Maha Bodhi School

2007 Preliminary Examination

Science

Name : _____ ( )

Class : P 6 ( )

Date : 23 August 2007

Duration : 1 h 45 min (Parts I & II)

Part I: (60 marks)

For each question from 1 to 30, four options are given. One of them is the correct answer. Make your choice (1, 2, 3 or 4). Shade the correct oval (1, 2, 3 or 4) on the Optical Mark Sheet (OMS).

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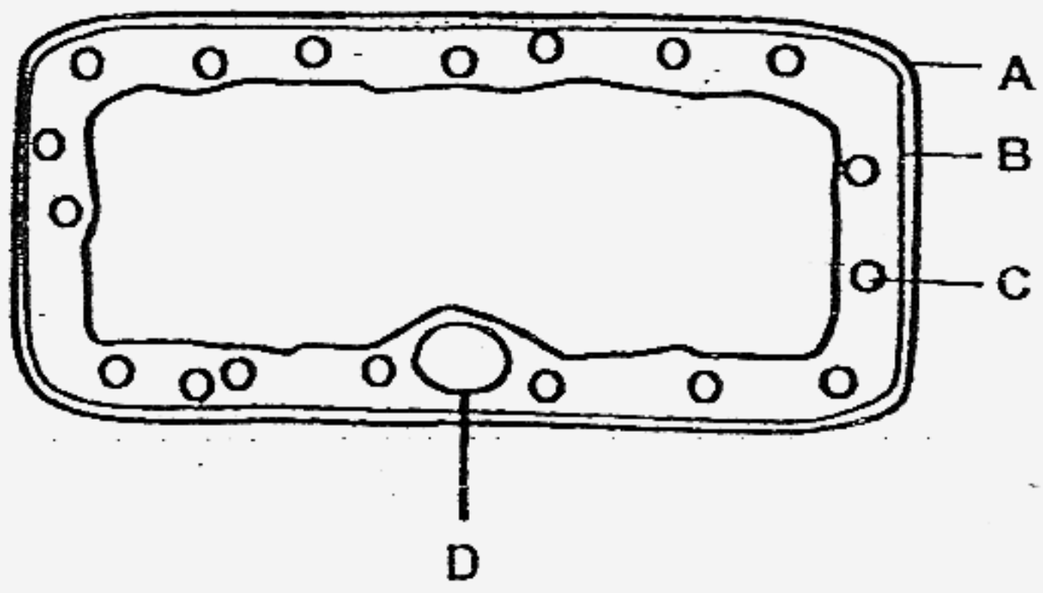
1. The diagram shows a cell from the leaf of a plant.



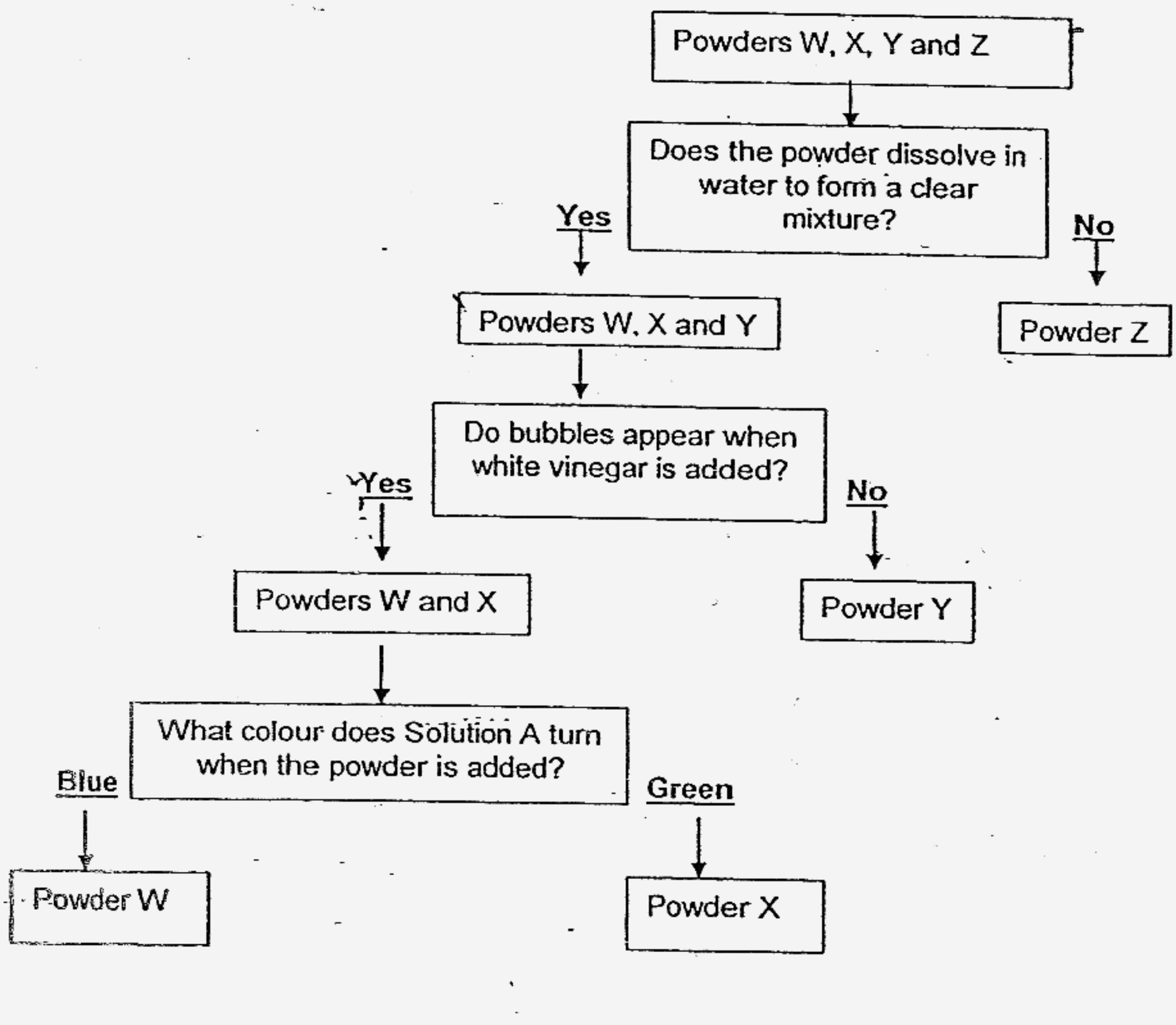
Which part of the cell controls substances that move in and out of the cell?

