Rosyth School
Mid-Year Examination 2022
SCIENCE
Primary 6

Total Marks: /56

Name: _____

Class: Pr 6- _____ Register No. _____

Date: 12 May 2022 Parent's Signature: _____

Duration: Total time for Booklets A and B: 1 h 45 min

Booklet A

Instructions to Pupils:

1. Please do not turn this page until you are told to do so.
2. Follow all instructions carefully.
3. Answer all questions.
4. This paper consists of 2 booklets, Booklet A and Booklet B.
5. For questions 1 to 28 in Booklet A, shade the correct ovals on the Optical Answer Sheet (OAS) provided using a 2B pencil.

This booklet consists of 23 printed pages (including cover page).

Part I

For each question from 1 to 28, four options are given. One of them is the correct answer. Make your choice (1, 2, 3 or 4). **Shade the correct oval (1, 2, 3 or 4) on the Optical Answer Sheet.** **(56 Marks)**

1 Which parts of the human digestive system produce digestive juices?

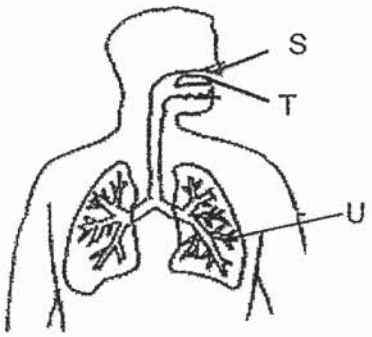
(1) stomach and small intestine only

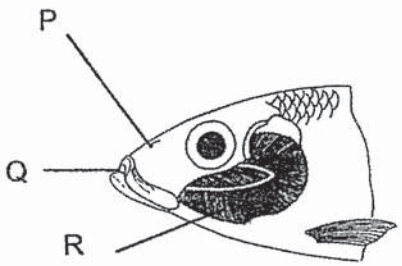
(2) mouth, gullet and large intestine only

(3) mouth, stomach and small intestine only

(4) mouth, gullet, stomach and small intestine only

2 The diagrams below show the respiratory systems of a human and fish.

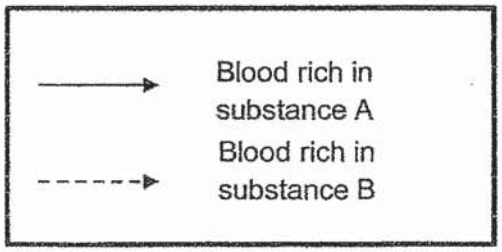




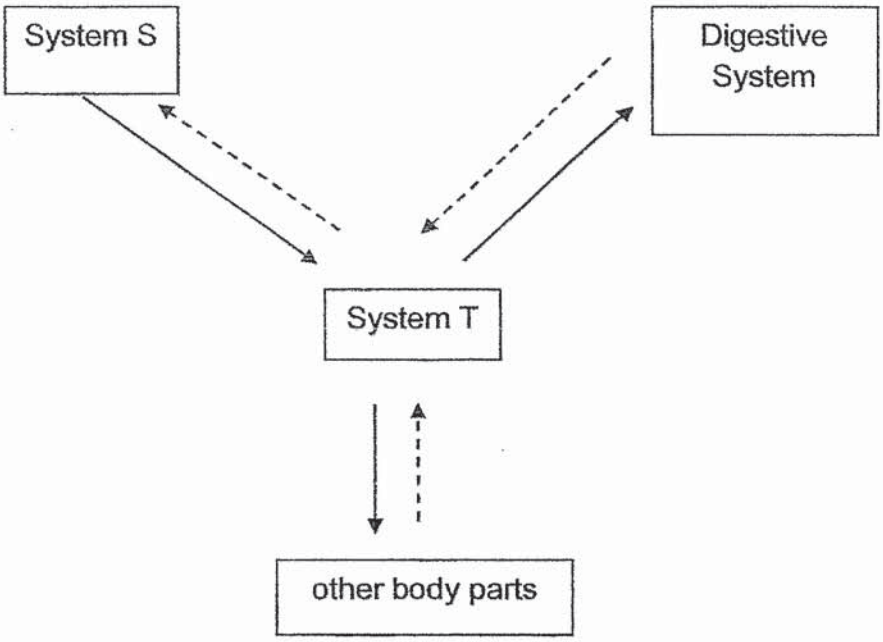
Which parts allow the exchange of gases to take place in human and fish?

	Human	Fish
(1)	S	R
(2)	U	R
(3)	T	Q
(4)	U	P

3 The box below shows what the arrows represent.



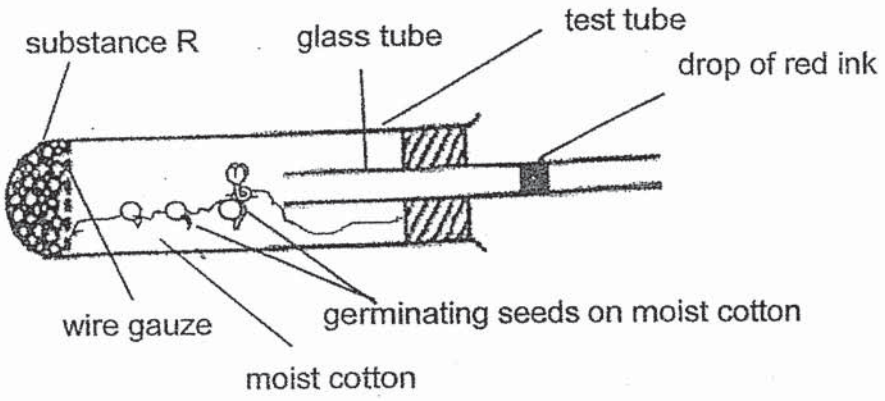
Robin used the above arrows to show how the three organ systems work together in a human body.



What are systems S and T and substances A and B?

	system S	**system T**	**substance A**	**substance B**
(1)	circulatory	respiratory	carbon dioxide	oxygen
(2)	respiratory	circulatory	oxygen	digested food
(3)	respiratory	circulatory	digested food	carbon dioxide
(4)	respiratory	circulatory	oxygen	carbon dioxide

4 John had a set-up as shown below.

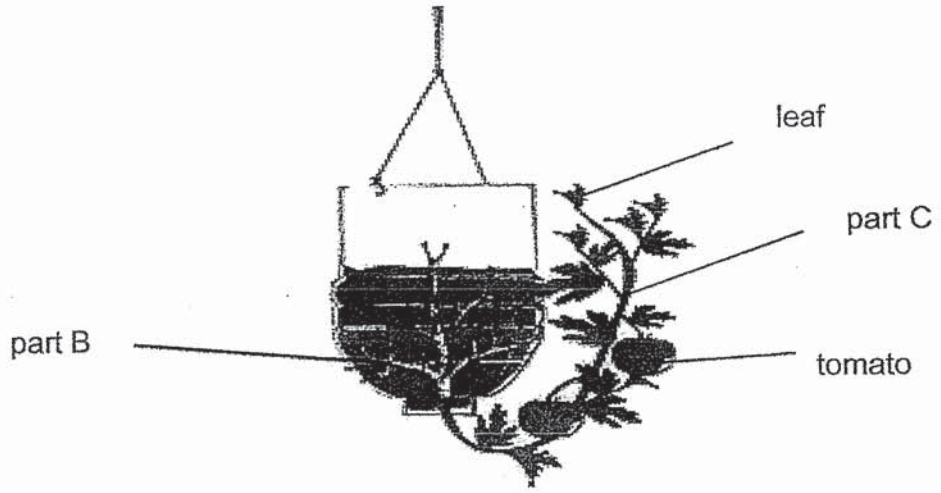


He placed substance R in the test-tube to absorb gas S. After a day, he observed that the red ink moved towards the test-tube.

Which one of the following represent gas S and the reason for his observation correctly?

	Gas S	Reason for his observation
(1)	carbon dioxide	Germinating seeds took in oxygen.
(2)	carbon dioxide	Germinating seeds took in carbon dioxide.
(3)	oxygen	Germinating seeds took in oxygen.
(4)	oxygen	Germinating seeds took in carbon dioxide.

5 Ramesh used the set-up as shown below to grow tomato plant.



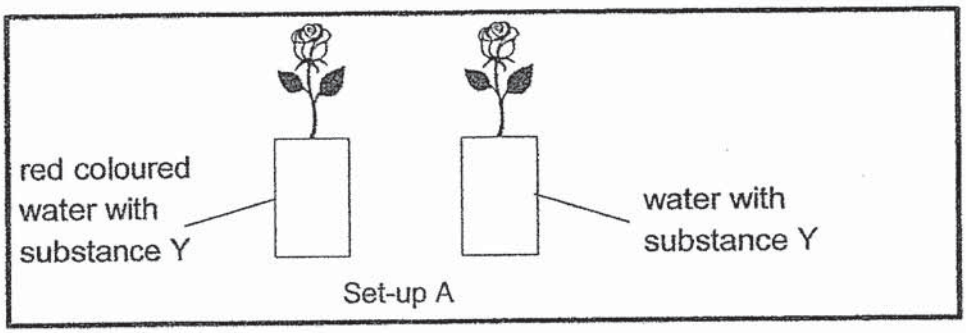
Which of the following best represents the functions of the two parts?

