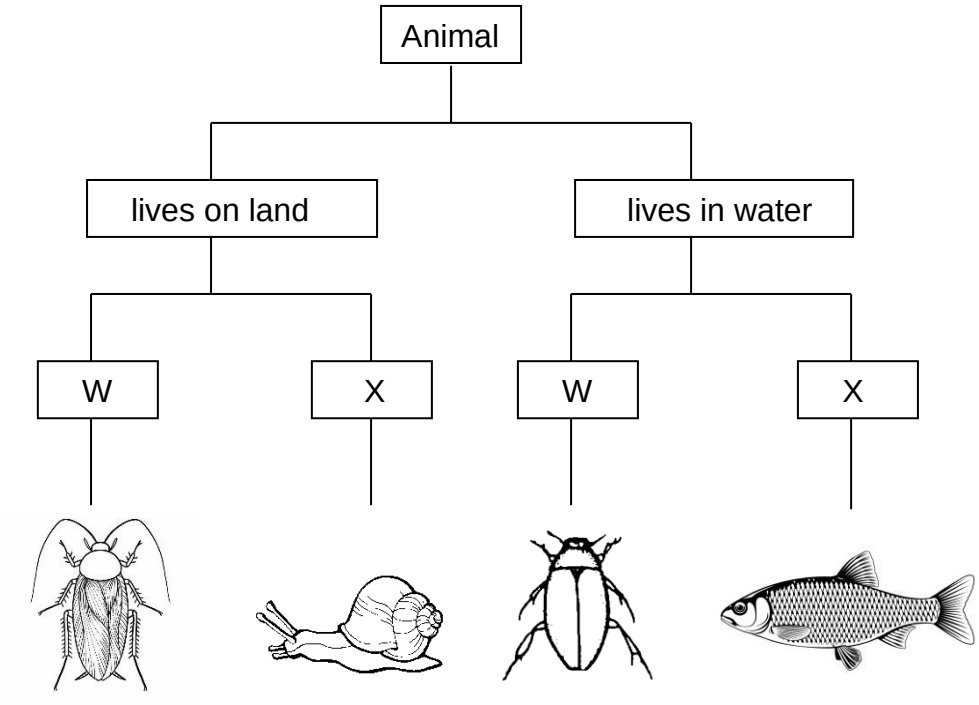
2021 PSLE SCIENCE – PAPER 1

PART I : (28 x 2) marks
For questions number 1 to 28, write 1,2, 3 or 4 in the brackets provided.

1. The classification table below shows how some animals in a pond are classified.



Which of the following correctly shows the characteristics of W and X?

	W	X
(1)	has wings	no feelers
(2)	has feelers	has a tail
(3)	has wings	no legs
(4)	has legs	no legs

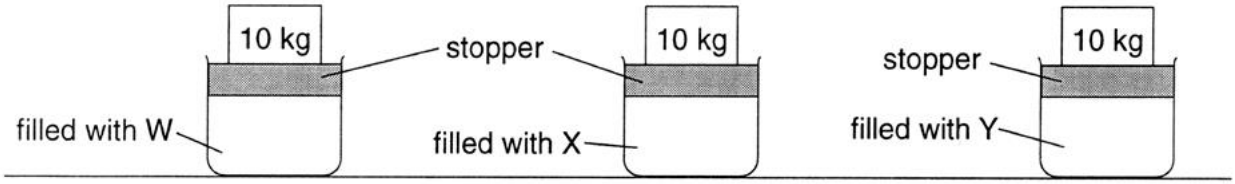
( )

2. The table below shows the freezing and boiling points of three substances W, X and Y.

Substances	Freezing point (^{o} C)	Boiling point (^{o} C)
W	50	105
X	42	90
Y	38	190

Which substance(s) is/are a liquid at 95^o C
(1) W only
(2) W and X only
(3) X and Y only
(4) W and Y only ( )

3. Three identical containers are each filled with one of the following substances W, X and Y. Stoppers were then used to seal the three air-tight containers as shown below.

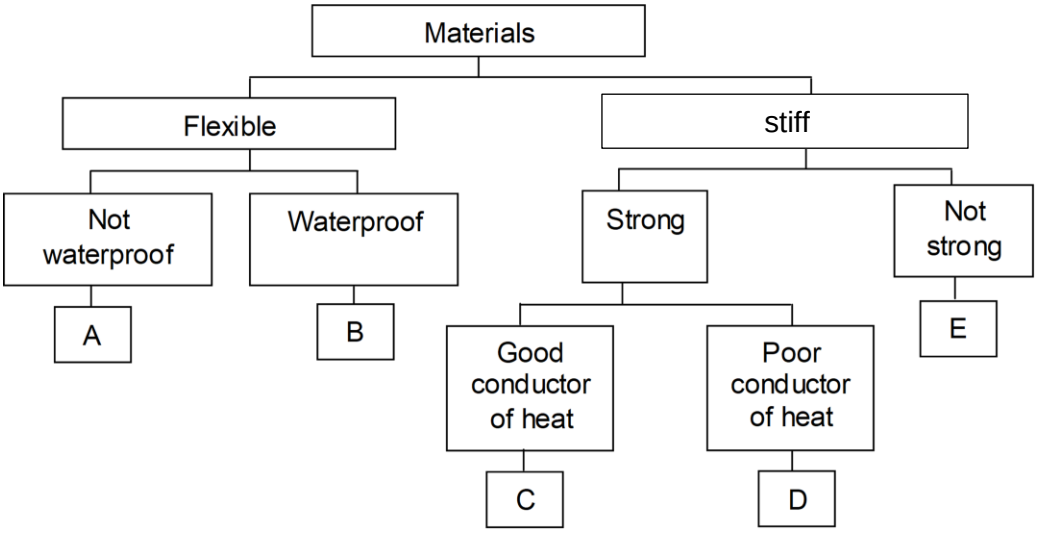


An object of mass 10 kg was placed on the stopper of each container. Only the stopper on X moved downwards. What could be a possible reason for this observation?

(1) Substance X has no definite volume.
(2) Substances W, X and Y are all matter.
(3) Substance W is a gas and can be compressed.
(4) Substance W is a solid but X and Y are both liquids.

( )

4. Johan was instructed to select the most suitable materials for making a frying pan and a raincoat.



Based on the classification chart above, which of the following shows the best choice for making both objects?

	Frying Pan	Raincoat
(1)	C	B
(2)	D	A
(3)	C	E
(4)	D	B

( )

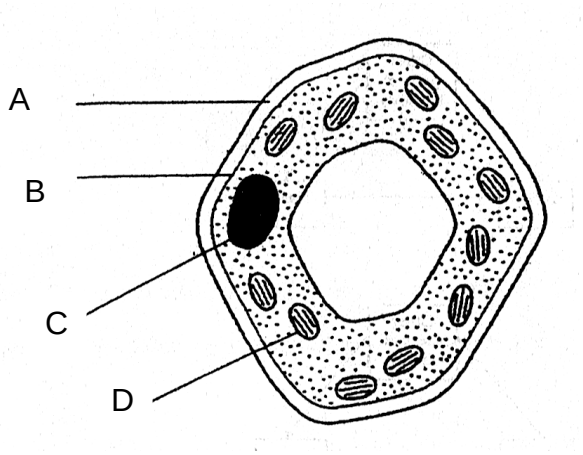
5. Four pupils came up with the following conclusions regarding decomposers.

