown below.



Pot **A**

2 plants placed in an open field



Pot **B**

She placed two pots of plants, A and B, in an open field for 1 week to ensure that they get enough sunlight. She watered both plants once and subsequently watered only pot A every day; she did not water pot B at all for the duration of the experiment.

At the end of the week, she found that there was not much difference in appearance between the two plants at the beginning of the experiment and at the end of it.

State two things that she could have done wrongly. [2]

_____

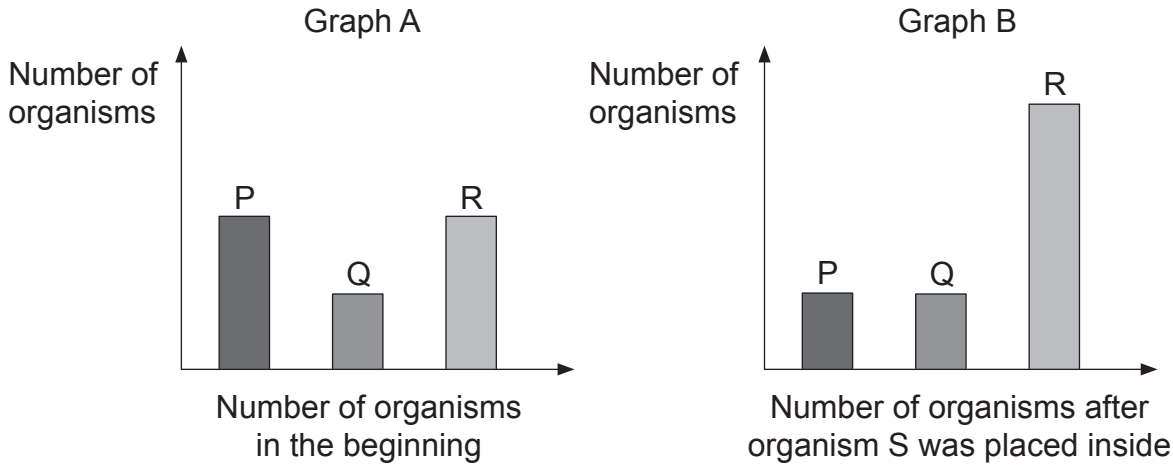
_____

_____

_____

36 Zack placed 3 organisms in an aquarium. The initial number of each organism is shown in graph A below.

He then caught another organism S from a pond and placed it into the aquarium. After some time, he noticed there were less of organism S in the tank and also a change in the number of organisms P and R. The results are shown in graph B below.

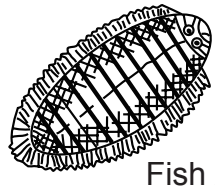


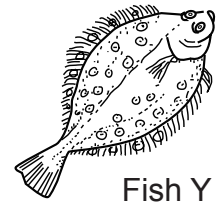
(a) Using the two graphs above, write down a possible food chain involving organisms P, R and S only. [1]

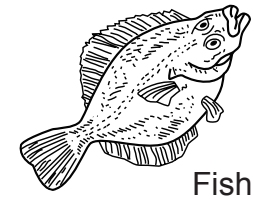
(b) When Zack removed organism Q from the aquarium, he noticed that all of the other organisms started to swim near the surface of the water.

What could organism Q be? Give a reason for your answer. [1]

37 The diagrams below show three types of fish, X, Y and Z, which are found in a marine habitat. The fish live at the bottom of the seafloor and so the floor pattern is important for their survival.


Fish X


Fish Y


Fish Z

Ten fish of each variety were placed in a large tank with a certain floor pattern. A predator of the fish was also introduced into the tank. After a few weeks, the number of each fish left is shown in the table below.