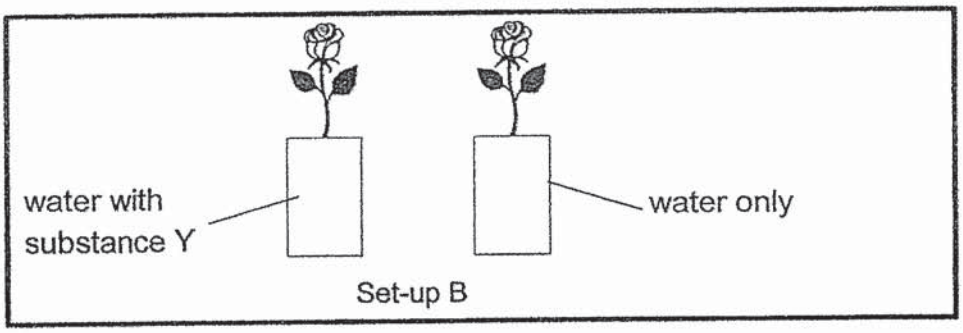
	Part B	Part C
(1)	Absorbs water and mineral salts	Holds the plant upright
(2)	Transports water to the tomatoes	Holds the plant upright
(3)	Transports mineral salts to the tomatoes	Transports water to the tomatoes
(4)	Holds the plant firmly in the soil	Transports carbon dioxide to the leaves

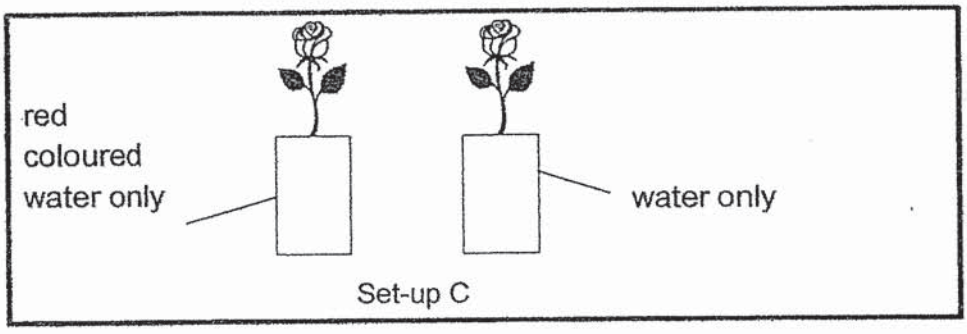
6 Cynthia read the following hypothesis,

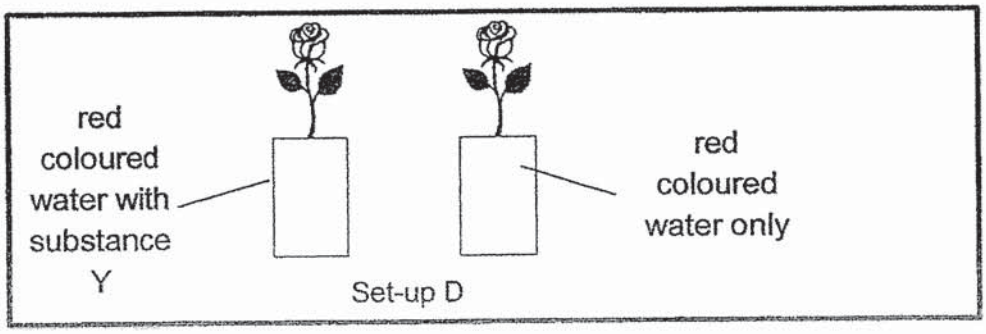
"Substance Y can increase the rate of water uptake by a plant."

Then she carried out an investigation to find out if the hypothesis is correct. She placed a similar stalk of white rose in each container with the same volume of liquid in set-ups, A, B, C and D as shown below.









Question 6 continues on the next page

If she wants to measure the time taken for the water to reach the top of the rose, which set-up should Cynthia use?

(1) A

(2) B

(3) C

(4) D

7 Muthu carried out an experiment using two similar plots K and M at the same location. Different number of cucumber seeds were sowed in each plot. They were watered with the same amount of water daily. After two months, he calculated the average number of cucumbers produced by each plant as shown below.

Plots	**Number of cucumber plants**	**Average number of cucumbers produced per plant**
K	15	8
M	25	3

What was the most likely reasons for the results obtained above?

A The plants in K competed for sunlight.

B The plants in M competed for water in the soil.

C The plants in M competed for mineral salts in the soil.

D The plants in K were able to attract bees for pollination.

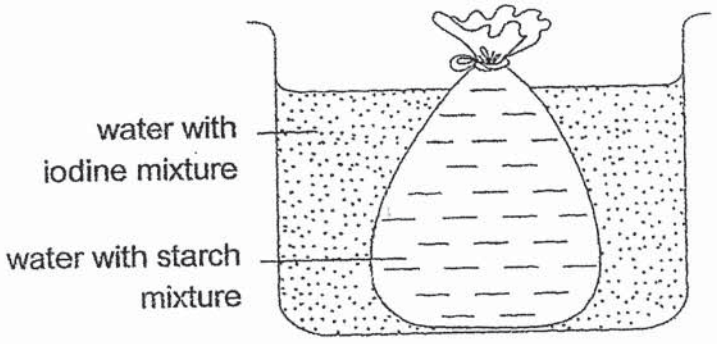
(1) A and B only

(2) B and C only

(3) B and D only

(4) C and D only

8 The diagram below shows a bag which holds a mixture of starch and water. It is placed into a beaker containing water with iodine solution.
Iodine turns from brown to dark blue in the presence of starch.



After three hours, patches of dark blue were seen inside the bag and not outside the bag.

Which part of the cell in the diagram below does the bag resemble?

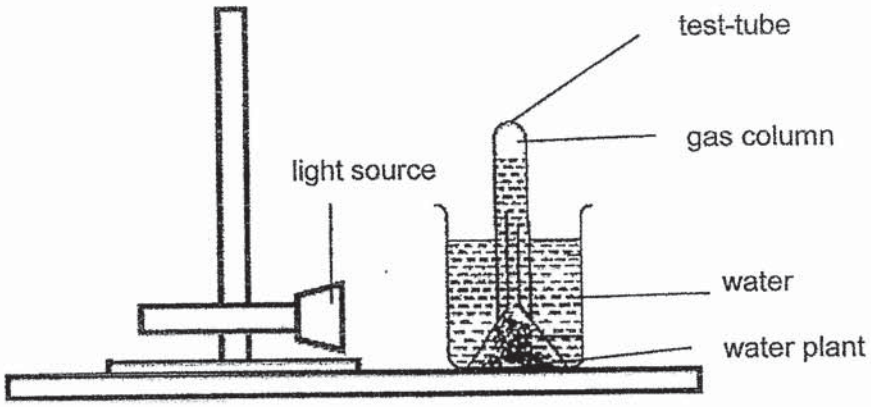
(1) nucleus

(2) cell wall

(3) cytoplasm

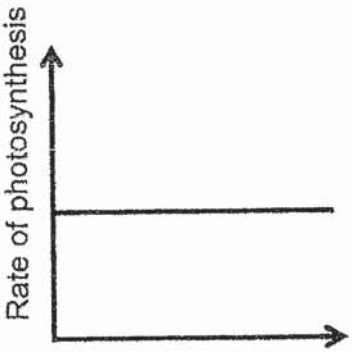
(4) cell membrane

9 Danial conducted the experiment as shown below to find out how the rate of photosynthesis is affected by the distance between the light source and the beaker. He conducted the experiment in a dark room.

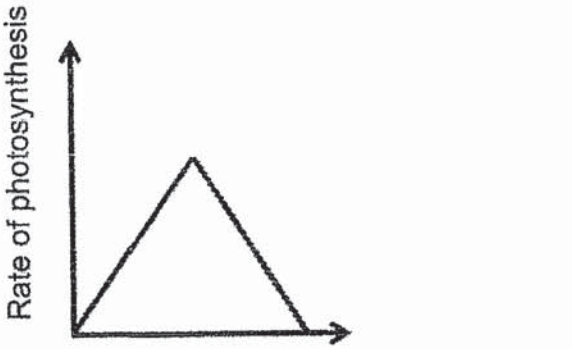


Which one of the following graphs correctly shows the relationship between the rate of the photosynthesis and the distance between the light source and the beaker?