Jason: Decomposers help make the soil fertile.
Gabriel: All decomposers make their own food and purify the air.
Natalie: Decomposers help to get rid of dead organisms and waste.
Grace: They speed up the process of decay by breaking down plant and animal waste into smaller pieces.

Who has/have made the correct conclusion(s)?

(1) Gabriel only
(2) Natalie and Grace only
(3) Jason and Gabriel only
(4) Jason, Natalie and Grace only. ( )

6. The diagram below shows a plant cell.

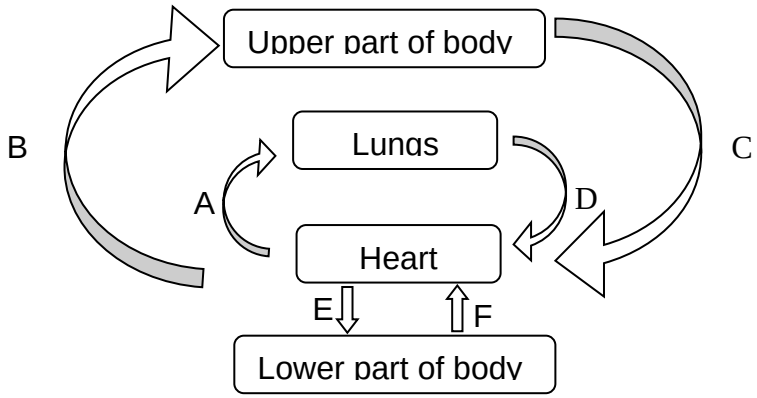


What is the function of each of the structures labelled A, B, C and D?

	Functions			
	Carries out photosynthesis	**Controls the activities in the cell**	**Maintains and supports the shape of the cell**	**Controls substances entering and leaving the cell**
(1)	A	B	C	D
(2)	C	D	B	A
(3)	D	C	A	B
(4)	D	C	B	A

( )

7. The diagram below shows the circulatory system in Man.



Blood vessels that carry oxygen-rich blood are shown by arrows _____.

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

( )

8. The picture below shows a hoverfly.

Which structure(s) of the hoverfly is/are most useful in identifying it as an insect?

A: Number of legs
B: Number of wings.
C: Presence of 3 body segments
D: Length of the feelers on its head

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

( )

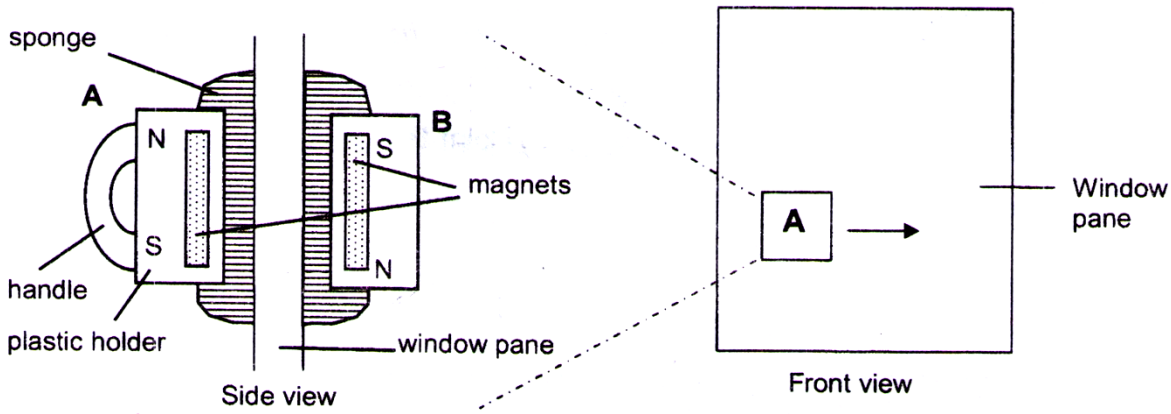
9. Which of the following characteristics are true for all living things?

A They need water, food and air.
B They move around from place to place.
C They reproduce by giving birth to young alive.
D They respond to changes in their environment.

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

( )

10. The diagram below shows a two-piece device designed for cleaning both sides of a window pane at the same time.



When Part A moves over the inside surface, Part B follows it and moves over the outer surface. What properties of a magnet are applied in this device?

A: Like poles of a magnet repel each other.

B: Unlike poles of a magnet attract each other.

C: The pull of a magnet is strongest at its middle.

D: Magnetic force can pass through non-magnetic materials.

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

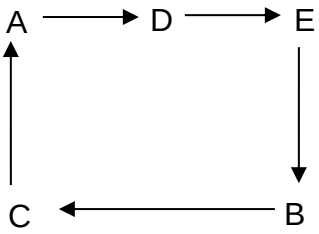
( )

11. The following statements describe the different stages of the water cycle.

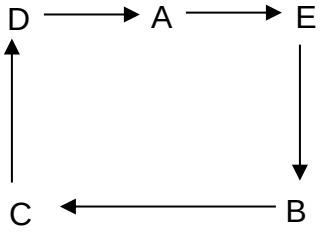
A Water droplets form clouds.
B Sun's heat energy warms the Earth.
C Water gains heat and starts to evaporate.
D Water vapour condenses at a greater height.
E When the water droplets become bigger, it rains.

Which of the following is a correct representation of the water cycle?

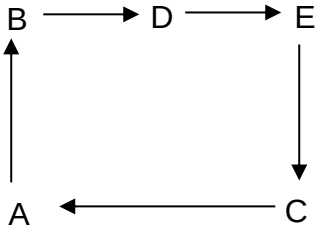
(1)



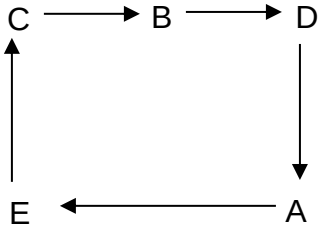
(2)



(3)

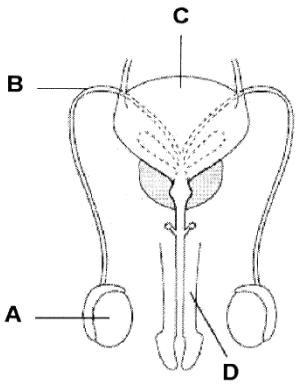


(4)



( )

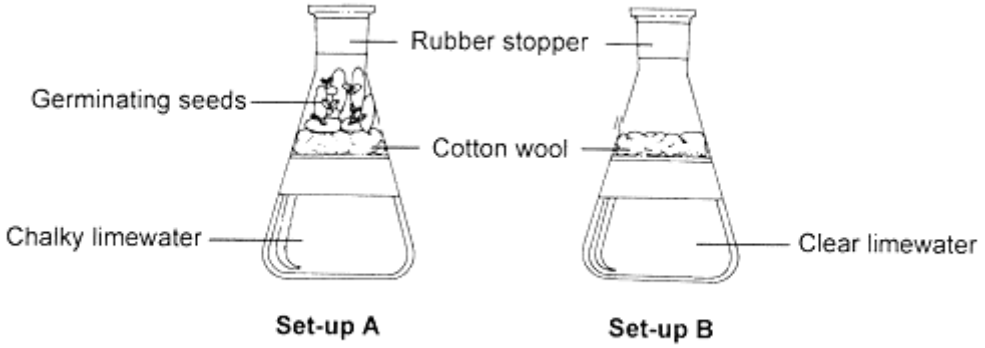
12. The diagram below represents the human male reproductive system.