Fish type	Fish X	Fish Y	Fish Z
Initial number	10	10	10
Number left	9	4	7

(a) What do you think the floor pattern of the tank looked like? Draw the likely pattern in the space below. [1]

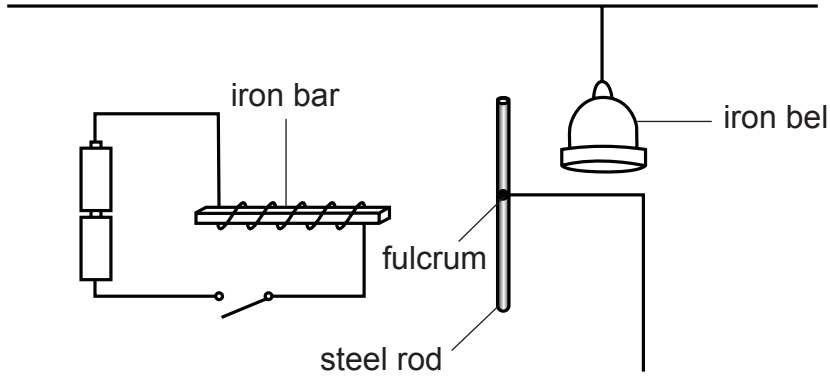
(b) Based on your answer in **(a)**, explain why fish Y decreased the most. [1]

_____

_____

(c) What type of floor pattern would enable fish Y to survive better than the other fish in a marine habitat? Draw your prediction in the space below. [1]

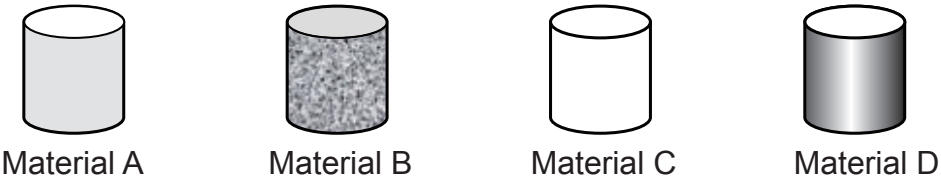
38 An iron bell is hung near a steel rod in the circuit below.



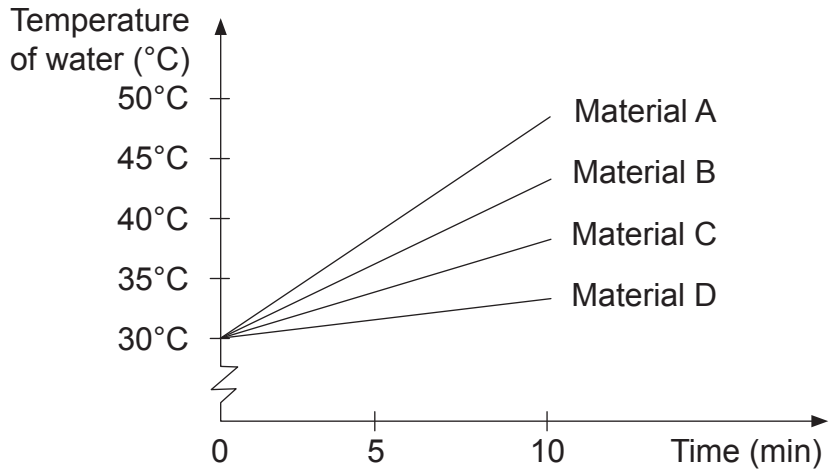
(a) When the switch is closed, the iron bell would ring. Explain why this happens. [2]

(b) The iron bar is now replaced with a copper bar. Would there be any difference in the result? Give a reason for your answer. [1]

39 Sarah was given 4 containers made of materials A, B, C and D. She then poured 100 m/ of water into each container and heated the water with the same flame for 10 minutes each.



The graph below shows the results after the water in each container was heated for 10 minutes.