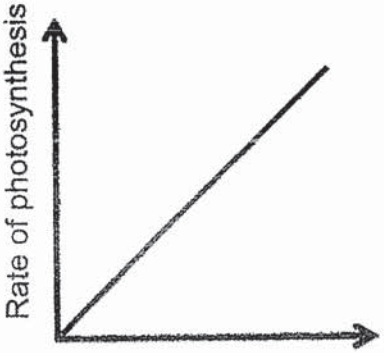
(1)



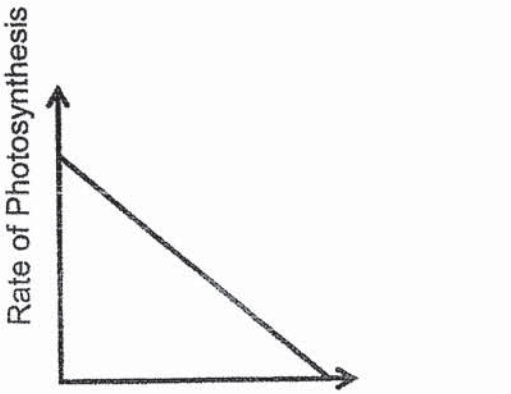
(2)



(3)



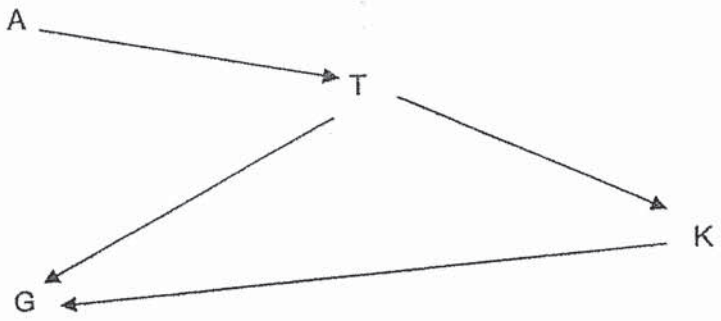
(4)



10 All the water plants, mosquito larvae, frogs and toads in a pond form a _____.

(1) group
(2) habitat
(3) population
(4) community

11 Study the food web below.



What is likely to happen to the population of A and the reason for the change if the population of K increases?

(1) It will increase as there is no predators for A.

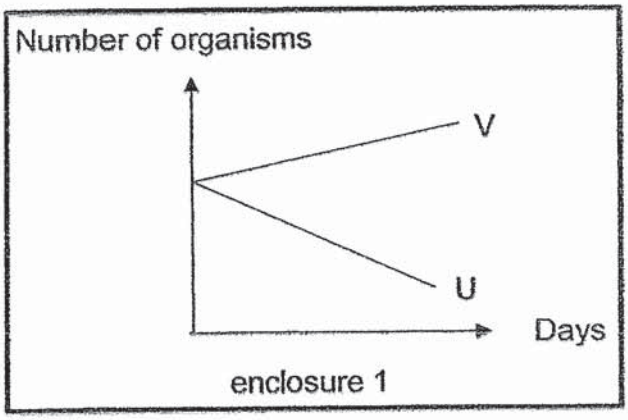
(2) It will stay the same because K does not eat A.

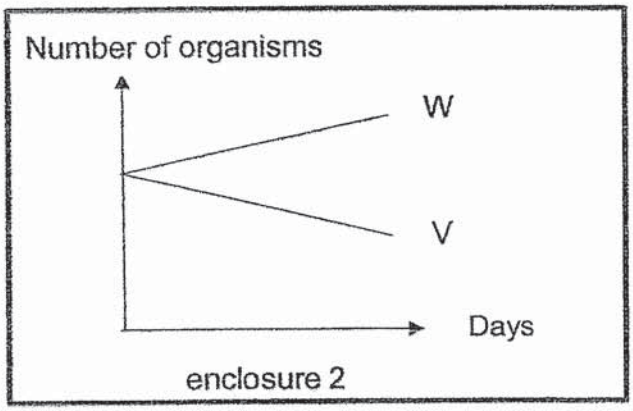
(3) It will increase because there are fewer T to feed on it.

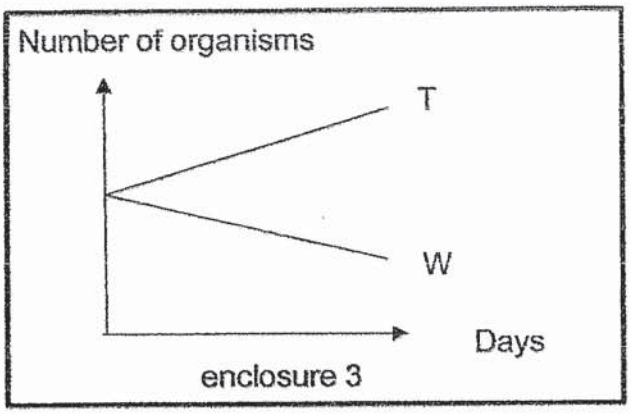
(4) It will decrease because all organisms depend on A directly or indirectly.

12 Four different organisms T, U, V and W, belonging to the same food chain are grouped in three enclosures, 1, 2 and 3 as shown below. One of the organisms is a food producer in the food chain.

The graphs below show the changes in the number of organisms after a period of time. There were no dead organisms in the enclosures.







From the graphs, which one of the following is correct?

	Prey	Predator	Both a prey and a predator
(1)	U	T	W
(2)	U	V	T
(3)	V	T	W
(4)	V	T	U

13 Why are there more water plants found just below the surface of water in the pond than at the bottom of the pond?

(1) They can take in more oxygen from the air.

(2) They can get more light for photosynthesis.

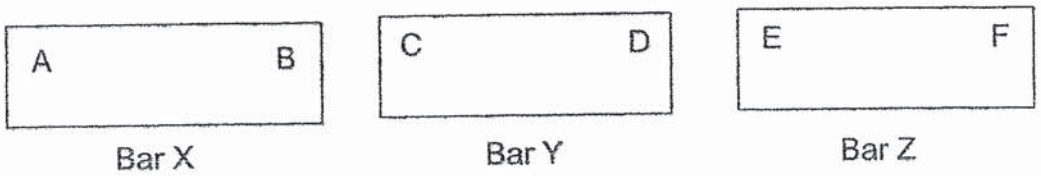
(3) They can get more space to prevent overcrowding.

(4) They can provide more shade for the animals in the pond.

14 Which of the following examples of adaptations have been correctly classified as behavioural and structural respectively?

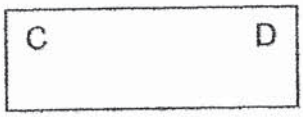
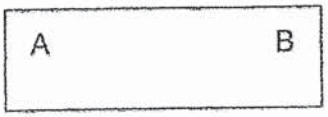
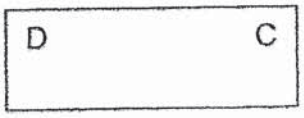
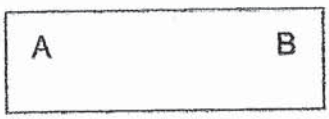
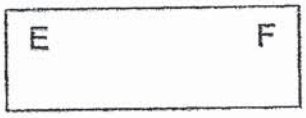
	Behavioural Adaptation	Structural Adaptation
(1)	Animals in desert search for food at night to avoid the heat from the sun.	Animals in desert hide in the shade to avoid the heat from the sun.
(2)	Some birds have colourful large feathers to attract mates.	Some birds dance to attract mates.
(3)	Predators have sharp teeth to tear the flesh of prey.	Predators usually hunt in groups to catch a prey that is larger.
(4)	Some insects pretend to be dead to prevent predators from attacking.	Some insects have toxic spines to kill the predators.

15 Zaki carried out an experiment with three different bars, X, Y and Z. The ends of the bars are labelled as shown.



Bar X Bar Y Bar Z

The table below shows how the bars interact when different ends of the bars are brought close to each other.

 	Repel
 	Attract
 	Attract
 	Attract

Based on the results given above, which of the following is definitely true?

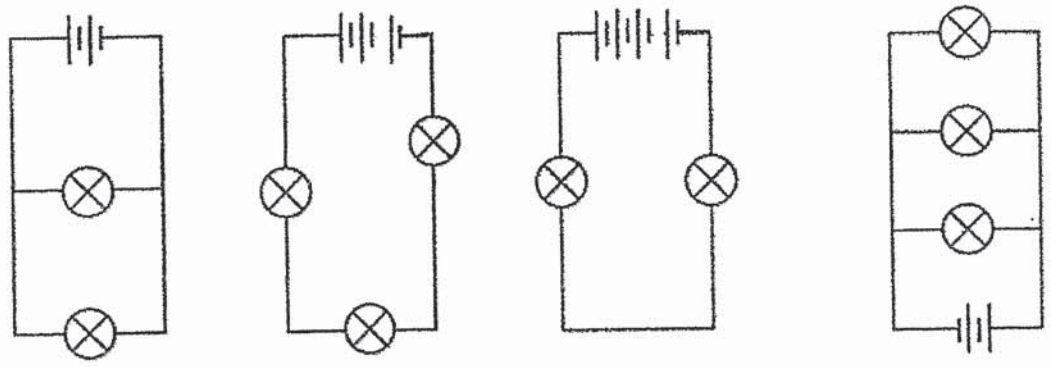
(1) Bar Z is made of steel.

(2) Only bar Y is a magnet.

(3) Bar X and bar Y are magnets.

(4) Bar X and bar Z are not magnets.

16 Study the electrical circuits shown below. The bulbs and batteries are new in each circuit.



In which circuit will the bulbs be dimmer compared to the other circuits?

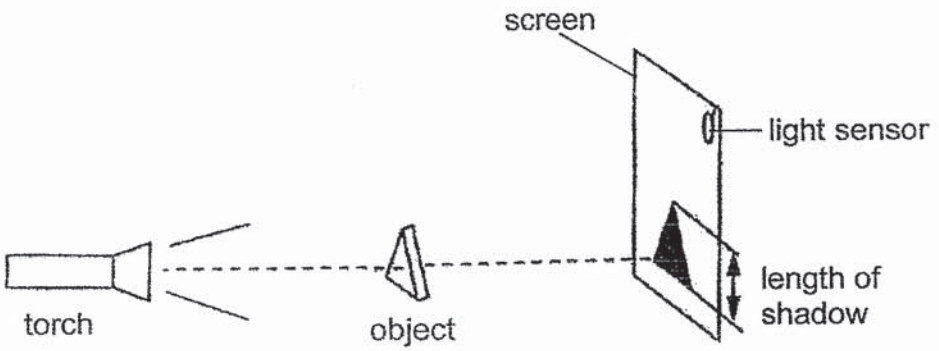
(1) A

(2) B

(3) C

(4) D

17 Alex used the set-up below to conduct an experiment.
He used a light sensor to measure the amount of light on the screen and a ruler to measure the length of shadow.