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

2. Yi Jing tested 4 white powders and recorded her results in the table below.

Powder	TEST		
	Do the powder and the water form a clear mixture?	Solution A turns _____ when the powder is added.	Do bubbles appear when white vinegar is added?
Cornflour	No	blue	No
Baking powder	Yes	blue	Yes
Washing powder	Yes	green	Yes
Fruit salt	Yes	blue	No

She constructed a flow chart to identify the 4 powders using the tests above.



Which substance is Powder W?

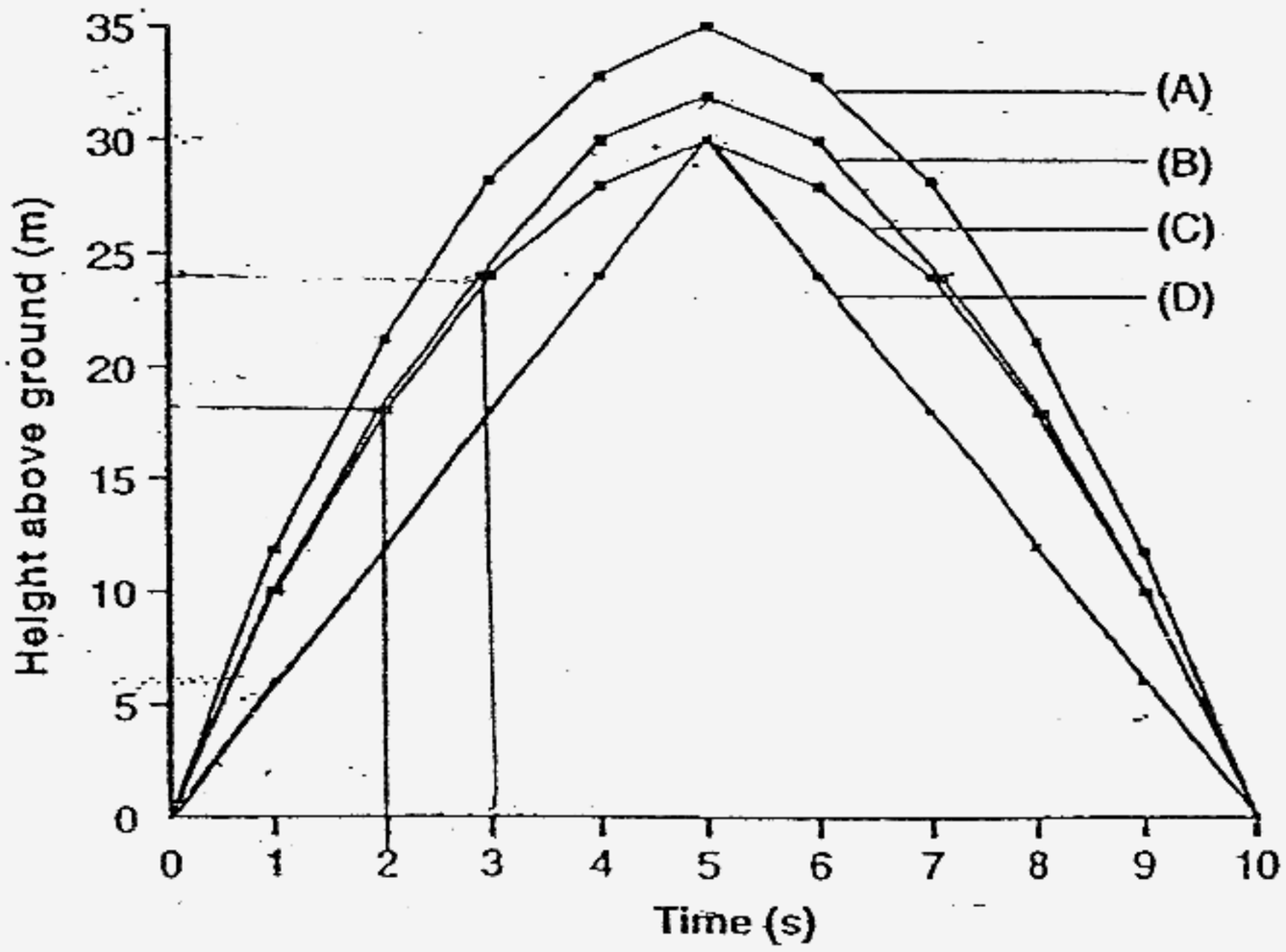
(1) Cornflour
(2) Baking powder
(3) Washing powder
(4) Fruit salt

3. Which one of the differences between wind-pollinated flowers and insect-pollinated flowers is **incorrect**?

	Wind-pollinated flower	Insect-pollinated flower
(1)	Petals usually small and dull	Petals usually large and colourful
(2)	Nectar absent	Nectar present
(3)	Produces less pollen	Produces more pollen
(4)	No smell	Usually has smell

4. Benjamin recorded the flight time and height of an arrow that Kenneth shot into the air and plotted his results on the graph below.

Time (s)	Height above the ground (m)
0	0
1	10
2	18
3	24
4	28
5	30
6	28
7	24
8	18
9	10
10	0



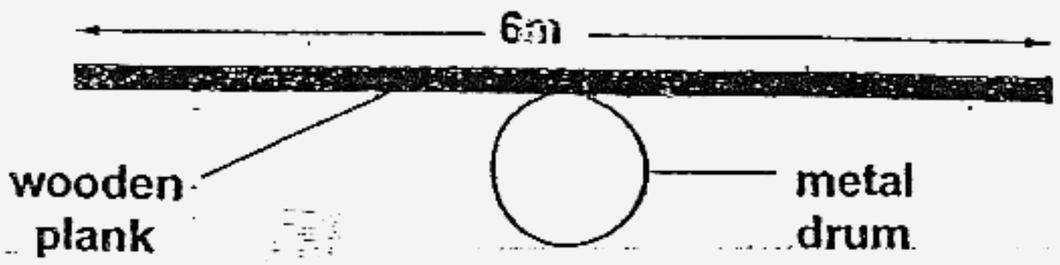
Which one of the graphs shows Benjamin's results?