Which of the letters, A, B, C or D, indicates a structure that produces the reproductive cells for fertilisation?

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

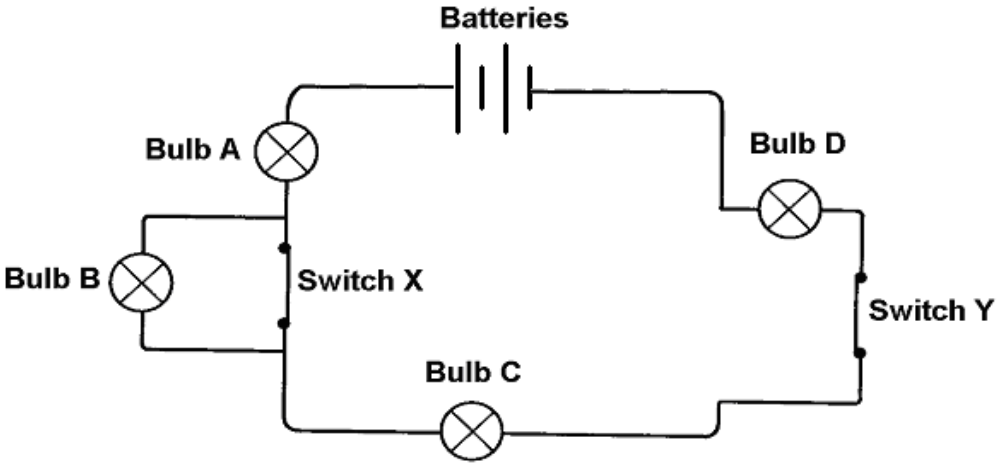
13. Aiko set up the apparatus as shown in the diagram below. She left both set-ups in a warm dark place for 24 hours. The limewater in Set-up A turned chalky but the limewater in Set-up B remained unchanged.



She was trying to find out if _____.

(1) oxygen will turn limewater chalky
(2) carbon dioxide will turn limewater chalky
(3) oxygen was given out during germination
(4) carbon dioxide was given out during germination ( )

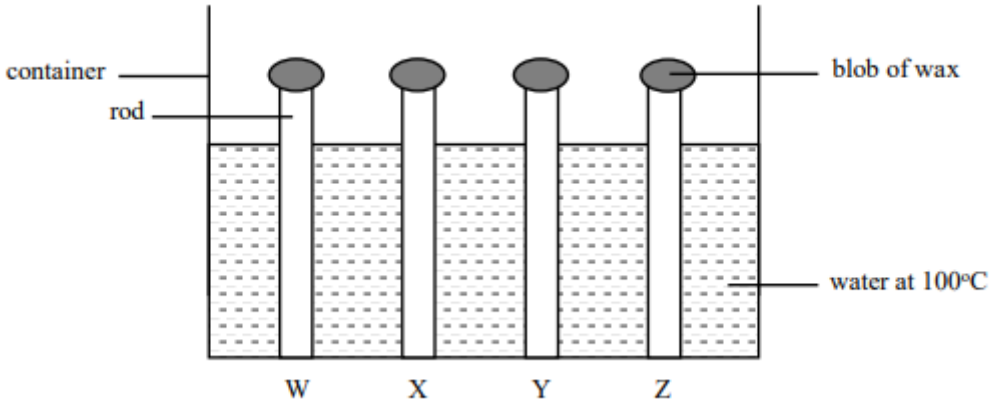
14. Study the electrical circuit below.



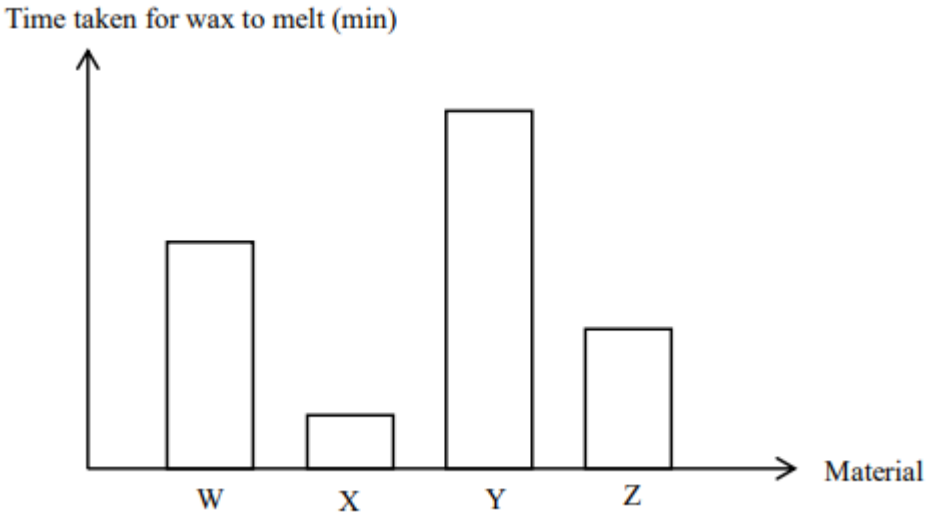
If Switch X remains closed and Switch Y is opened, which bulbs will light up?

(1) C and D only
(2) A and B only
(3) A, C and D only
(4) None of the bulbs ( )

15. Paul set up an experiment as shown below.



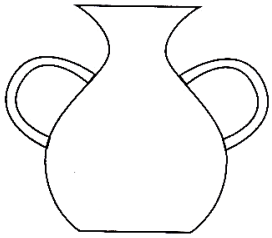
All the rods were of the same size but made of different materials. He placed the same amount of wax on the tip of each rod and poured boiling water into the container as shown above. He recorded the time taken for all the wax on rods W, X, Y and Z to melt. He plotted his results in the graph shown below.



Which one of the rods is made of a material that is the most suitable for making boxes to store ice cream so that the ice cream will melt the slowest?

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

16. Study the object below carefully



Which of the shadows shown below can be cast by the object?

A 

B 

C 

D 

(1) D only
(2) B and D only
(3) B. C and D only
(4) All of the above

( )

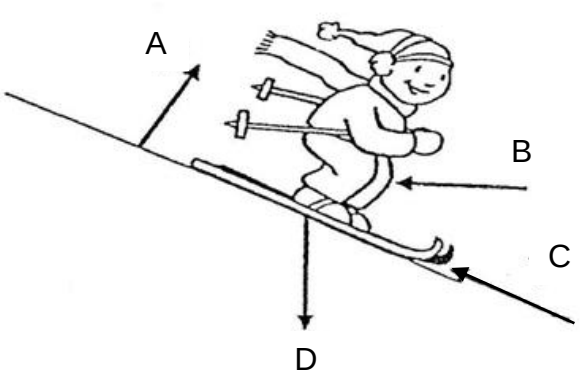
17. Malik observed a fruit as shown below. He wanted to determine if the fruit is dispersed by water.

What can be done to test if the fruit is suitable for water dispersal?

(1) weigh the fruit
(2) check if it floats in water
(3) look for fibrous covering
(4) check for explosive action of fruit

( )

18. The diagram below shows a person skiing down a slope.



Which of the above arrows show the directions of forces experienced by the skier?