He arranged the items as shown above and then recorded the results in table 1 as shown below.

Table 1

Light Intensity (units)	Length of shadow(cm)
100	5

He then moved the position of the torchlight and the screen in the above set-up. He measured the results and recorded in table 2 as shown below.

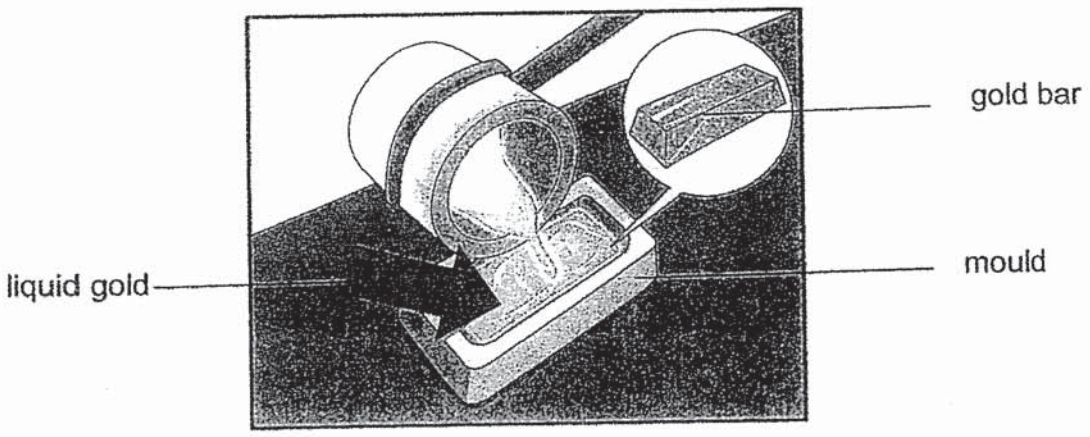
Table 2

Light Intensity (units)	Length of shadow(cm)
150	5

What were the two changes made by Alex in order to obtain the results shown in Table 2?

	Distance between torchlight and screen	Distance between object and screen
(1)	Increased	Increased
(2)	Increased	Decreased
(3)	Decreased	Increased
(4)	Decreased	Decreased

18 Liquid gold is poured into the mould as shown below to make a gold bar.



Which physical change/s will take place when a gold bar is formed from the liquid gold?

(1) temperature only

(2) mass and strength only

(3) volume and temperature only

(4) volume, strength and temperature only

19 Four similar-sized cups made from different materials were filled with 200ml of water at 10^0C. The cups were left in the room. The time taken for the appearance of water droplets on the outer surface of the cups was recorded.

Cup	Time taken for the appearance of water droplets (s)
A	120
B	10
C	100
D	50

Which material of the cup would be most suitable to make a container to keep ice cream?

(1) A

(2) B

(3) C

(4) D

20 Study the following information in the table below.

Appliance	
Useful energy	Light energy + sound energy
Energy that is not useful	Heat energy

Which one of the appliances is the best match for the energy conversion shown above?

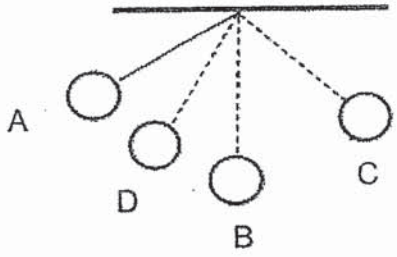
(1) iron

(2) lamp

(3) television

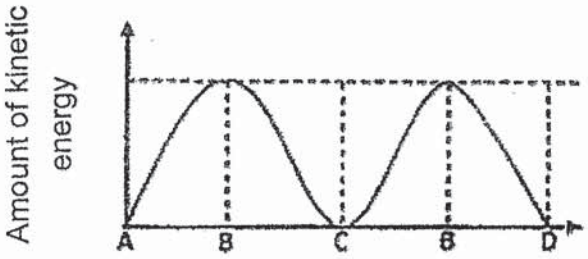
(4) vacuum cleaner

21 Marcus carried out an experiment with a pendulum as shown in the diagram below. He released the metal ball at position A and let it swing to position C and then back to position D.

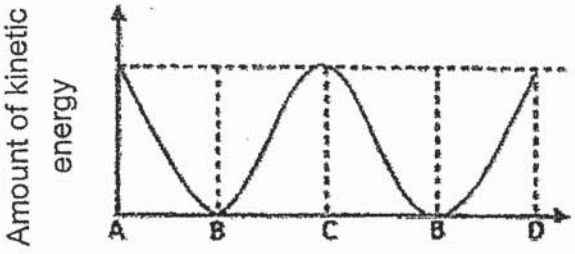


Which one of the following graphs shows the changes in kinetic energy of the metal ball as it swung from A to B to C and then back to B and D before coming to a stop?

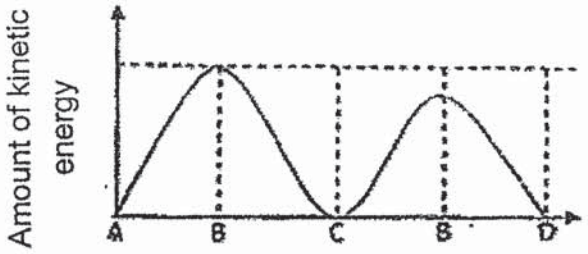
(1)



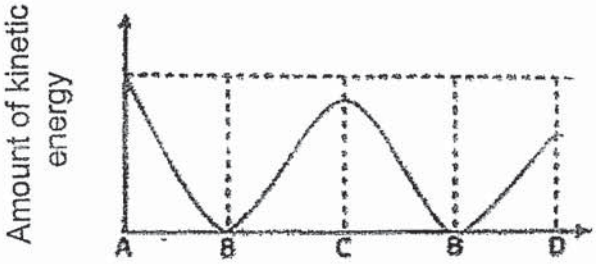
(2)



(3)

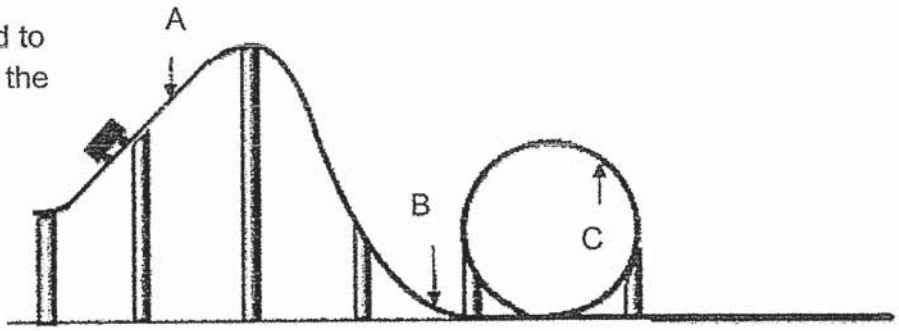


(4)



22 The diagram below shows a train moving up a roller coaster.

Electricity is used to drag the train up the slope



Which of the following statements is correct?

(1) The train moves faster at B than at C.

(2) The train has maximum potential energy at A.

(3) The train has more electrical energy at B than at A.

(4) The train does not need electrical energy to move from C till it stops.

23 An apple falling from a tree shows that a force can _____.

(1) stop a moving object

(2) move an object at rest

(3) change the shape of an object

(4) change the direction of moving object

24 Which of the following does **not** involve forces?

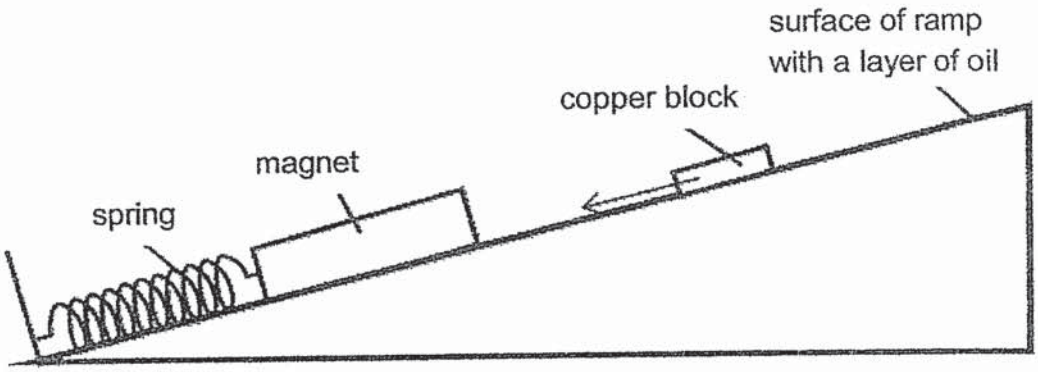
(1) Kites flying in the sky.