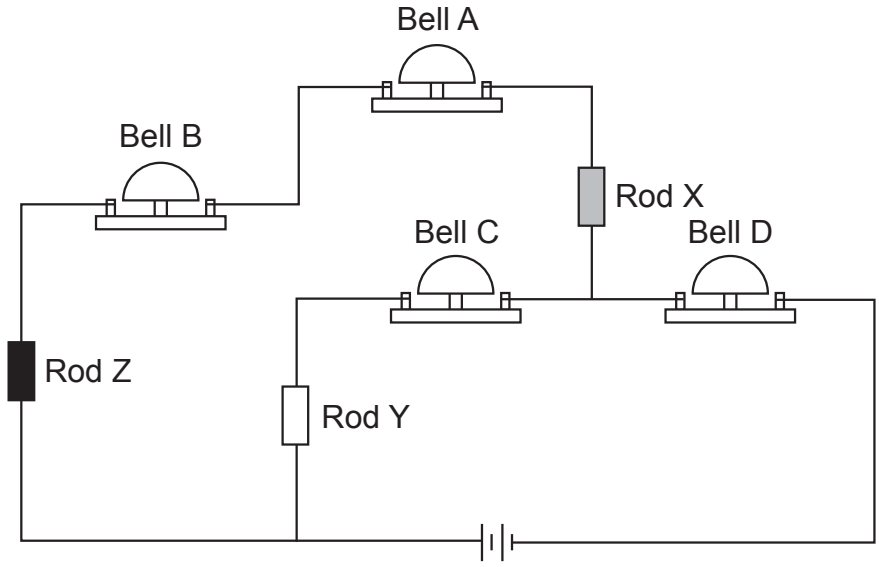


(a) What do you think is the purpose of the experiment? [1]

(b) Sarah has some orange juice. If she wants it to be cold quickly, which container should she choose to pour the juice into when she places it in the refrigerator? Give a reason for your answer. [1]

(c) Which material should she use if she wants to keep her coffee hot for as long as possible? [1]

40 Janson was given three rods made of different materials X, Y and Z. He then placed the rods in an electric circuit with four bells, A, B, C and D, which were all in working order. The results of his experiment are given in the table below.

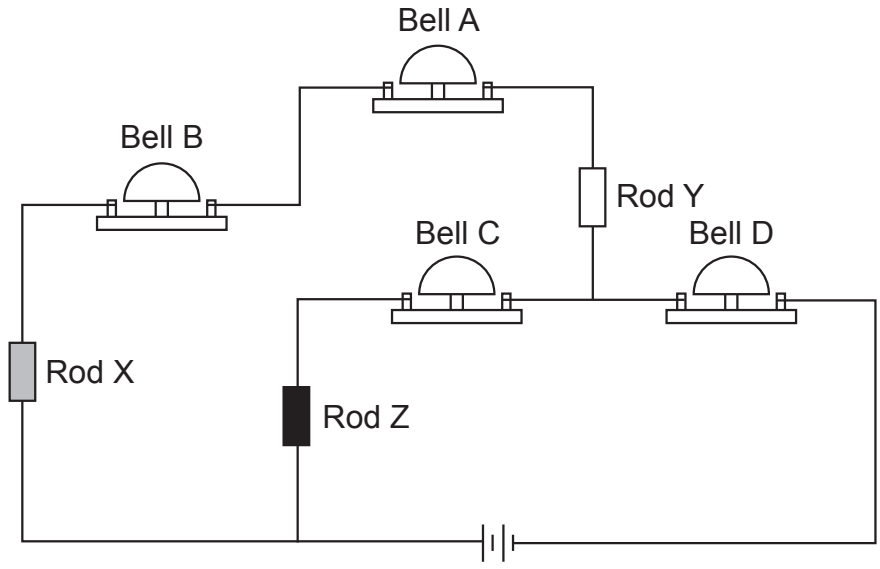


Set-up A

Set-up A	Does it ring?
Bell A	Yes
Bell B	Yes
Bell C	No
Bell D	Yes

(a) State a possible conclusion about the electrical conductivity of the 3 rods from his experiment shown above. [1]

Janson then changed the positions of rod X, rod Y and rod Z in the circuit as shown below.



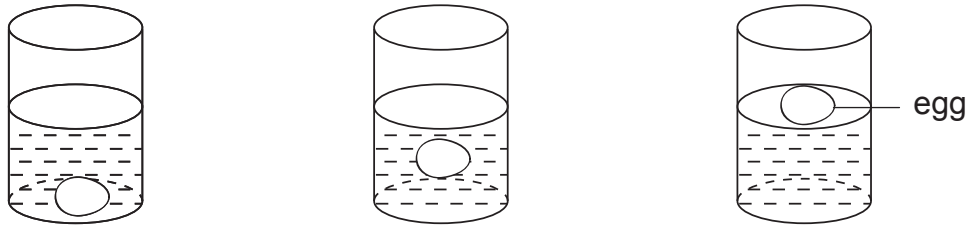
Set-up B

(b) From the results given in set-up A, predict whether the bells will ring or not by writing 'Yes' or 'No' in the table below. [2]

Set-up B	Does it ring?
Bell A	
Bell B	
Bell C	
Bell D	

41 Shirley conducted an experiment to find out how the amount of salt added to a beaker of tap water would affect the position of an egg in the water.