	Friction	Gravity
(1)	C	D
(2)	D	A
(3)	C	E
(4)	D	B

( )

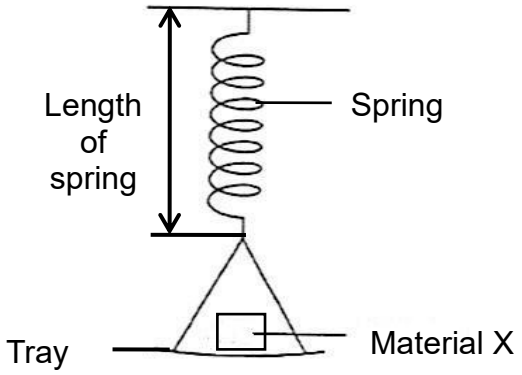
19. Four pupils kicked the same ball from the same spot on a soccer field. The table below shows the distance travelled by the ball along the ground before it stopped.

Pupil	Ali	Billy	Cathy	Darren
Distance travelled by the ball (m)	8	10.5	11	7.5

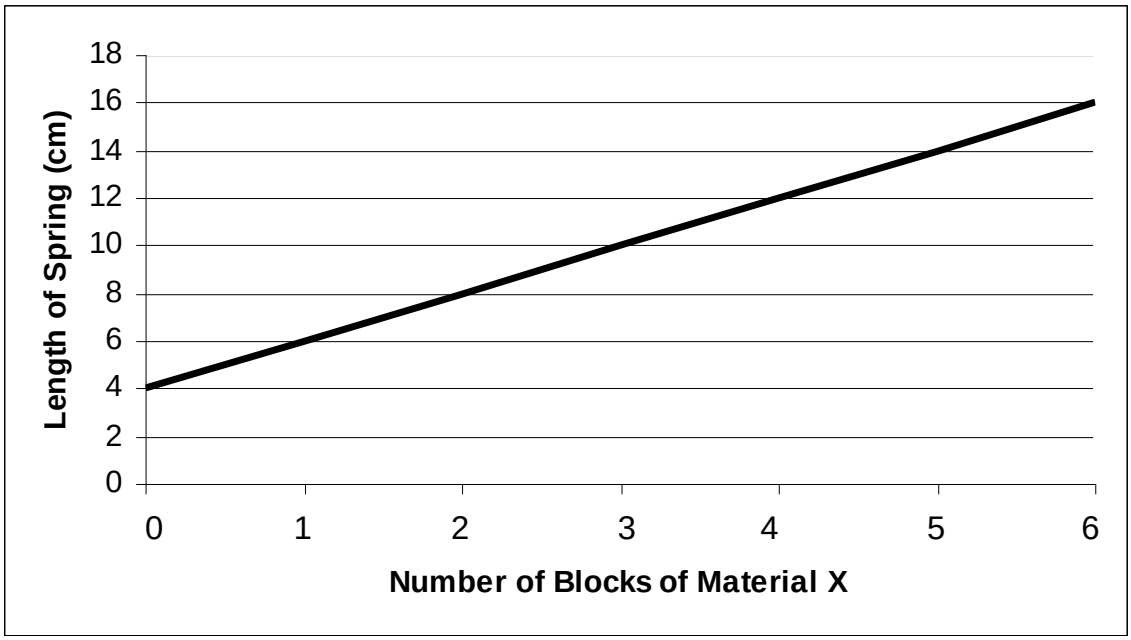
Who has applied the greatest force on the ball?

(1) Ali
(2) Billy
(3) Cathy
(4) Darren ( )

20. Jon measured the length of a spring each time he put a block of material X on the tray.



He plotted the graph below to show his results.

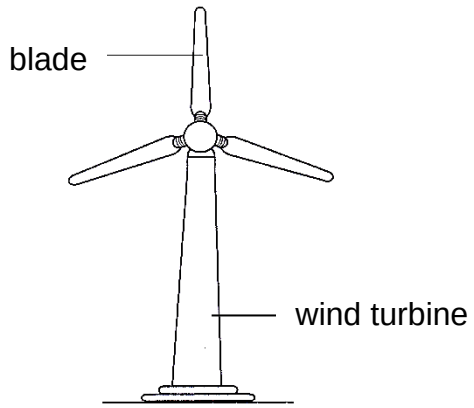


Jon then placed some blocks of material X on the tray. If the extension of the spring is 6 cm, how many blocks of material X did he place on the tray?

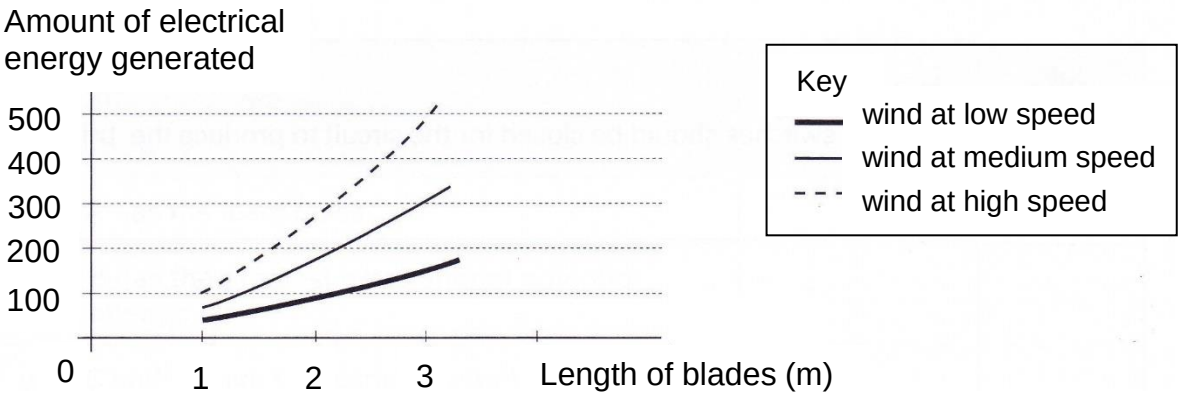
(1) 2 block
(2) 3 blocks
(3) 4 blocks
(4) 5 blocks

( )

21. Electricity can be generated with the use of wind turbines. The diagram below shows a wind turbine.



The graph below shows the amount of electrical energy generated by wind turbines with different lengths of blades at different wind speeds.

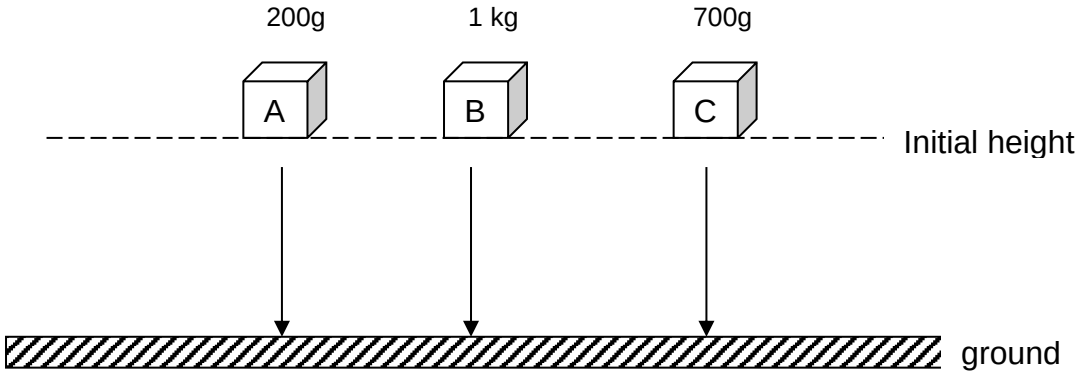


From the graph, which pair of conditions shown below will enable the wind turbine to generate more electrical energy?