(2) Rain drops falling to the ground.

(3) Plants trapping light to make food.

(4) Leaves on a tree moving on a windy day.

25 Ali attached a strong magnet to a spring and placed it at the bottom of a ramp. He added oil to the surface of the ramp and placed a copper block at the top of the ramp. He then observed that the copper block moved towards the magnet as shown below.



Based on the information above, what were the forces acting on the copper block as it moved along the ramp?

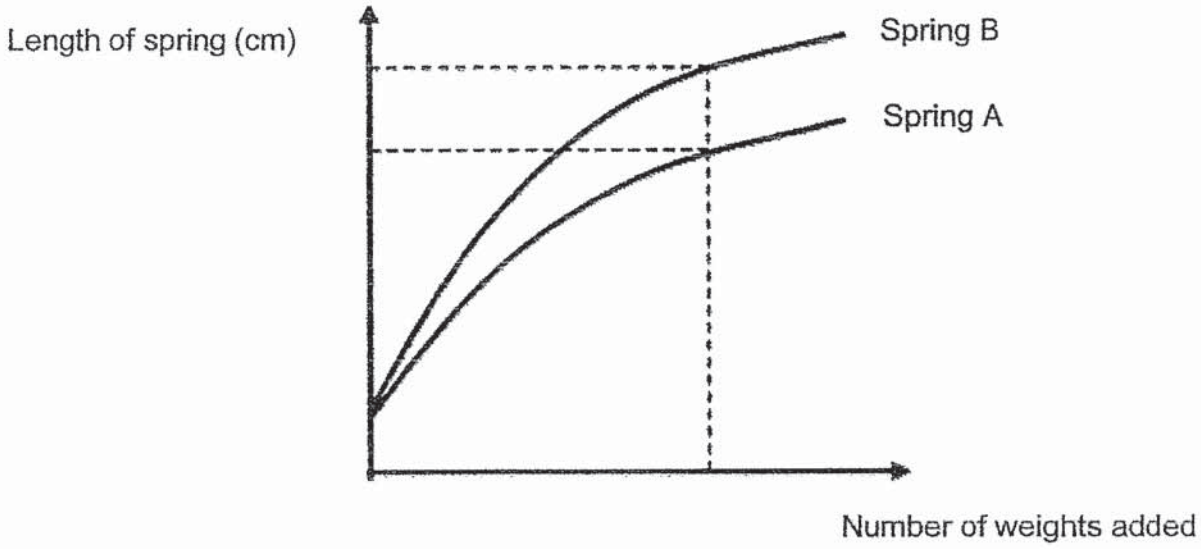
(1) Frictional force and gravitational force

(2) Magnetic force and elastic spring force

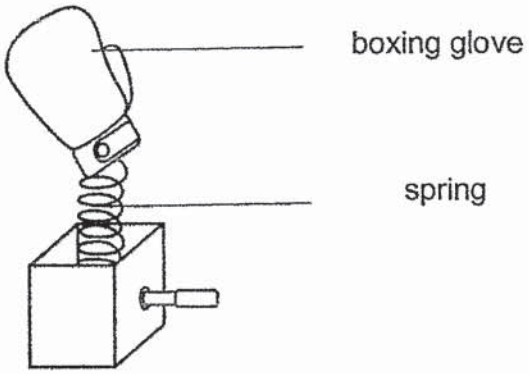
(3) Magnetic force, frictional force and gravitational force

(4) Elastic spring force, frictional force and gravitational force

26 Weights are added to two springs, A and B.
The length of each spring increases as weights are added to them, as shown on the graph below.

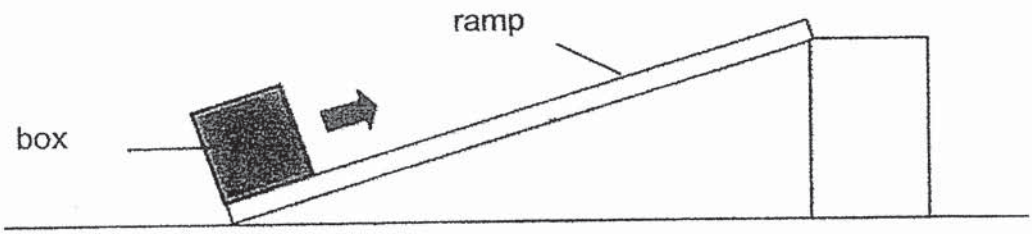


Based on the graph, which spring would cause the boxing glove to spring out of the box with more force and why.



	Spring	Reason
(1)	A	A is more stiff than B
(2)	A	A is less elastic than B
(3)	B	B is more elastic than A
(4)	B	B is less stiff than A

27 Simon wanted to move a box up a ramp. He pushed the box up the ramp but it did not move at all.



Why did the box not move up the ramp?

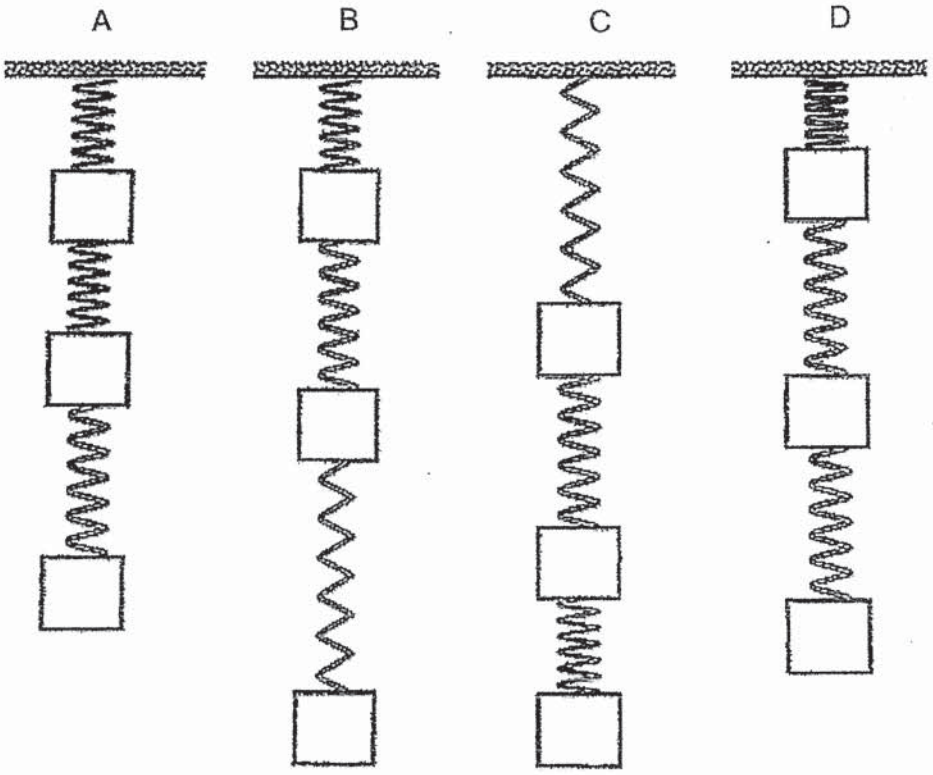
(1) There was no force acting on the box.

(2) Frictional force was acting upwards along the ramp.

(3) A force smaller than the frictional force was applied.

(4) Gravitational force was acting downwards along the ramp.

28 Janet hung three identical springs from the ceiling as shown below. Each spring was attached to an object of equal mass.



Which of the following is a possible observation Janet would make?

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

Go to BOOKLET B

Rosyth School
Mid-Year Examination 2022
SCIENCE
Primary 6

Total Marks: / 100

Name: _____

Class: Pr 6- _____ Register No. _____

Date: 12 May 2022 Parent's Signature: _____

Duration: Total time for Booklets A and B: 1 h 45 min

Booklet B

Instructions to Pupils:

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

	Maximum	Marks Obtained
Booklet A	**56 marks**	
Booklet B	**44 marks**	
Total	**100 marks**	

* This booklet consists of 15 printed pages (including cover page).

For questions 29 to 40, write your answers in the space provided. **(44 Marks)**

29 (a) Name the two parts in the human circulatory system. [2]

_____

_____

(b) Describe how the parts in the circulatory and respiratory systems work together for the body to remove carbon dioxide from the legs to the environment. [2]

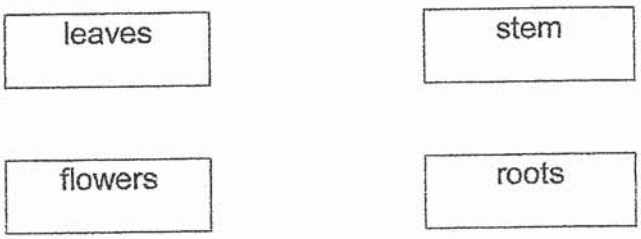
_____

_____

_____

_____

30 (a) Four parts of a plant are shown below. Draw arrows (⟶) in the Diagram below to show how food is transported in a plant. [1]

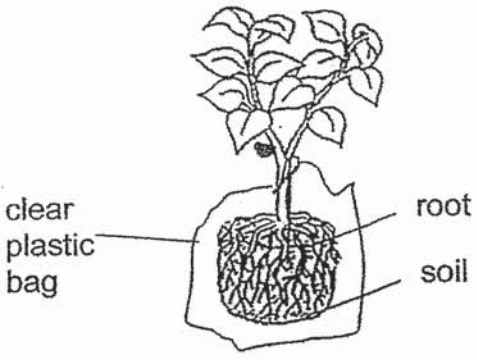


(b) Ray wanted to find out which type of soil is suitable to grow his plants. He used two similar plants with different types of soil for his experiment.