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

5. When the Earth has travelled round the Sun once, the Earth would have turned _____ time(s) about its own axis.

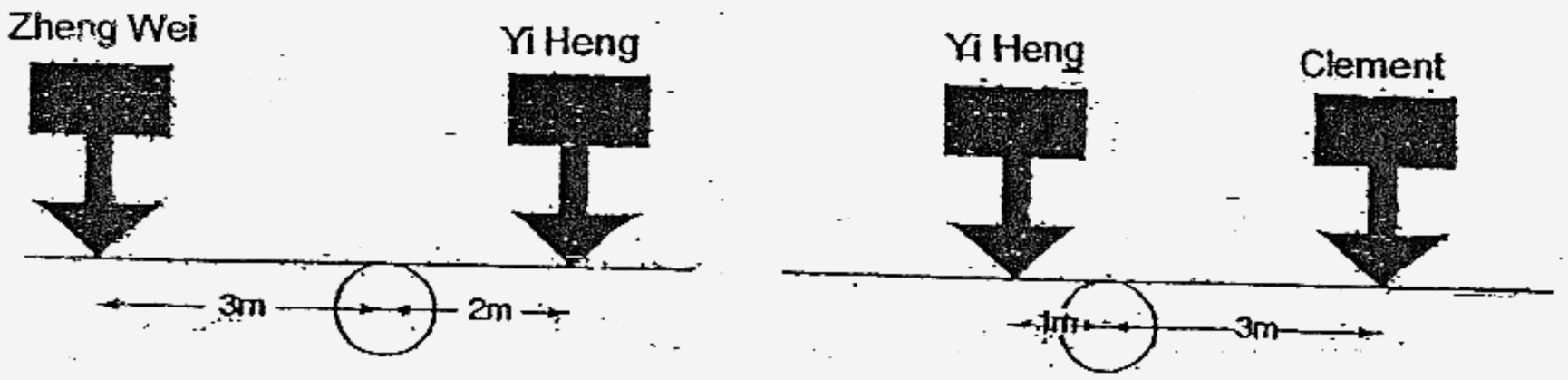
(1) 1
(2) 24
(3) 28
(4) 365

6. Three children made a seesaw from a plank of wood and a metal drum. The seesaw is balanced with no children on it as shown in the diagram below.



Name	Weight
Yi Heng	60 kg
Zheng Wei	40 kg
Clement	20 kg

Although the children weigh differently as shown in the table above, they could balance each other by changing the position they sat on the plank.



If the seesaw was balanced with Zheng Wei on one end and Clement on the other, what distances were Clement and Zheng Wei from the centre of the metal drum?

	Clement	Zheng Wei
(1)	1m	2m
(2)	1m	3m
(3)	2m	1m
(4)	2m	3m

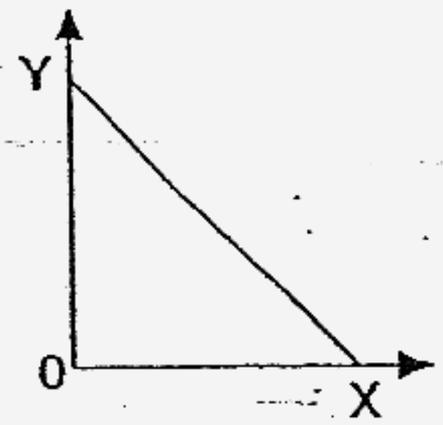
7. Which of the following statements about gravity are <u>true</u>?

(A) Gravity is a force that can act at a distance.
(B) Gravity causes objects on Earth to have mass.
(C) Gravity makes things in the air fall to the ground.
(D) Gravity varies with the distance the object is from the Earth.

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

8. Which one of the graphs below shows <u>correctly</u> the relationship between the amount of gravitational potential energy of an object (Y) and the height of the object above the ground (X)?

(1)



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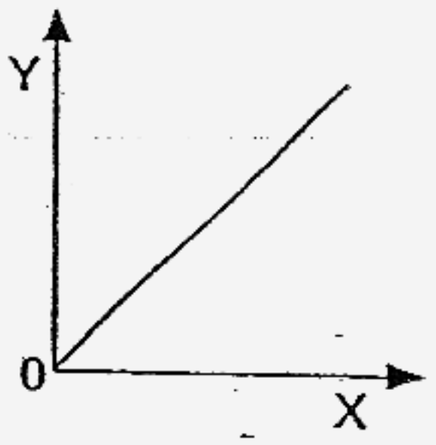
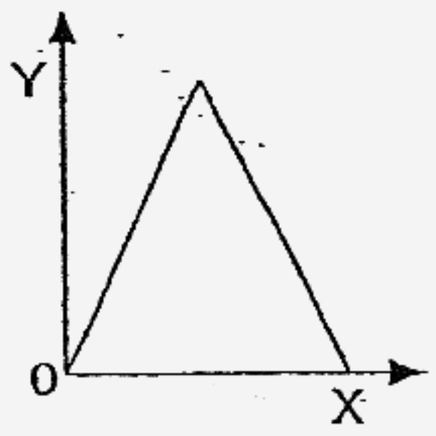


(3)