	Wind speed	**Length of blade**
(1)	lower wind speed	longer blades
(2)	higher wind speed	longer blades
(3)	lower wind speed	shorter blades
(4)	higher wind speed	shorter blades

( )

22. Three cubes of the same size but different masses were raised to the same initial height before they were dropped.



Which of the following statements is true?

(1) The gravitational force acting on B is the greatest.

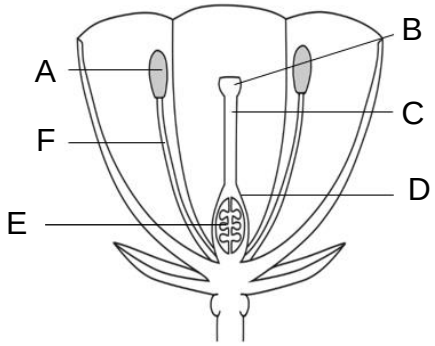
(2) A, B and C have the same amount of gravitational potential energy at the initial height.

(3) The gravitational potential energy of A, B and C will change to kinetic energy as they drop.

(4) A, B and C will have no gravitational force acting on them once they reach the ground.

( )

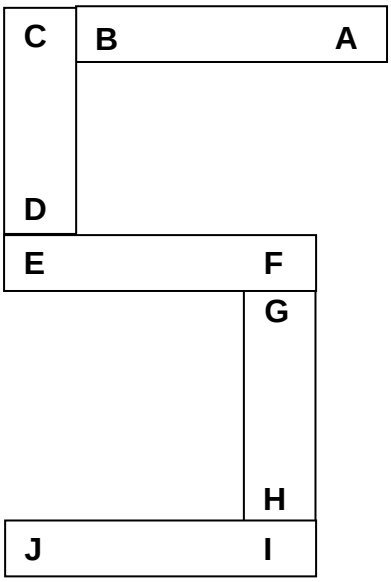
23. Study the flower below



Fertilisation can still take place even if parts _____ are removed.

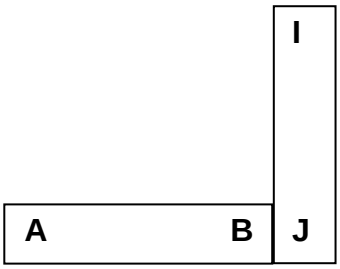
(1) B and D only
(2) C and E only
(3) D and E only
(4) A and F only ( )

24. Mary arranged five bar magnets as shown below.

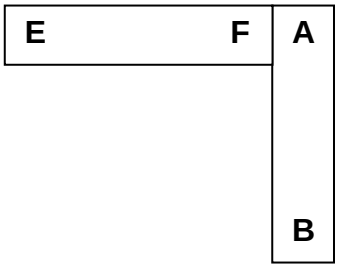


Which of the following diagrams shows a possible arrangement of two of the magnets?

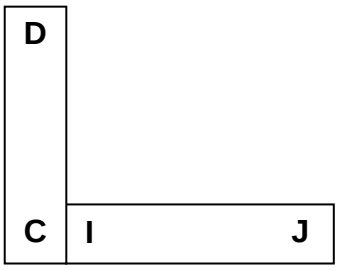
(1)



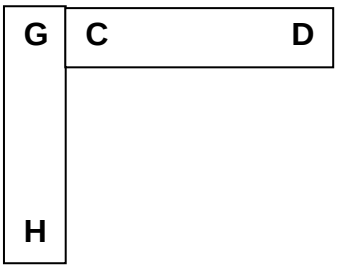
(2)



(3)

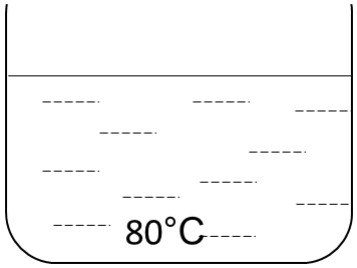


(4)

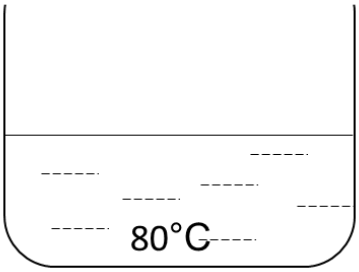


( )

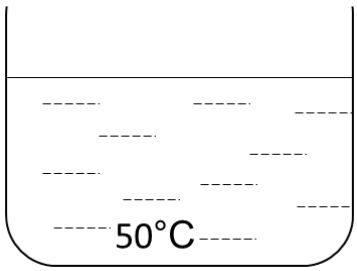
25. Samad has four identical beakers with different amounts of water at different temperatures.



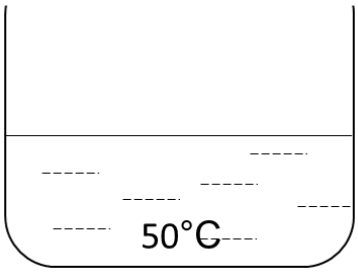
Container A



Container B



Container C



Container D

Which of the containers have the most and least amount of heat respectively?

	Highest amount of heat	Lowest amount of heat
(1)	A	C
(2)	A	D
(3)	B	C
(4)	B	D

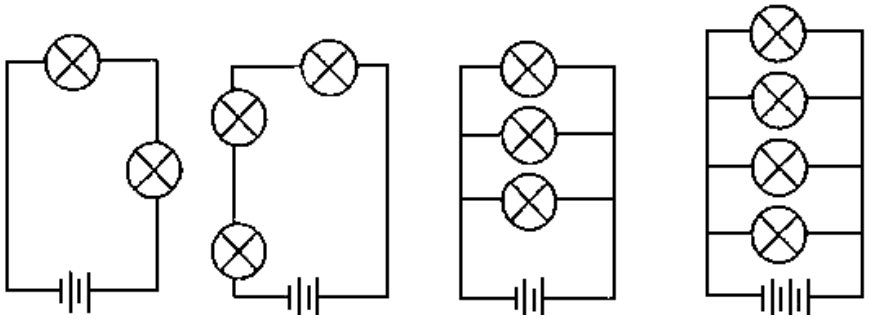
( )

26. In what ways are the **plant** transport system and **human** circulatory system similar?

A : Both systems transport food to the other parts.
B : Both systems have tubes to transport materials.
C : Both systems transport oxygen and carbon dioxide only.
D : Both systems need an organ to pump the materials in the tubes to different parts.