The results of her experiment are shown below.



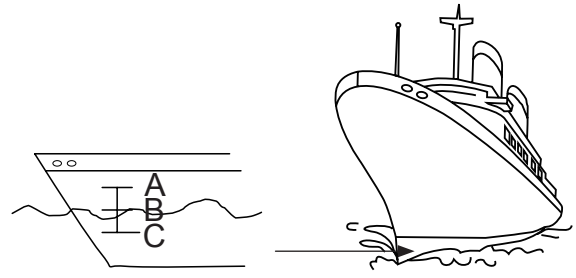
mixture of water and 0 tablespoonful of salt

mixture of water and 3 tablespoonfuls of salt

mixture of water and 5 tablespoonfuls of salt

(a) What can Shirley conclude from the experiment above? [1]

(b) The diagram below shows a ship that is currently at sea with the saltwater at position B.

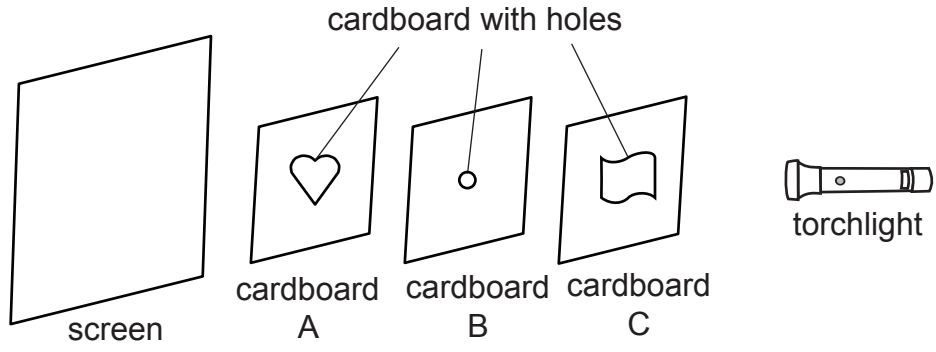


The markings on the ship indicate the position of the ship in the water.

If the ship moves to a place with freshwater instead, where will the water level be on the markings of the boat? Is it A, B or C? [1]

(c) Provide a reason for your answer in **(b)**. [1]

42 Michelle conducted an experiment as shown below.



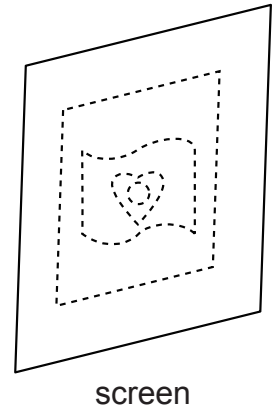
When the torchlight was shone on three opaque cardboards with holes of various shapes in the middle as shown above, a shadow was formed on the screen.

(a) How can the shadow be made bigger by moving just the torchlight? [1]

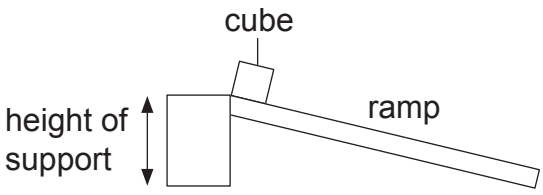
_____

_____

(b) Shade the **shadow** in pencil according to what could be seen on the screen. The outline of the cardboard and the various holes are shown in dotted lines below. [1]



43 The set-up below shows the relationship between the height of the support and the time taken for a cube to slide down the ramp.

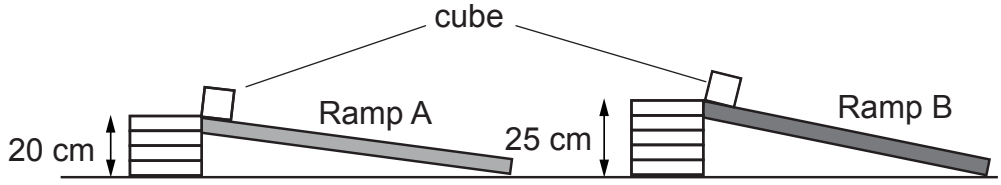


Height of support (cm)	Time taken for the cube to slide down the ramp (s)
5	8
10	6
15	4
20	2

(a) What is the relationship between the height of the support and the time taken for the cube to slide down the ramp? [1]

Sarah set up another experiment using two different materials for ramp A and ramp B. She used the same cube to slide down the ramps for both set-ups.