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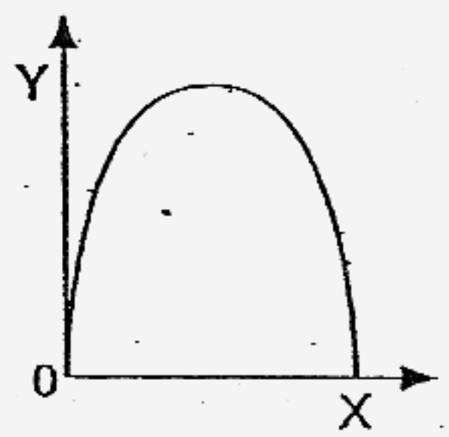
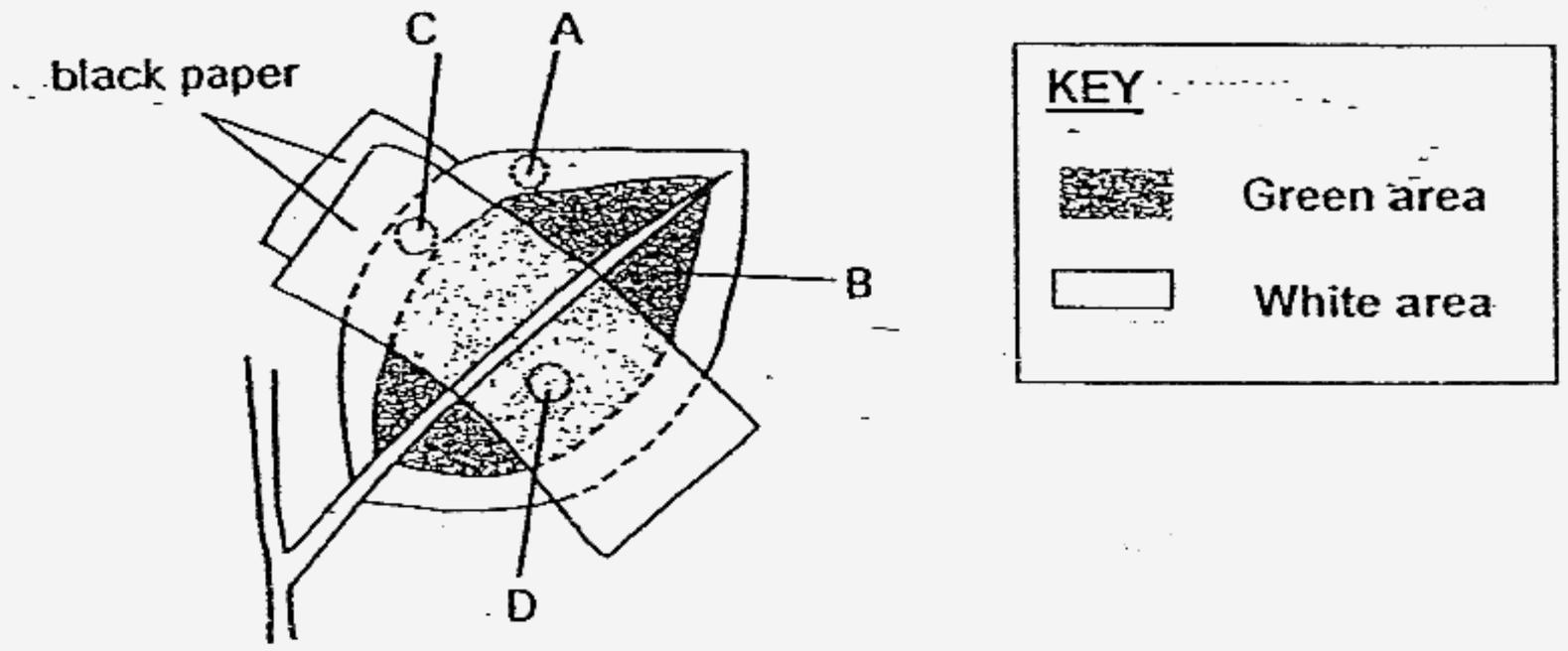


9. Yee Thien carried out an experiment on a leaf as shown in the diagram below.



There was no starch in the leaf at the start of the experiment. She placed the plant in bright sunlight for several hours. Then she cut out 4 discs from the leaf in the positions shown and tested each disc for the presence of starch.

Which disc(s) contained starch?

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

10. Hanna compared the properties of 4 objects in the table below.

Property	Objects			
	A	B	C	D
Non-metal	Yes	No	Yes	Yes
Magnetic	No	Yes	No	No
Definite shape	Yes	Yes	Yes	No
Conduct electricity	No	Yes	No	Yes

Which of the following can A, B, C and D be?

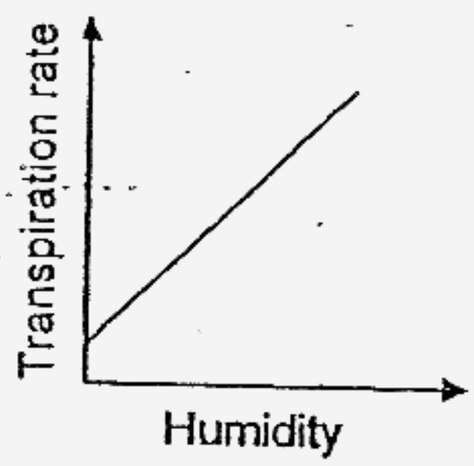
	A	B	C	D
(1)	Ceramic mug	Copper wire	Mercury	Rainwater
(2)	Wooden chopsticks	Steel screw	Kerosene	Air
(3)	Glass bowl	Iron nail	Plasticine	Sea water
(4)	Styrofoam container	Aluminium foil	Apple juice	Oxygen

water

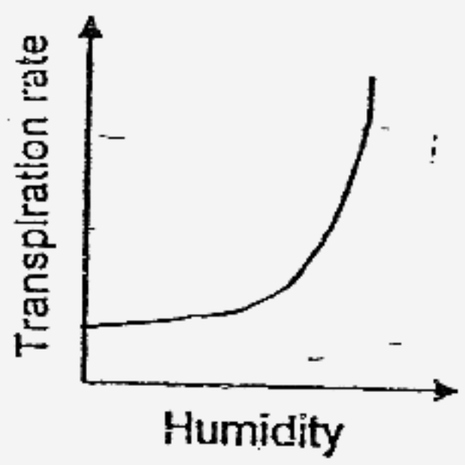
11. Humidity measures the amount of water vapour in the air.
Transpiration is the process by which plants lose water to the air.

Which one of the following graphs shows what happens to the rate of transpiration as humidity is increased?

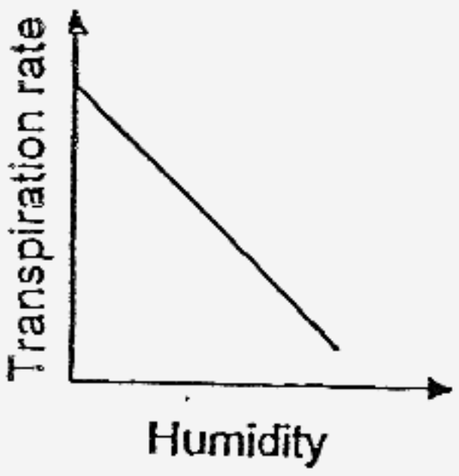
(1)



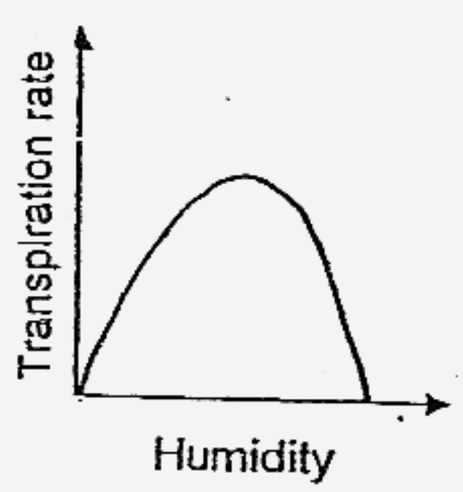
(2)