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

27. Study the circuits below.



Circuit A Circuit B Circuit C Circuit D

Arrange the circuits in order from the one with the brightest bulbs to the circuit with the least bright bulbs. (Bulbs and batteries in all the circuits are similar)

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

( )

28. Which of the following statements about cells are true?

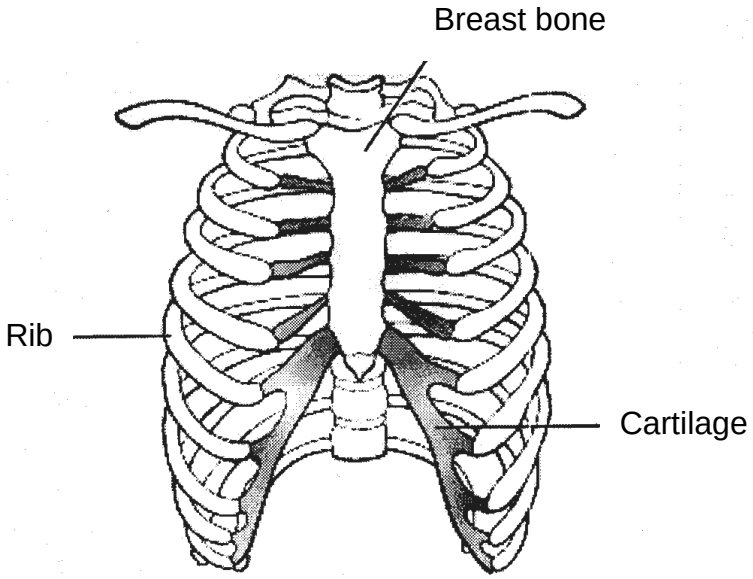
A: Cells need light to survive.
B: All living organisms have cells.
C: Cells release energy from oxygen only.
D: Cells release energy for the organisms' survival.

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

BOOKLET B: [44 marks]

For questions 29 to 41, 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.

29. The diagram below shows the human rib cage.



(a) Name the two organs that the rib cage protects in the chest. [2]

(i) _____

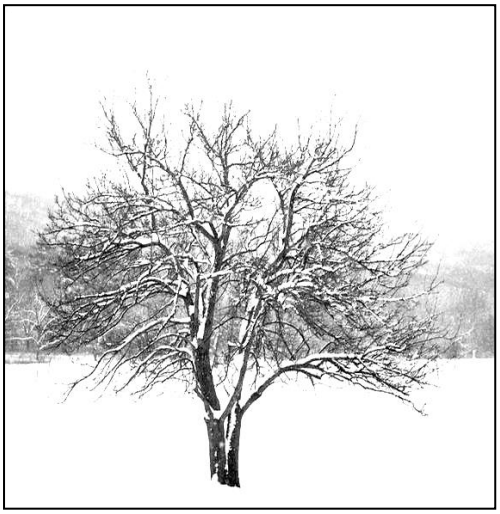
(ii) _____

(b) The ribs are attached to the breast bone by cartilage which bends easily. This allows the space in the chest to get bigger. Why is it important that the space in the chest is able to get bigger? [1]

_____

_____

30. Ginger took a photograph of a tree during winter. She observed that almost all the trees had few or no leaves left at that time.



She remembered that her Science teacher had told her that there is little light during winter. This results in the trees slowing down their process of making food. However, she does not understand why the trees need to shed their leaves.

(a) Explain why trees must shed their leaves during winter. [2]

_____

_____

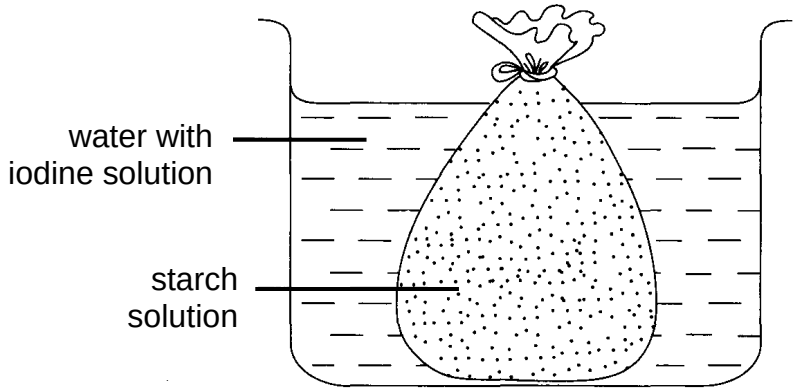
_____

(b) Is it possible for the tree in the picture to bear fruits during winter? Explain. [1]

_____

_____

31. Patrick set up some apparatus as shown below.



He filled a bag with starch solution and placed the bag in a beaker containing water and some brown iodine solution.

He then left it overnight. The material of the bag allowed the iodine solution to pass through and enter it but not the starch solution.

a) What will Patrick observe the next day? [2]

_____

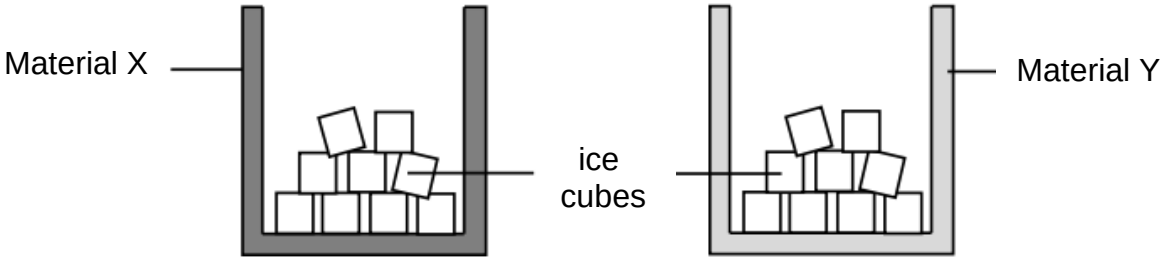
_____

_____

b) One part of a cell behaves in the same way as the bag. Name this part. [1]

_____

32. Steven conducted the experiment as shown below to find out more about the property of materials X and Y.



The results of his experiment are shown below.

Material	Time taken for all the ice to melt completely (min)
X	38
Y	22

a) What is the measured variable of Steven's experiment? [1]

_____

_____

b) Other than the ice in both set-ups, state another variable that has to be kept constant for a fair test. [1]

_____

_____

c) Steven wants to bring some hot curry to his friend's house for potluck. Which material is more suitable for making a container to keep the curry warm for a longer time? Explain your answer. [2]

_____

_____

_____

33. Chris was lifting dumbbells at home.

a) Describe how oxygen in the surrounding air was sent to his arms when he was lifting the dumbbells. [2]

_____

_____

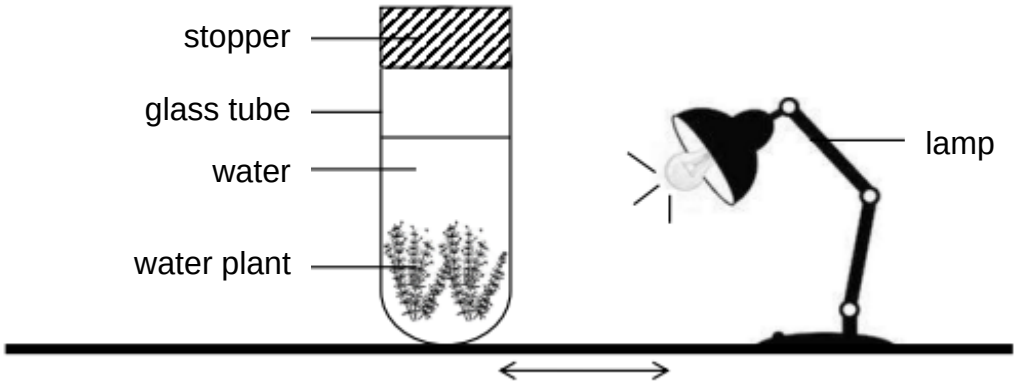
_____

b) State two substances being transported in the circulatory system that the body requires. [1]

_____

_____

34. Andy conducted an experiment shown below in a dark room. He then repeated his experiment by adding some water snails in the glass tube.