He kept the volume of water added for the plants the same for a fair test.

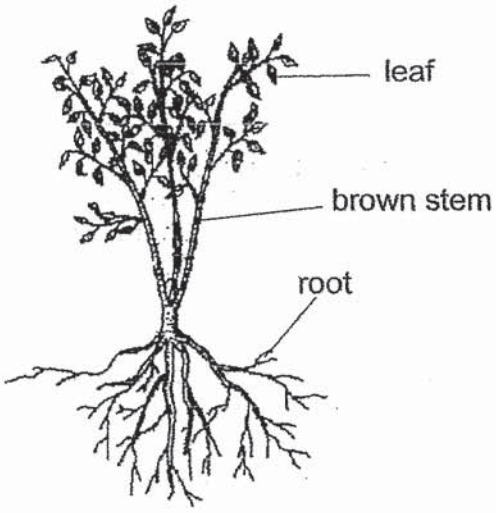
Explain why adding the same volume of water for the plants will ensure that the plant growth is not affected by it. [2]

(c) Ray carried out another experiment using another plant. He wrapped the plant with clear plastic as shown below.

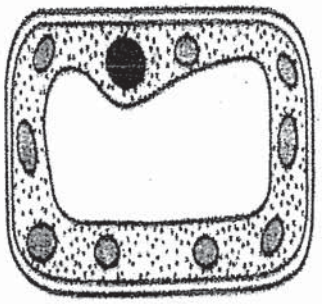


He observed water droplets on the inner side of the plastic bag. Explain how the water droplets are formed on the inner side of the plastic bag. [2]

31 The diagrams below shows a plant and a cell taken from a specific part of the plant.



plant



plant cell (enlarged view)

(a) Which part of the plant was the cell most likely been taken from? Explain your answer. [2]

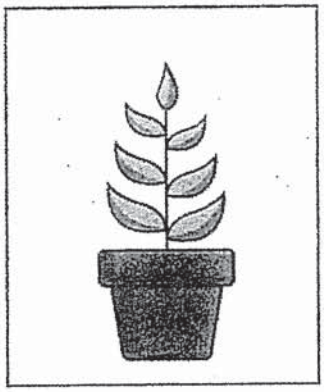
(b) In the diagram above, name and label the part of the plant cell which controls all activities in the plant cell. [1]

(c) State another function of the part of the ~~pant~~ plant cell mention in (b). [1]

32 Doris wanted to find out if plant growth is affected by the amount of light received by the plant.

Her set-up is as shown below.

Pot P in clear glass box



Pot Q in frosted glass box

Plant in	Height of plant at the start of the experiment (cm)	Height of plant after 2 weeks (cm)
Pot _____	20	22
Pot _____	20	24

(a) From the results, identify the correct plants by writing **'P'** and **'Q'** in the blanks provided in the table above. [1]

(b) Photosynthesis is taking place in the plants during the experiment. State the energy conversion. [1]

Energy Energy

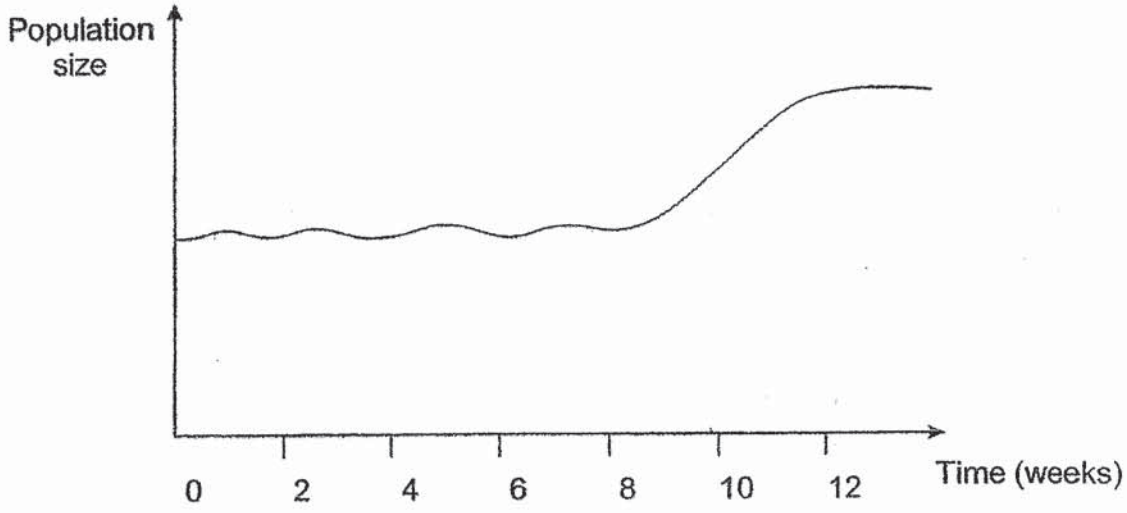
(c) Why did Doris use a clear glass box and a frosted glass box in her set-up? [2]

_____

_____

_____

33 The graph below shows the change in the population size of plant P in a field.



(a) Name two physical characteristics of the environment that can affect the population size of plants. [1]

_____

(b) At week 8, there was an increase in the population of a certain type of birds. Give two reasons how this has affected the population size of plant P. [2]

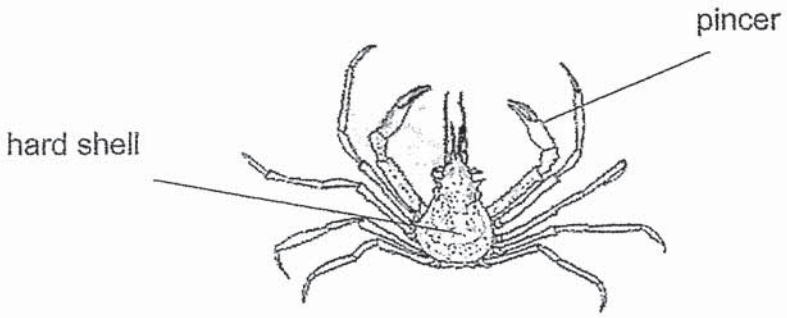
Reason 1: _____

_____

Reason 2: _____

_____

34 Study the Animal X shown below.



(a) Animal X has a pair of pincers and a hard shell. Explain how these physical features would benefit it. [2]

(i) pincers:

_____

_____

(ii) hard shell:

_____

_____

(b) Animal X 'decorates' itself in the sea using water plants as shown below.

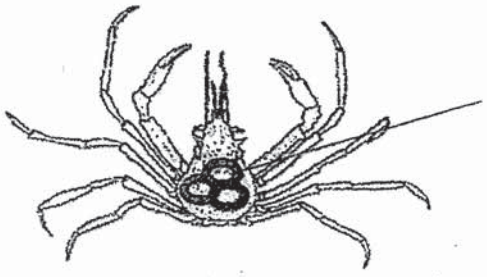
Explain why animal X needs to 'decorate' itself with water plants. [1]

_____

_____

Question 34 is continued on the next page

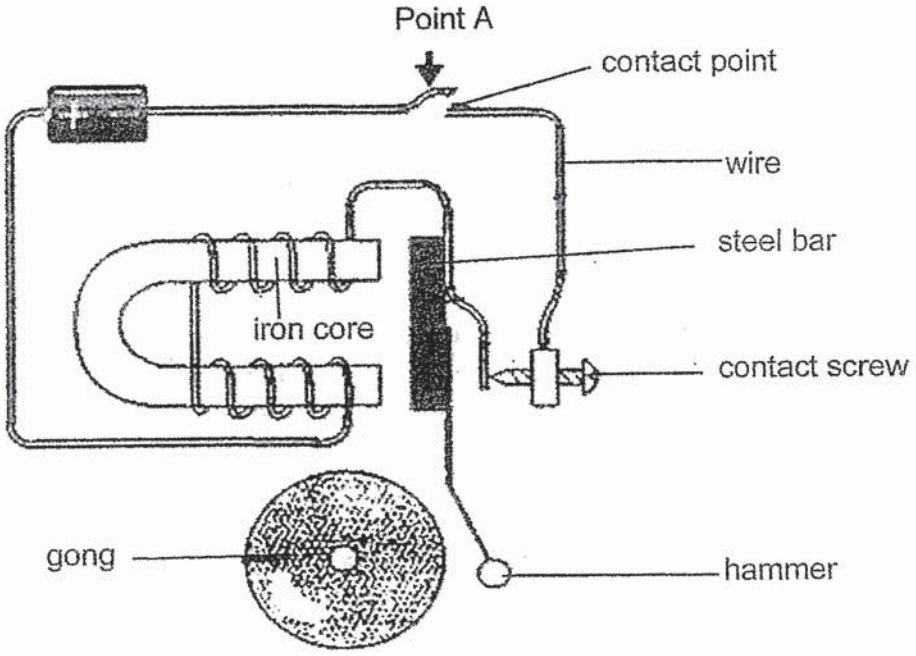
(c) Animal Z is small and it grows on animal X.