(3)

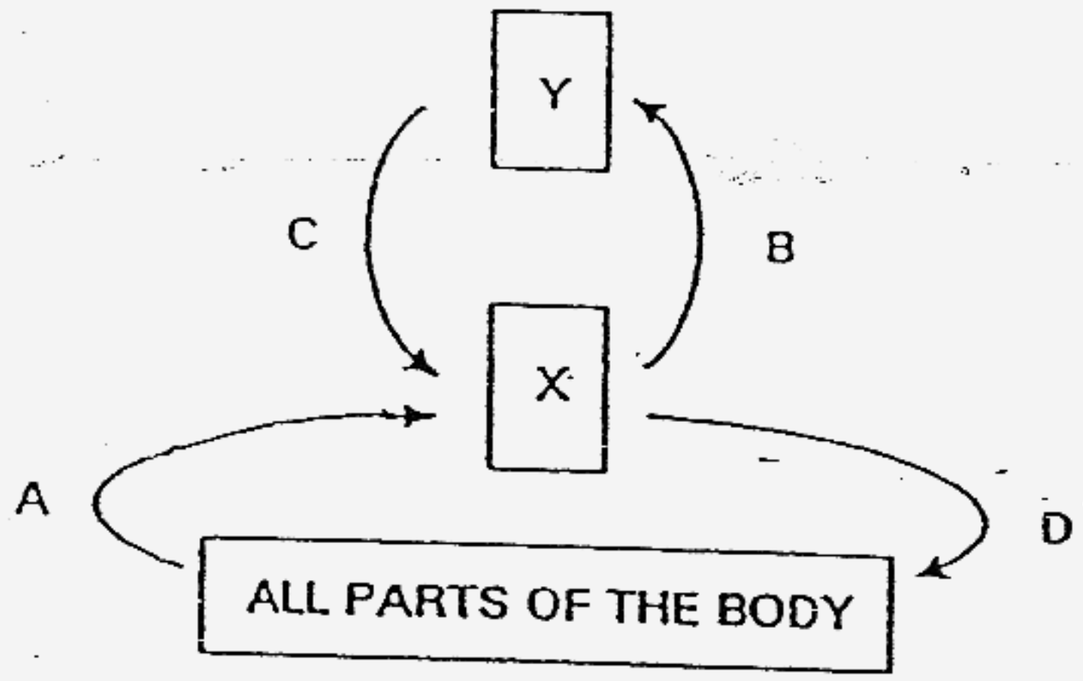


(4)



12. The diagram below shows our circulatory system.

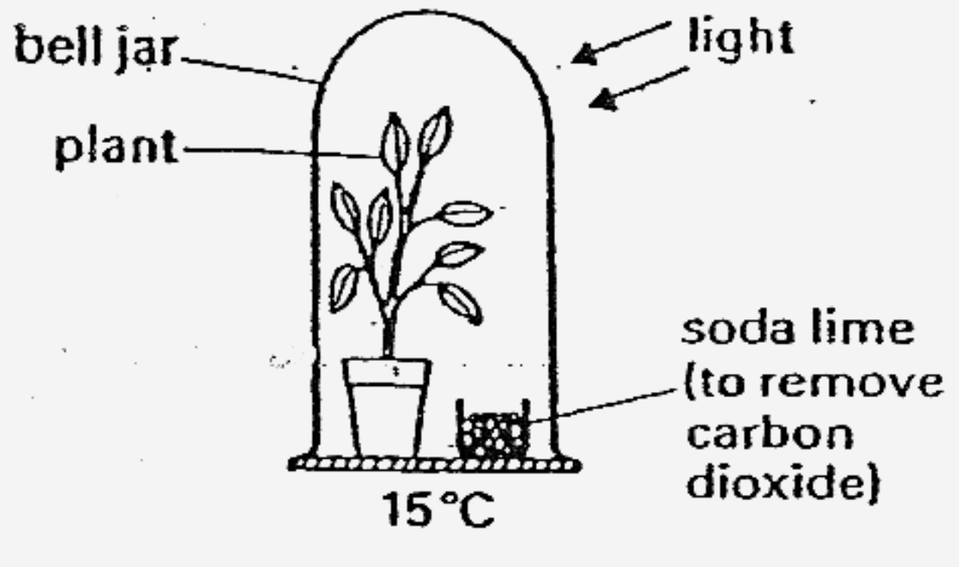
X and Y represent organs. A, B, C and D represent blood vessels.



Which one of the following about our circulatory system is **correct**?

	Organ X	Organ Y	Type of Blood in A	Type of Blood in B	Type of Blood in C	Type of Blood in D
(1)	Heart	Lungs	Rich in Carbon dioxide	Rich in Carbon dioxide	Rich in oxygen	Rich in oxygen
(2)	Heart	Lungs	Rich in oxygen	Rich in oxygen	Rich in Carbon dioxide	Rich in Carbon dioxide
(3)	Lungs	Heart	Rich in oxygen	Rich in Carbon dioxide	Rich in oxygen	Rich in Carbon dioxide
(4)	Lungs	Heart	Rich in Carbon dioxide	Rich in oxygen	Rich in Carbon dioxide	Rich in oxygen

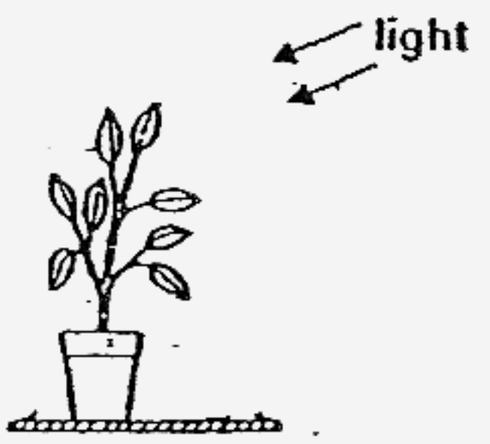
13.