He recorded his results in the table below.

Distance of lamp from water plant (cm)	Number of bubbles produced per minute	
	Without water snails	With water snails
10	17	32
20	13	23
30	8	13

a) In the absence of water snails, the number of bubbles produced decreased as the distance from the lamp increased. Explain why. [2]

_____

_____

b) Explain why there was an increase in the number of bubbles produced when water snails were placed in the glass tube. [2]

_____

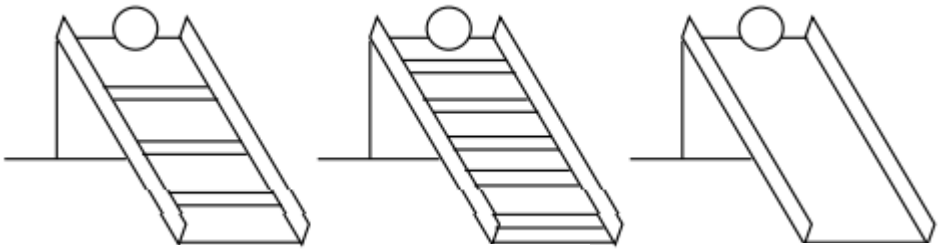
_____

c) Why is it important for Andy to conduct his experiment in a dark room? [1]

_____

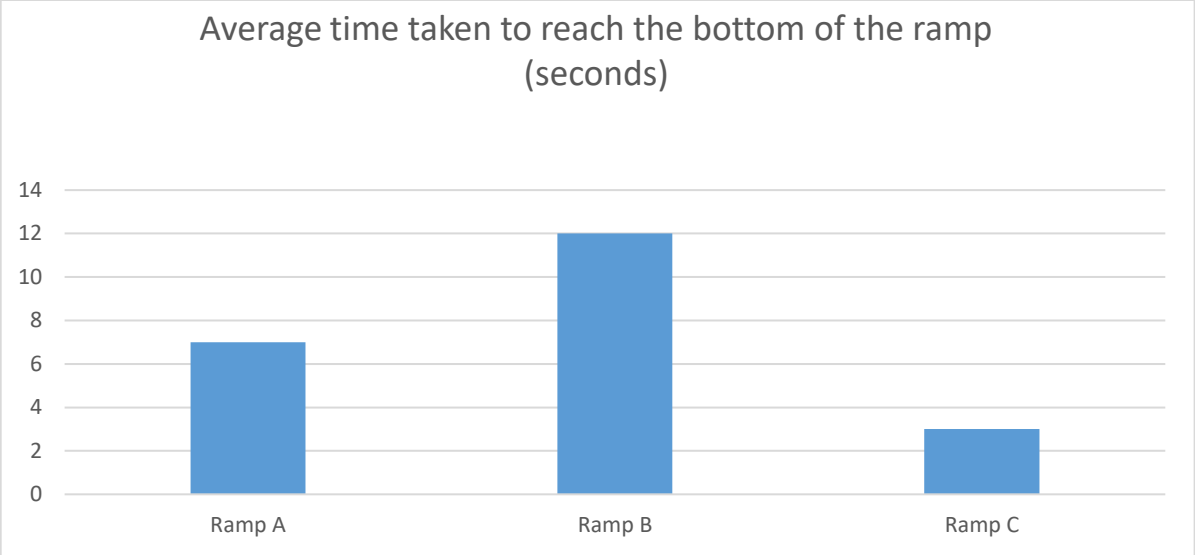
_____

35. Sam conducted an experiment as shown in the diagram below. He placed three similar marbles on each of the three similar ramps A, B and C. Ramps A and B were painted with a different number of thick strips of white paint.



Ramp A Ramp B Ramp C

The marbles were then rolled down the ramps at the same time. The bar graph below shows the average time taken by each marble to reach the bottom of the ramps.



a) What can Sam conclude from his experiment? [1]

_____

_____

b) What is the purpose of Ramp C? [1]

_____

_____

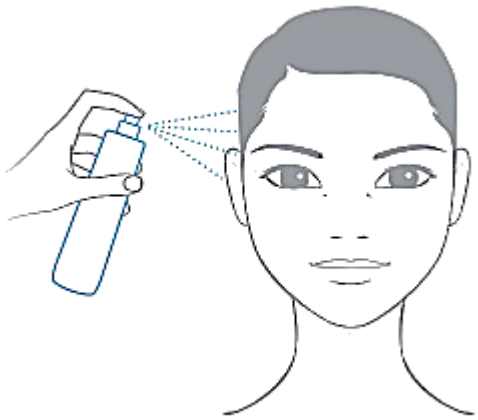
c) Name the forces acting on the marble as they roll down along the three ramps.

[2]

i) _____

ii) _____

36. When she feels warm, Jeannette likes to spray mist onto her face.



a) Explain why Jeannette's face feels cool when she uses the mist spray. [1]

_____

_____

b) Jeannette plans to buy a new water bottle which could produce even smaller drops of mist. Would the mist from the new water bottle cool Jean down faster, slower or the same as that from her old water bottle? Explain your answer. [2]

_____

_____

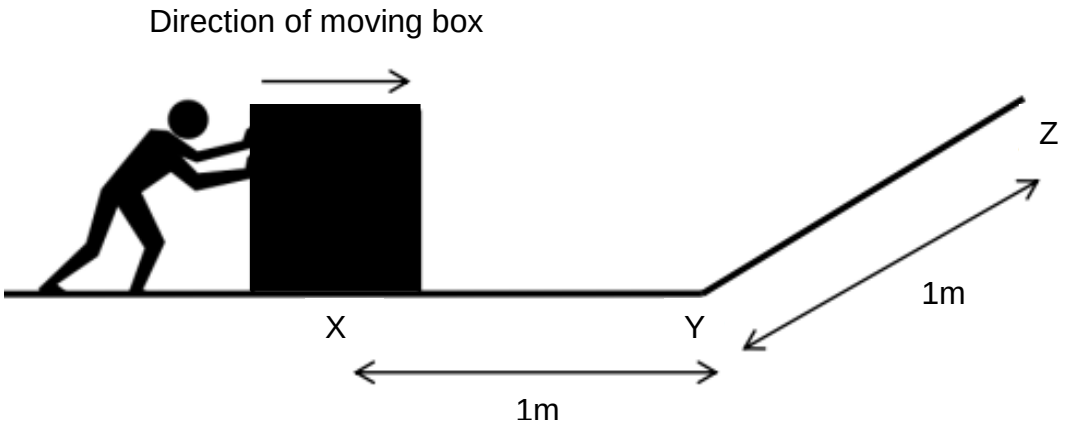
_____

c) Jeannette's mother advised her to buy a fan to attach to the new water bottle and to turn on the fan together with the misting spray. Explain why using the fan with the misting spray helps cool Jean down even faster on hot days. . [1]

_____

_____

37. Mohammed placed a box over the same type of surface from points X to Z as shown the diagram below.



a) State the direction in which friction is acting on the moving box. [1]

_____

b) Based on the diagram above, explain why Matthias needed more force to push the object from Y to Z than from X to Y. [1]