She found out that for both cubes to reach the bottom of the ramp at the same time, she needed to raise ramp A to a height of 20 cm while ramp B required a height of 25 cm.

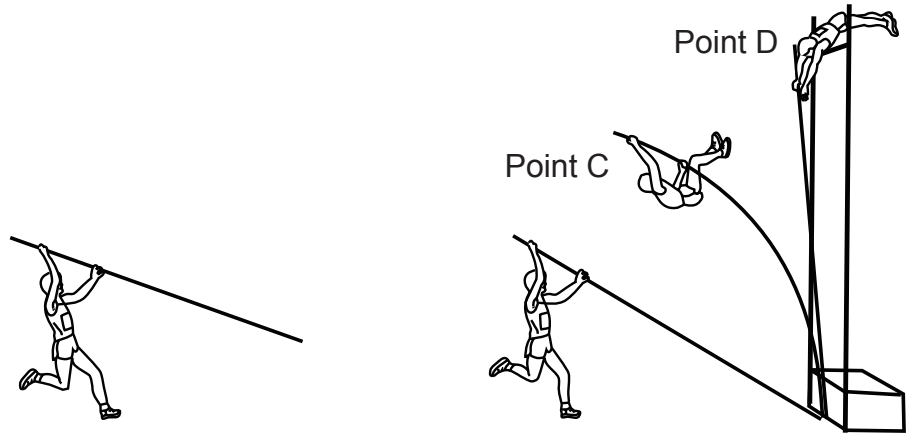


	Ramp A	Ramp B
Time taken for the cube to reach the bottom of the ramp	5 s	5 s
Height of support	20 cm	25 cm

(b) Which ramp had a smoother surface? Give a reason for your answer. [1]

(c) Which material, A or B, would you suggest to use as a flooring material for wet bathroom floors? Give a reason for your answer. [1]

44 The diagram shows a man participating in a sport called pole vaulting. From point A, he will run towards point B and lunge up in the air with the help of a pole until he crosses a bar at point D, the highest point.



Study the diagram above carefully and answer the following questions. [2]

(a) State the form(s) of energy that the man possesses at the following points:

(i) Point A: _____

(ii) Point C: _____

(iii) Point D: _____

(b) What form of energy does the pole possess at point C that allows the man to propel forward to point D? [1]

_____

_____

Answers to:

SCIENCE
END-OF-YEAR
MOCK EXAMINATION SET 1

PART I

1 (3)
Root hair cells have a nucleus and a cell wall but no chloroplast.

2 (2)
The graph shows that when the amount of carbon dioxide in the water increases, the rate of photosynthesis also increases, as indicated by the amount of oxygen produced per minute. The amount of oxygen does not affect the rate of photosynthesis. The distance of the lamp is fixed and does not change the rate of photosynthesis.

3 (4)
Blood from the heart has to travel to the lungs to exchange carbon dioxide for oxygen and is transported back to the heart again to pump oxygenated blood to the head and back to the heart again.

4 (1)
Graph A shows a growth pattern that is typical of animals like the mouse where its size increases gradually. Insects like the butterfly have a staggered growth pattern as they are unable to grow bigger until they moult, which is the shedding off their old covering.

5 (1)
We can answer this question by elimination. The dolphin is mammal while the shark is a fish. So only the dolphin feeds its young with milk. Only the shark is covered with scales (dermal denticles) and breathes with its gills.

6 (3)
To find out and be able to compare the results of the experiment correctly, a control set-up should consist of the same number of weevils with a pot of rice but without the pandan leaves.

7 (3)
As the cut was made above the water in set-up B, the water-carrying tubes were cut off and cannot transport the water to the top of the celery. Thus only the region on the right side of the celery can still carry water to the top.

8 (3)
The fruit has a wing-like structure which allows it to be carried far away from the parent plant by the wind. In option (3), the pattern shows that the seeds are scattered in one direction to the right, which matches the direction of the wind.

9 (1)
Cell X is a sperm cell and is produced in the testis which is shown in part A. Cell Y is the egg cell and is produced in the ovary, which is shown in part C.