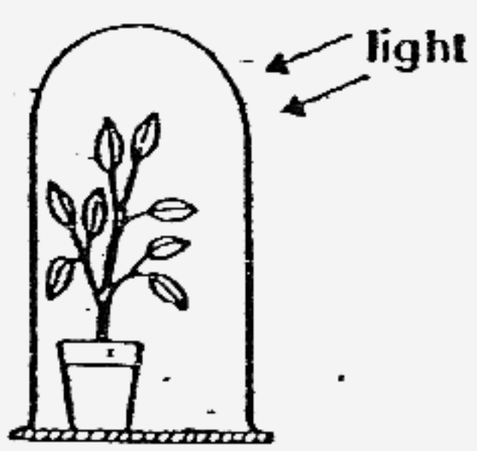
Tiffany set up an experiment to find out if carbon dioxide is needed for photosynthesis. She forgot to include a control for her experiment.

Which one of the following is most suitable as a control?

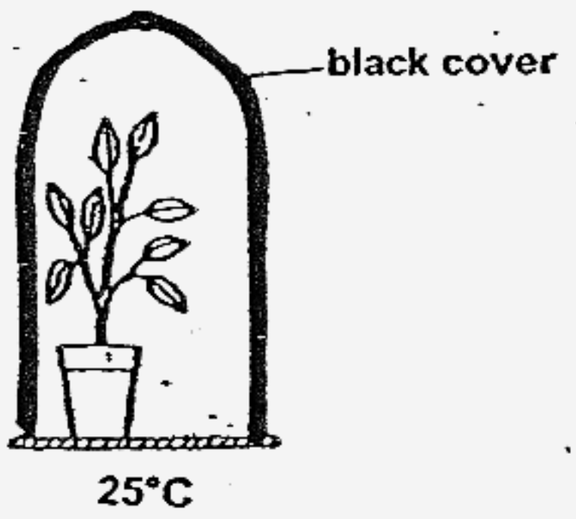
(1)



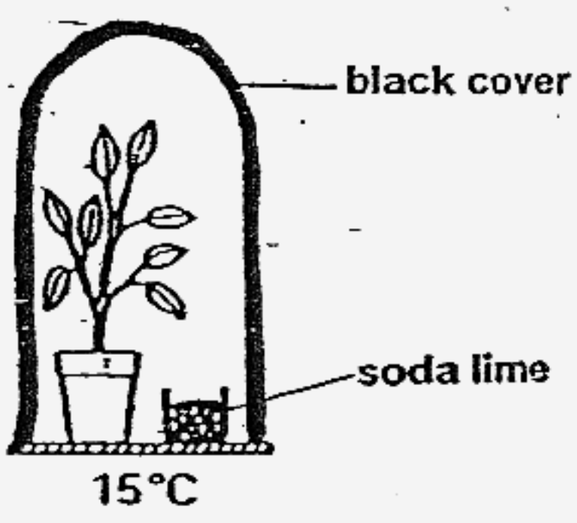
(2)



(3)



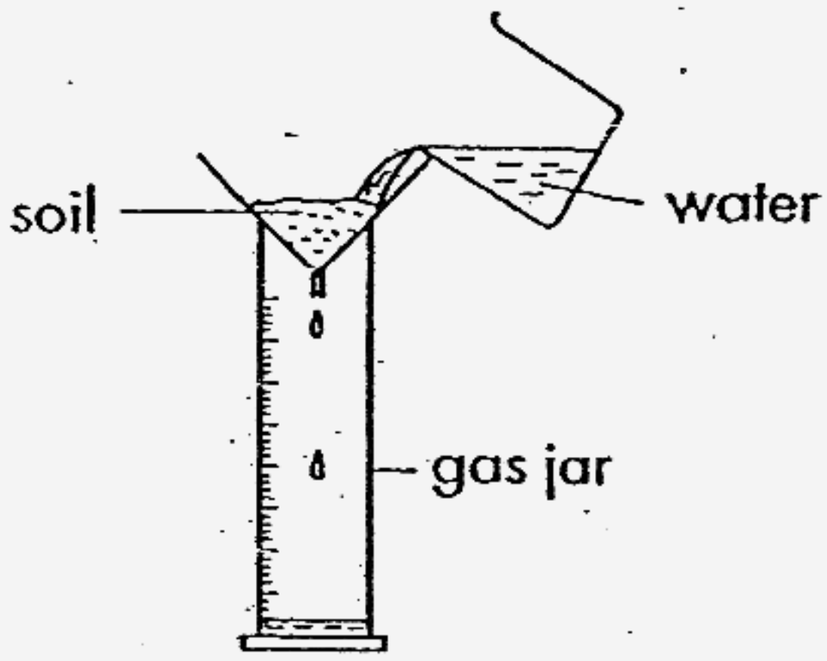
(4)



14. Which one of the following are used to make yoghurt?

(1) Milk and bacteria
(2) Sugar and bacteria
(3) Soya beans and mould
(4) Milk, bacteria and mould

15. Si Ying wants to conduct an experiment using the set-up below to see (which type of soil allows the most amount of water to pass through it.)



Which of the following variable(s) must Si Ying keep the same for a fair test?

(A) Type of soil used
(B) Amount of soil used
(C) Amount of water poured on each type of soil
(D) Time taken for the water to pass through the soil

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

16. Which of the following statements about decomposers is/are <u>true</u>?

(A) Bacteria and maggots are decomposers.
(B) Decomposers break down dead matter and animal waste.
(C) Decomposers enrich the soil with nutrients for plants to grow.

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

17. The food chain shown below is observed in a pond.

X ⟶ Y ⟶ Z

A large population of herbivores which feed on X is introduced into the pond where they do not have any predators.
Which of the following would happen in the pond after 3 weeks?

(A) Population of X would decrease.
(B) Population of Y would increase.
(C) Population of Z would decrease.

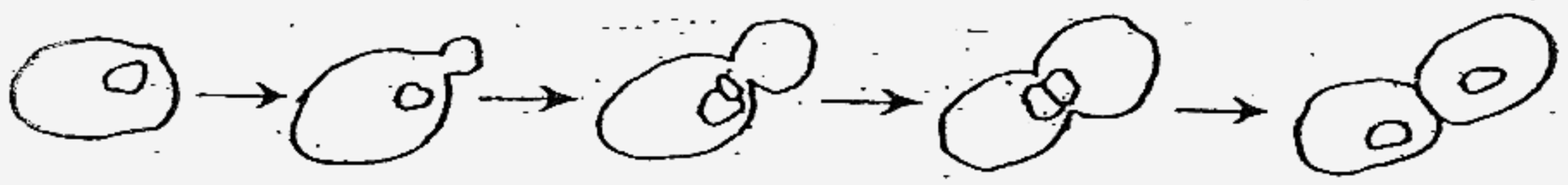
(1) A only
(2) A and C only
(3) B and C only
(4) All of the above

18. Which of the following are characteristics of sandy soil?

(A) Is usually wet
(B) Has large air spaces
(C) Made up of large particles

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

19.