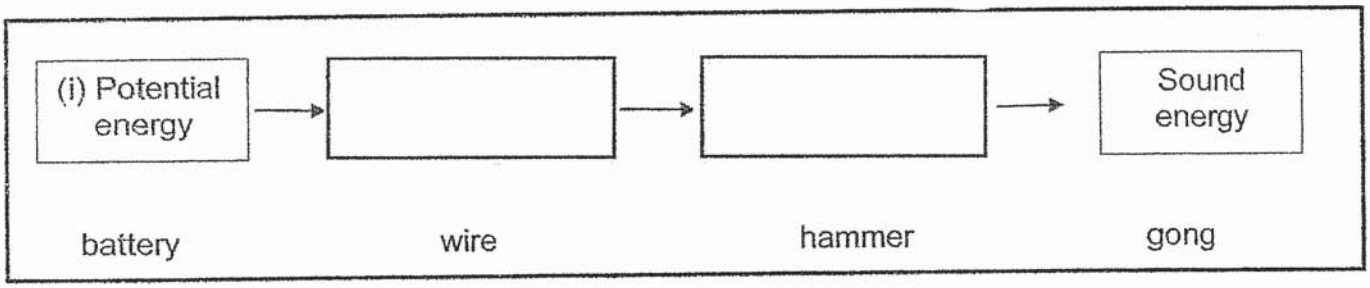
animal ~~X~~ Z

Explain why it is an advantage to grow on animal X. [1]

35 The diagram below shows the parts of a doorbell.



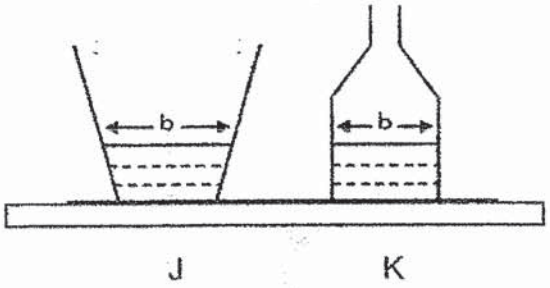
(a) Complete the boxes below to show the energy conversion when point A is pushed downwards. [1]



(b) Describe how the doorbell works when point A is pressed to touch the contact point. [2]

(c) Suggest one way to produce a louder sound by the doorbell. [1]

36 Daryl set up an experiment as shown below.



He poured 100ml of water into each of the two containers, J and K. The containers were placed in the same room under similar conditions for an hour. The surface areas of the water, ***b***, in each container and the volume of water after a day were measured and recorded as shown in the table below.

Container	Exposed surface area of water, b, (cm^2)	Volume of water after a day (ml)
J	20	80
K	16	90

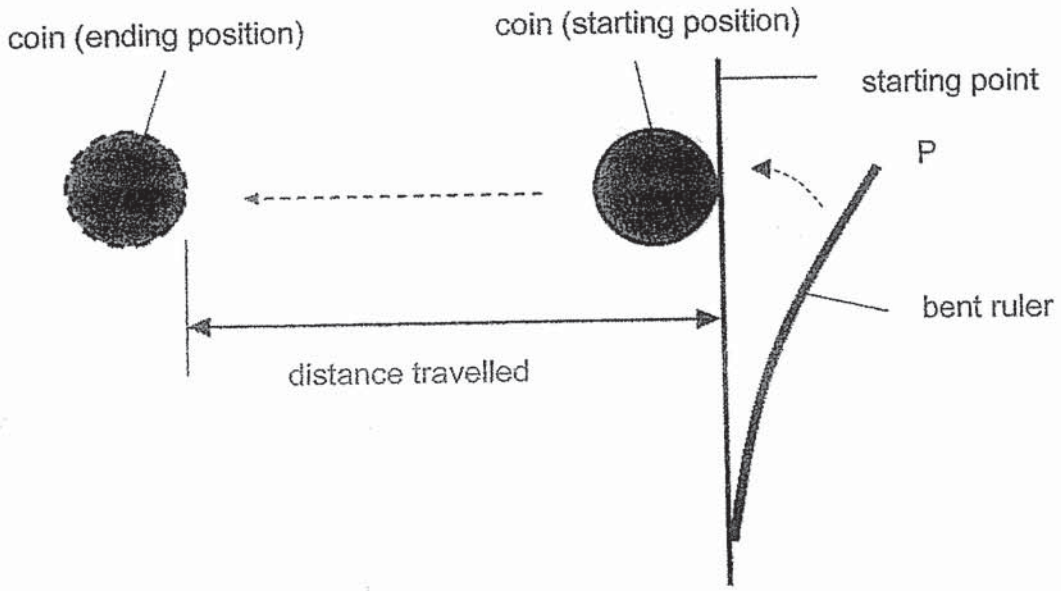
(a) His friend said that his containers, J and K, must be replaced for a fair test. In what way would you change the containers, J and K, to make the experiment a fair test? Draw and label the containers in the box provided below. [1]

(b) Kangaroos spread their saliva on their front limbs when the temperature is very high.

Explain how spreading the saliva helps the kangaroo survive in the heat. [2]

37 Huiling set up an experiment to find out how the mass of a coin affects the distance travelled by it when flicked.

She placed the coin at the starting point. She then bent a ruler to Point P before flicking it at the coin as shown in the diagram below. She then measured the distance travelled by the coin. She repeated the experiment with coins of different masses but of the same size.



The results of her experiment are tabulated below.

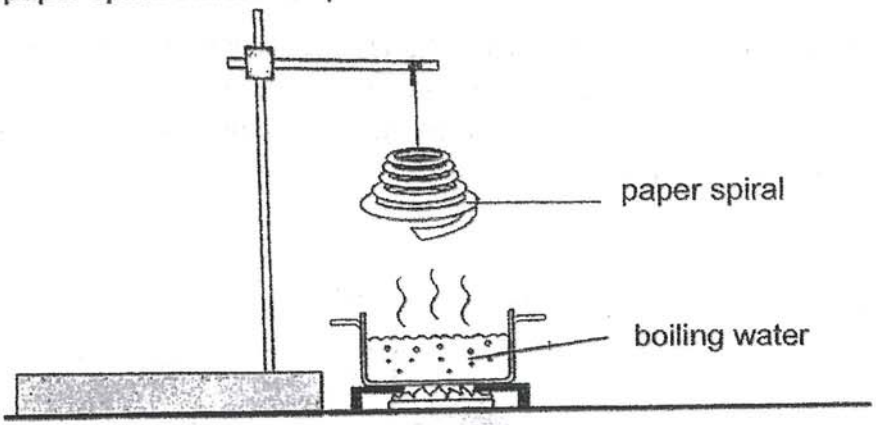
Mass of coin (g)	Distance travelled (cm)			
	1st try	2nd try	3rd try	Average
20	26	28	27	27
30	18	20	19	19
40	10	13	13	12

(a) Why did she repeat the experiment three times for each mass of the coin?

[1]

(b) Explain the relationship between the mass of the coin and the distance travelled by it when flicked. [2]

38 Jane hung a paper spiral above a pot of boiling water. After some time, the paper spiral started to spin.



Jane wanted to find out how the exposed surface area of a container affected the average number of spins made by the paper spiral in one minute.
The table below shows the results she obtained.

Exposed surface area of container (cm^2)	Average number of spins (per minute)
200	3
400	5
600	6
800	6

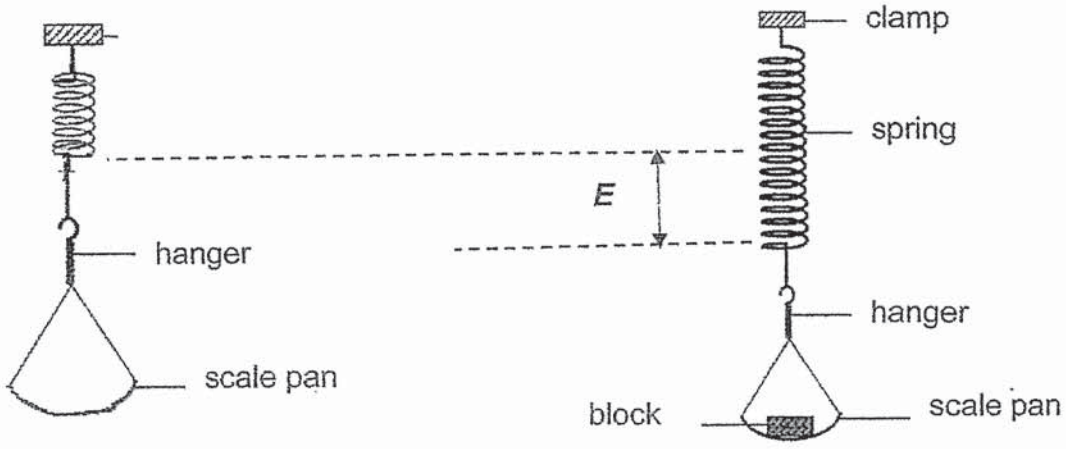
(a) Based on the results, state how the average number of spins changed with the exposed surface area of the container. [1]

(b) Why was the same paper spiral used in the above experiments? [1]

(c) Jane decided to modify her experiment. Using the same container, she decreased the heat provided and the water stopped boiling. The experiment was conducted again.