10 (4)
Option (1) is incorrect as the frogs will decrease too once the grasshopper's population decreases. Option (2) is incorrect as the population of frogs will decrease. Option (3) is incorrect as both populations of grasshoppers and frogs will increase. Option (4) is correct as the population of snakes will decrease which, in turn, will cause the frogs to increase. This will lead to a decrease in the population of the grasshoppers.

11 (2)
Part B is the seed leaf which provides food for the seedling to grow bigger. Option (1) is incorrect as the leaves do not make food for the seed leaves. Option (3) is incorrect as minerals do not provide energy for the seedling to grow bigger. Option (4) is incorrect as D is the seed coat and serves to protect the seed.

12 (4)
Option (A) is incorrect as fungi cannot make their own food. Option (B) is incorrect as all living things respire including fungi. Options (C) and (D) are incorrect as non-flowering plants like ferns reproduce by spores and do not produce flowers.

13 (4)
S is in danger of being extinct as its population only decreases throughout the years while R and P increase and decrease over time. Q's population stays relatively constant throughout the years so it is also not in danger of being extinct.

14 (1)
Options (2), (3) and (4) are unique adaptations of the cactus to take in more water and prevent water loss. Option (1) is incorrect as other plants also have water-carrying tubes to transport water.

15 (1)
The presence of fish provide carbon dioxide for the hydrilla. To conduct a fair test, only one set-up should contain the fish with the hydrilla while the control set-up should contain only

the hydrilla. The amount of pond water and the number of stalks of hydrilla should be the same for both set-ups.

16 (4)
By testing to see if the plunger can be pushed in, he is trying to find out if the substances can be compressed or in other words, have an indefinite volume. All matter occupy space so option (1) is incorrect. We cannot compare the mass or the hardness of the substances with this set-up so options (2) and (3) are incorrect.

17 (2)
A balloon is elastic and would allow another 50 cm^3 of air to be pumped into it. Since there is already 200 cm^3 of air in the balloon, the total volume would be 250 cm^3.

18 (4)
The air loses heat to the ice cubes and decreases in temperature. The temperature of the ice cube remains the same as melting takes place at 0°C. The temperature of the water will increase as it gains heat from the surrounding air.

19 (2)
At 20°C, P is a solid as it is below 25°C, the melting point. At 60°C and 100°C, P is a liquid as they are below the boiling point of 150°C.

20 (4)
Heat travels from a hotter place to a colder place. So the cold water gains heat from the hot milk, and increases in temperature.

21 (2)
To test the strength of the magnet, we should count the number of nails at a particular point of the magnet and not the total number of nails it attracts at different parts of the magnet. Magnet B is the strongest as it attracted the most number of nails at one point.

22 (1)
Sheets A and C allow most light to pass through them (transparent). Sheet B prevents light from passing through it (opaque) except through the triangular hole. Thus only a triangular patch of light will be seen on the screen.

23 (2)
Batteries in a parallel arrangement will provide the same amount of energy as the other batteries in the other paths in the circuit. Thus circuit C's bulb will be the brightest, followed by circuit A then circuit B.

24 (4)
Heat is lost when liquid water changes to ice and when steam changes to liquid water.

25 (3)
Since the logs are in the water, the kinetic energy of the moving water will transport the logs down the river.

26 (1)
Options (2), (3) and (4) are all advantages of friction. Without friction, the knife would not be sharpened, the match would not be lighted up and the boy would slip and fall while running. In option (1), the man would have to use more effort to overcome friction in order to lift the load.

27 (4)
The original length of the spring is 5 cm and the extension of the spring when a 250-g weight is attached is 10 cm. Thus the total length of the spring is 15 cm.

28 (3)
Point A should be at a higher position than point B which in turn is lower than point D. Point C is higher than point A. Point D is lower than point A. Point D is also lower than point C. Thus only option 3 matches the description.

29 (4)
Acid rain is caused by gases produced by factories or vehicles. Insecticides, smoke from burning paper and dust do not cause acid rain.

30 (1)
To make a fair comparison, a control set-up without any lubricant should be used to compare with the results from the ramps with Vaseline and water.

PART II

31 (a)

	Cell part removed	Results
(i)	None	Chemical Q is not found in the cell.
(ii)	Part X removed only	Chemical Q is found in the cell.
(iii)	Part Y removed only	Chemical Q is not found in the cell.