The above diagram shows the stages when a yeast cell reproduces.
Which one of the following statements about reproduction of yeast is **not true**?

(1) The new cell is identical to the original cell.
(2) The new cell and the original cell share the same nucleus.
(3) Part of the cytoplasm of the new cell comes from the original cell.
(4) The new cell increases in size and breaks away from the original cell.

20. Miss Tan wasted a lot of time removing the iron filings that were stuck to the bar magnets at the end of her lesson.
What do you think she should do to prevent the iron filings from getting stuck directly to the bar magnets?

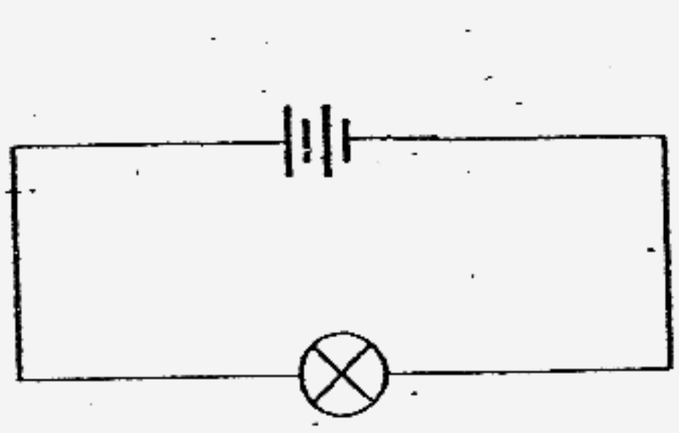
(1) Wet the magnets.
(2) Smear a layer of oil on each magnet.
(3) Wrap the magnets with aluminium foil.
(4) Sprinkle the iron filings some distance away from the magnets.

21. Which one of the following statements about reproduction in flowering plants is **incorrect**?

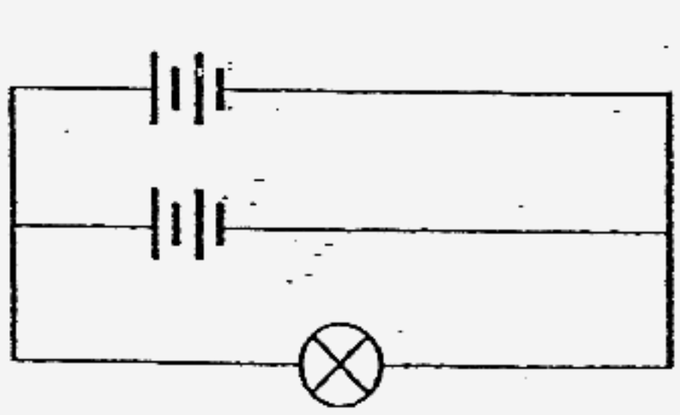
(1) Pollination occurs before fertilisation.
(2) Pollen grains are produced in the pollen sac.
(3) The male cell fuses with the egg cell in the ovule.
(4) The pollen grain moves down the style to reach the ovules.

22. Which 2 circuits shown below can be used to show how the arrangement of batteries affect the brightness of the bulb?

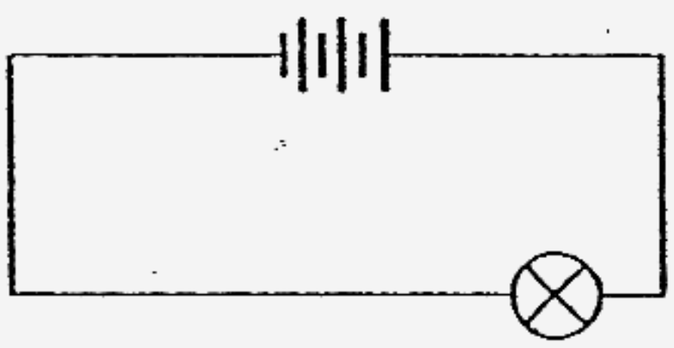
(A)



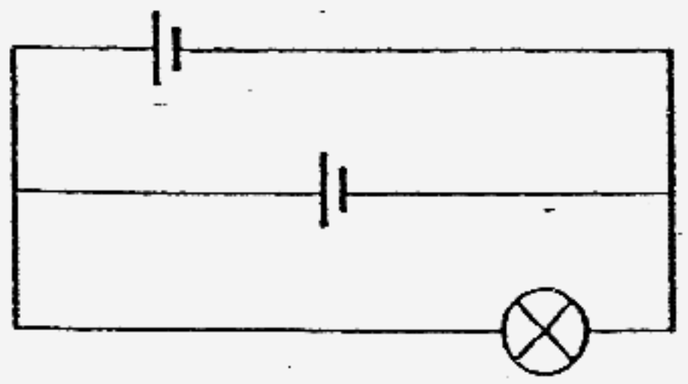
(B)



(C)