_____

_____

c) Suggest one method to allow Matthias to reduce the amount of force needed to push the object from X to Y. [1]

_____

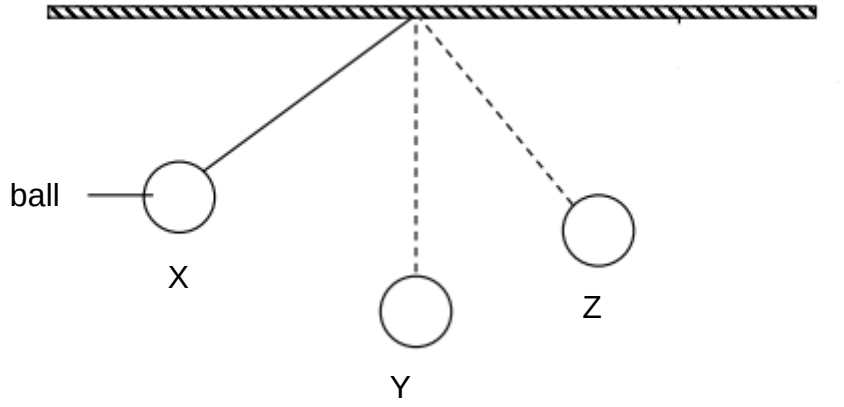
_____

d) Explain, in terms of forces, how your method stated in (c) will reduce the amount of force needed to push the object from X to Y. [1]

_____

_____

38. Daeng hung a metal ball to a support as shown in the diagram below. When the metal ball was released from point X, it swung to point Y and then to point Z.



a) Daeng observed that the metal ball swung to and fro a few times and eventually came to a stop. Why did the metal ball eventually come to a stop? [1]

_____

_____

b) Complete the table below by ticking the appropriate boxes. [1]

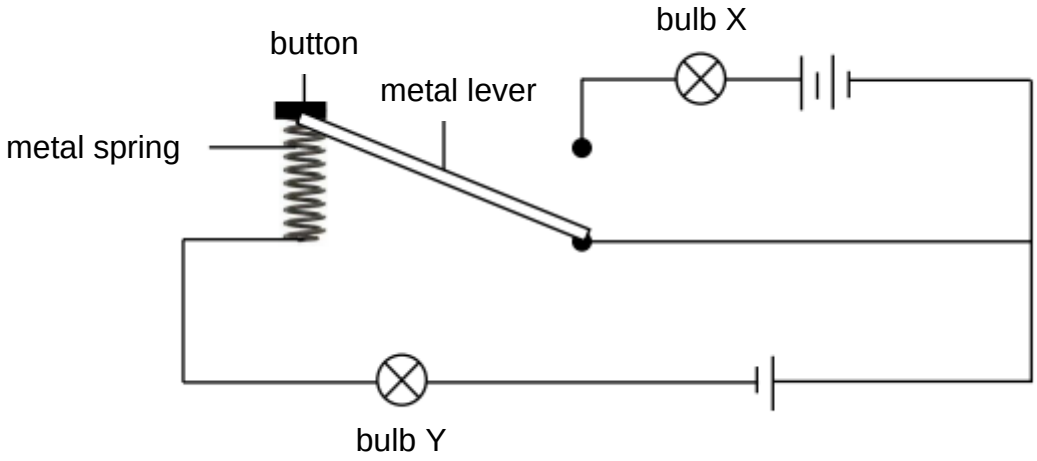
	Point with greatest amount of kinetic energy	Point with greatest amount of potential energy
X		
Y		
Z		

c) When Daeng released the ball at a position higher than point X, he observed that the ball swung to a position higher than Z. Explain his observation. [1]

_____

_____

39. Nat set up the circuit below using two identical bulbs, X and Y, and three identical batteries. At first, bulb X was unlit while bulb Y was lit with a brightness of 5 units.



a) When the switch is pressed and held down, the iron bar sprung upwards. What would happen to the brightness of bulbs X and Y? Explain. [2]

_____

_____

_____

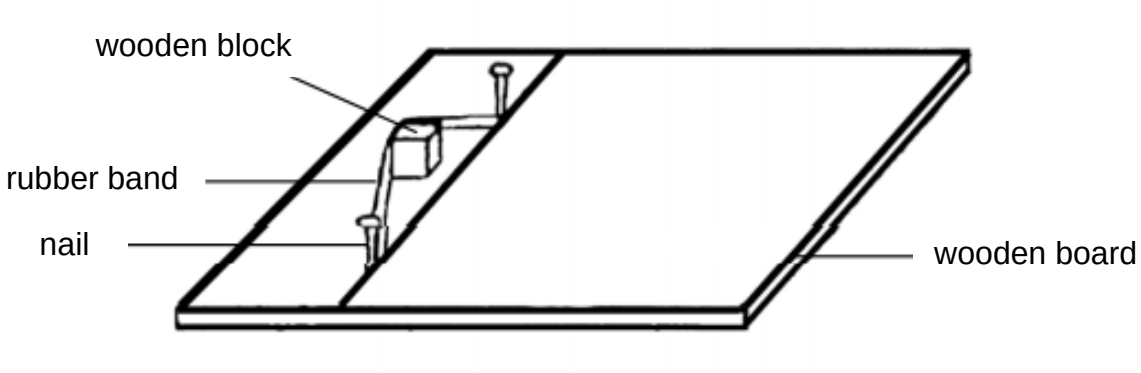
b) After a while it was found that bulb Y has fused. What would be observed when the switch is pressed and held down this time? Explain. [2]

_____

_____

_____

40. Jimmy made a toy catapult by attaching a rubber band to two nails which had been driven into a wooden board as shown in the diagram below. He pulled the rubber band back with the wooden block before releasing it.

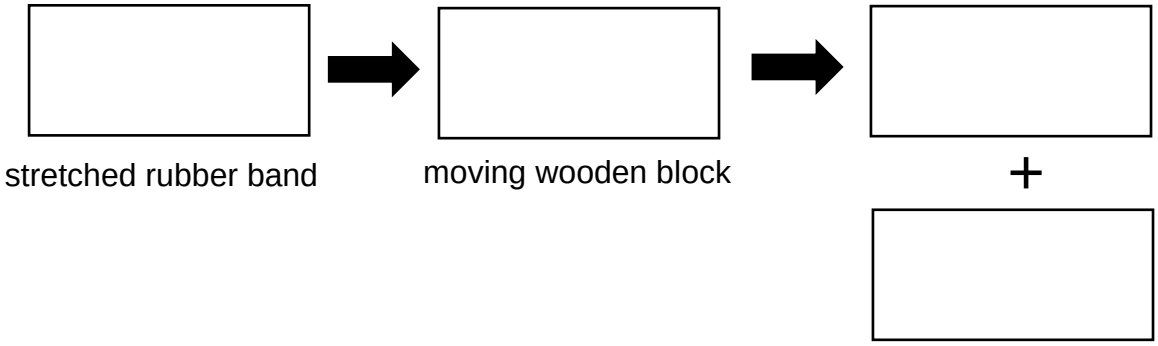


a) Name the force that is produced by the stretched rubber band. [1]

_____

_____

b) Fill in the blanks to show the correct energy conversions that occur. [1]



c) State two ways through which Jimmy can make the original wooden block travel further. [2]

_____

_____

_____