(b) Part X is the cell membrane which controls the movement of materials in or out of the cell Thus when part X is removed, chemical X can enter the cell freely.
Part Y is the cell wall and does not control movement of materials in or out of the cell. As only part Y is removed, the cell membrane, part X, will still be able to prevent chemical Q from entering.

32 (a) The more energy-consuming the activity is, the faster a person's average breathing rate.

(b) When we perform activities requiring more energy, our body takes in more oxygen to produce more energy for the activity during respiration.

(c) Set-up A: Female mosquitoes prefer air with 5 times more carbon dioxide than normal atmospheric air.

Set-up B: Female mosquitoes prefer an environment with human sweat than fresh water.

(d) Arthur, who had just finished playing soccer, would perspire more. His breathing rate would also be faster and would exhale more carbon dioxide than Reo. Therefore, he would attract more mosquitoes and be bitten by them.

33 (a) They are B, C, F and G.

(b) Humans take in atmospheric oxygen while fish take in dissolved oxygen.

(c) In the fish, blood flows from the gills to the body before reaching the heart while in humans, blood flows from the lungs to the heart first before reaching the rest of the body.

Or

In the fish, blood flows through the heart once while in humans, blood flows through the heart twice.

34 (a) Flower B would not be able to bear fruit.

(b) In flower B, the stigma was removed. Pollen could not land on it for pollination to take place and thus fertilization could not take place as well.

(c) The petals help to attract insects for pollination. Without them, fewer insects would be attracted to flower C to pollinate it.

35 • She should use the same type of plant for the experiment to make it a fair comparison.

• The size of pot and the amount of soil should be the same.

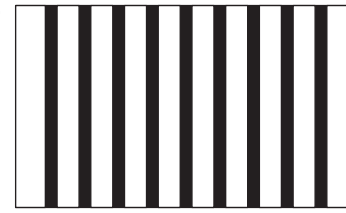
• The two pots could be placed under a glass shelter in the open field as plant B could still be receiving water when it rains.

(*Accept any two of the answers.*)

36 (a) It is P → S → R.

(b) Organism Q could be a plant. Plants produce oxygen during photosynthesis for the organisms in the aquarium. When it was removed, the amount of oxygen in the aquarium decreased, causing the organisms to swim near the surface of the water where the level of oxygen is higher.

37 (a)



(*Accept any other reasonable answers.*)

(b) Fish Y was unable to camouflage itself as it has a different body pattern from the floor pattern. Thus it was spotted more easily by the predator as compared to fish X and Z.

(c)

(*Accept any other reasonable answers.*)

38 (a) Electricity would flow through the iron bar and cause it to become an electromagnet. The lower end of the steel rod would then be attracted to the iron bar and move towards it, causing the other end to hit the iron bell and make it ring.

(b) The bell would not ring. Copper is a non-magnetic material and would not become an electromagnet to attract the steel rod when the switch is closed.

39 (a) It is to compare how well each material conducts heat.

(b) She should choose material A. It is the best conductor of heat and would, therefore, allow the orange juice to lose heat quickly and become cold faster.

(c) She should use material D.

40 (a) Rod X and rod Z are conductors of electricity while rod Y is an insulator of electricity.

(b)

Set-up B	Does it ring?
Bell A	No
Bell B	No
Bell C	Yes
Bell D	Yes

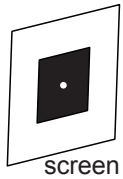
41 (a) The more tablespoonfuls of salt added, the position of the egg floating in the beaker of water will be higher.

(b) It will be at A.

(c) As the ship moves from saltwater to freshwater, the ship will sink deeper into the water and thus the water level would be higher than the current level at B.

42 (a) The torchlight can be moved nearer to cardboard C.

(b)



screen

43 (a) The higher the height of the support, the faster the time taken for the cube to slide down the ramp.

(b) Ramp A had a smoother surface. The height of the support is lower than ramp B yet it took the same time for the cube to reach the bottom.

(c) Ramp B has a rougher surface than ramp A. Thus it would provide more friction between the floor and the feet to prevent slipping.

44 (a) (i) kinetic energy

(ii) kinetic energy and gravitational potential energy

(iii) gravitational potential energy

(b) It possesses potential energy (or elastic potential energy).