How would this change the average number of spins made by the paper spiral? Explain your answer. [2]

39 John conducted an experiment to find out the effect of different masses and volumes of blocks on the extension of a spring.



He measured the extension E after each block was placed on the scale pan. He repeated the experiment using blocks of various masses and volumes. He recorded his results as shown in the table below.

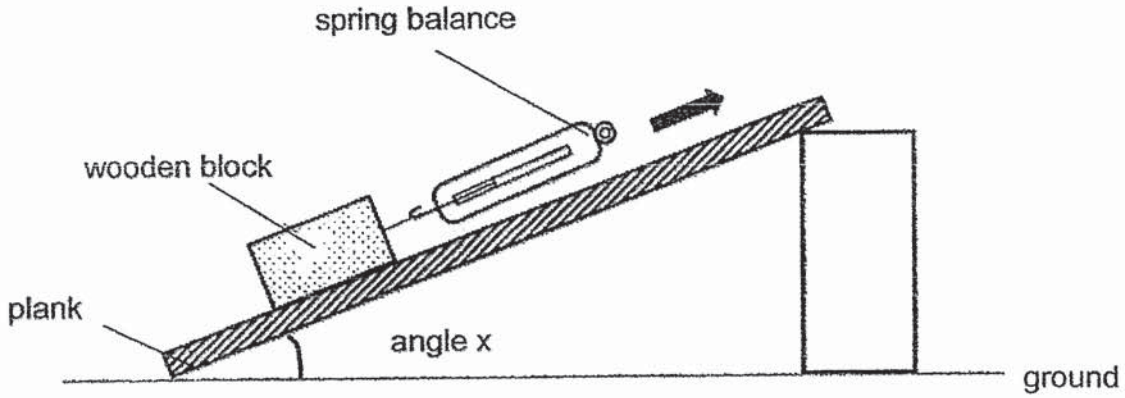
Block	Mass (g)	Volume (cm^3)	*E* (cm)
P	25	80	1.5
Q	75	80	4.5
R	75	100	4.5
S	100	100	6.0

(a) Based on John's results, did the volume of the block affect the amount of force acting on the spring? Using the results, explain how you came to your conclusion. [1]

(b) John repeated the same experiment using Block T. The mass of T was 25g and its volume was 100 cm^3 .What could the value of *E* be? [1]

(c) When John removed all the blocks from the scale pan, he observed that the measurement of *E* was 0 cm. State the property of the spring shown by his observation. [1]

40 Roy set up an experiment as shown below. He pulled the wooden block up a plank using a spring balance. He repeated the experiment for different values of angle x.



The results of his experiment are shown in the table below.

Angle x (°)	Amount of force used (units)
20	90
30	110
40	135
50	165

(a) What is/are the force(s) acting on the wooden block as it moves up the plank? [1]

_____

(b) Using the same set-up, Roy pulled the wooden block down the plank. He observed that the spring balance showed a smaller reading compared to pulling the wooden block up the plank. Explain his observation. [1]

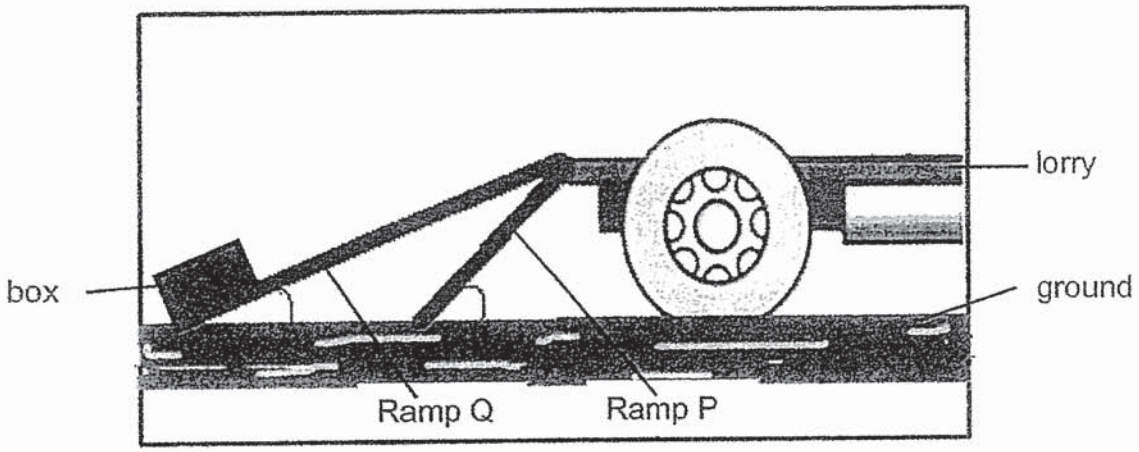
_____

_____

_____

Question 40 is continued on the next page

(c) Roy was then asked to push a box up a ramp from the ground to the back of a lorry, as shown in the diagram below.



Based on his experimental results, which ramp, P or Q, would he choose to push the box with more ease to the back of the lorry? Explain your choice. [1]

_____

_____

_____

End of Booklet B

SCHOOL: ROSYTH SCHOOL

SUBJECT: SCIENCE

LEVEL: PRIMARY 6

PAPER: MID-YEAR EXAMINATION

BOOKLET A

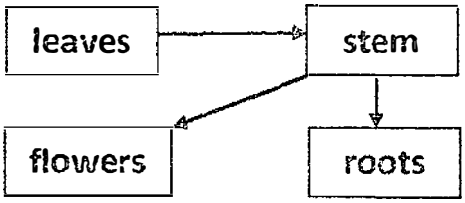
Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
3	2	4	1	1	4	2	4	4	4
Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20
3	3	2	4	3	2	4	4	1	3
Q21	Q22	Q23	Q24	Q25	Q26	Q27	Q28		
3	1	2	3	1	1	3	3		

BOOKLET B

Q29. (a) Heart, blood vessels

(b) The heart pumps blood rich in carbon dioxide from the legs to the lungs, where the exchange of gases occurs. The carbon dioxide is exhaled through the nose to the environment.

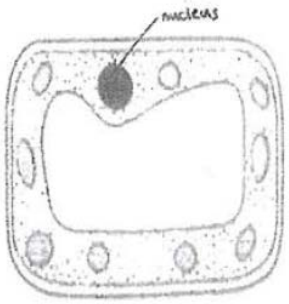
Q30. (a)



(b) The volume of water added affects plant growth, thus it should be kept constant to ensure that the type of soil is the only variable that affects plant growth.

(c) Water from the soil gains heat and evaporates into water vapour. The water vapour loses heat to the inner surface of the clear plastic bag and condenses to form water droplets.

Q31. (a) The leaves. The cell contains chloroplast, which is required by the leaves for photosynthesis.



(b) plant cell (enlarged view)

(c) It contains the genetic information that is passed down from the parent plant to a young plant.

Q32. (a)

Plant in	Height of plant at the start of experiment (cm)	Height of plant after 2 weeks (cm)
Pot Q	20	22
Pot P	20	24

(b) Light energy -> Chemical potential energy

(c) Clear glass allows all the light to pass through, while frosted glass allows some light to pass through. Hence, the amount of light received by each plant is different, which will affect plant growth.

Q33. (a) Amount of sunlight and water.

(b) Reason 1: The birds help pollinate the flowers.

Reason 2: The birds will eat insects that are pests to plant P.

Q34. (a) (i) Pincers: It can be used to kill its prey and protect itself from predators.

(ii) Hard shell: It protects itself from animals that attack it.

(b) It is to hide itself from predators.

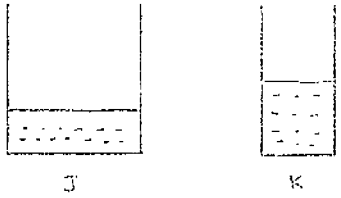
(c) Animal Z will be protected from predators by animal X.

Q35. (a) Potential energy → Electrical energy → Kinetic energy → Sound energy

(b) When point A is pressed to touch the contact point, the circuit becomes closed, and the iron core become an electromagnet. The iron core attracts the steel bar, causing the hammer to strike the gong.

(c) Add more batteries/Increase the number of turns of the coil around the iron core.

Q36. (a)



(b) When the saliva on the front limbs evaporates, the surface of the kangaroo's skin loses heat to the environment, which helps it to survive in the heat.

Q37. (a) To ensure that the results are reliable.

(b) As the mass of the coin increases, the distance travelled by the coin decreases. This is because the friction between the coin and the surface increases as the mass increases, thus the coin will come to a stop at a shorter distance.

Q38. (a) As the exposed surface area of the container increases, the average number of spins increases.

(b) To ensure that the mass of the paper spiral remains constant.

(c) The average number of spins would decrease. The rate of evaporation decreases, thus there would be less water vapour formed to cause the paper spiral to spin.

Q39. (a) No. Comparing the result for blocks Q and R, the mass of the blocks is the same, while block R has a greater volume than block Q. However, the extension is the same, thus the volume of the block does not effect the amount of force acting on the spring.

(b) 1.5cm

(c) The spring is elastic.

Q40. (a) Gravitational force and frictional force.

(b) By pulling the wooden block up the plank, more force is required to overcome both the gravitational and frictional forces. However, less force is required to overcome only frictional force when pulling the wooden block down the plank.

(c) Ramp Q. The angle for ramp Q is smaller than that for ramp P, thus less force is required to push the box up, making it easier.

END