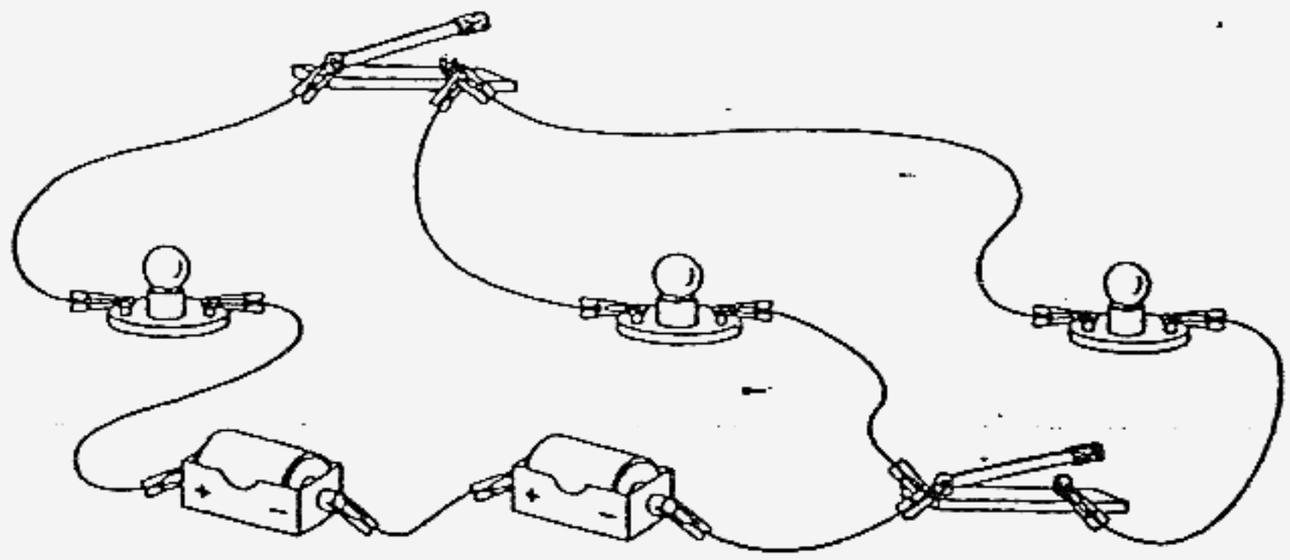


(D)



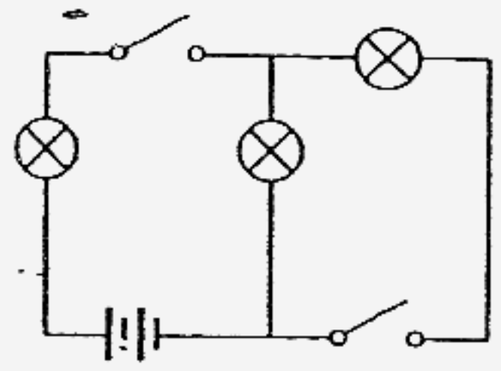
(1) A and C
(2) B and C
(3) A and D
(4) B and D

23.

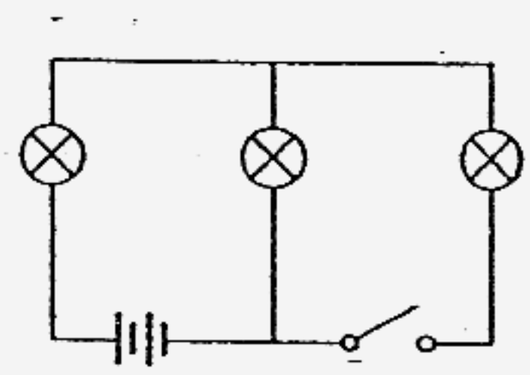


Which one of the following circuit diagrams represents the circuit above?

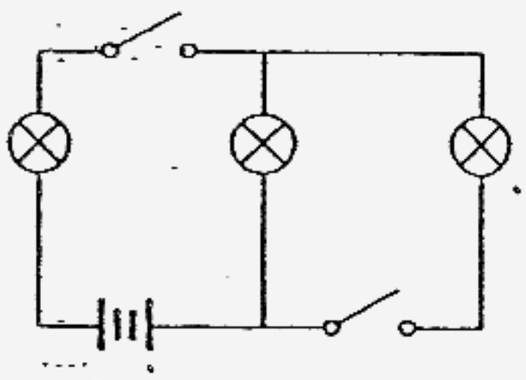
(1)



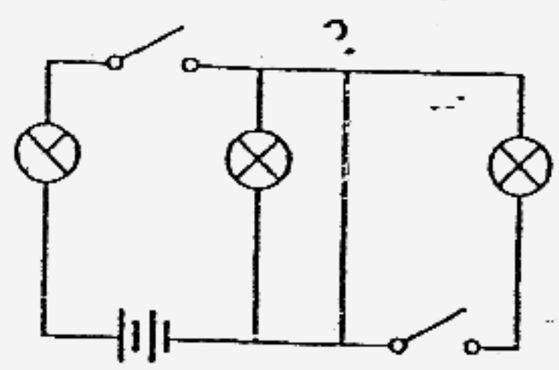
(2)



(3)



(4)



24.

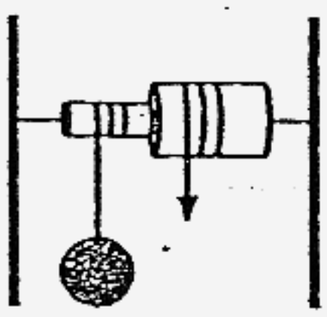
	Papaya	Fern
(A)	Has flowers	No flowers
(B)	A food producer	A decomposer
(C)	Produces seeds	Produces spores
(D)	Part of a food chain	Not part of a food chain

Jolene compared some characteristics of the papaya and the fern in the table above. Which of the comparisons are <u>true</u>?

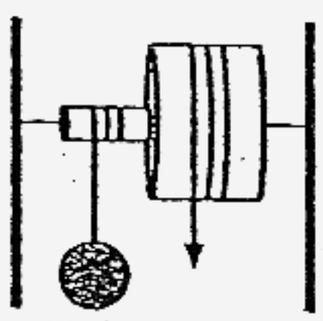
(1) A and C only
(2) B and D only
(3) A, B and C only
(4) A, C and D only

25. Shi Wei carried out an experiment to lift the same load using 4 types of wheel and axle. The wheels are of different diameters.
Which one of the following would require the <u>greatest</u> effort to lift the load?

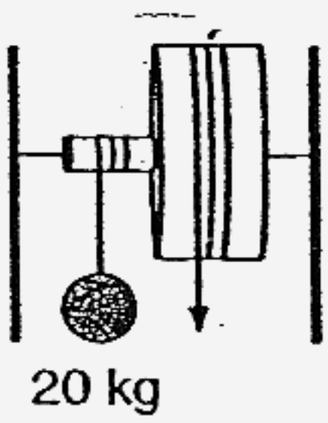
(1)



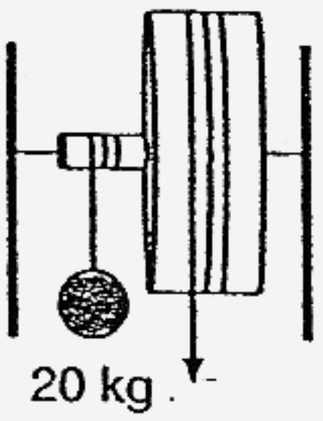
(2)



(3)

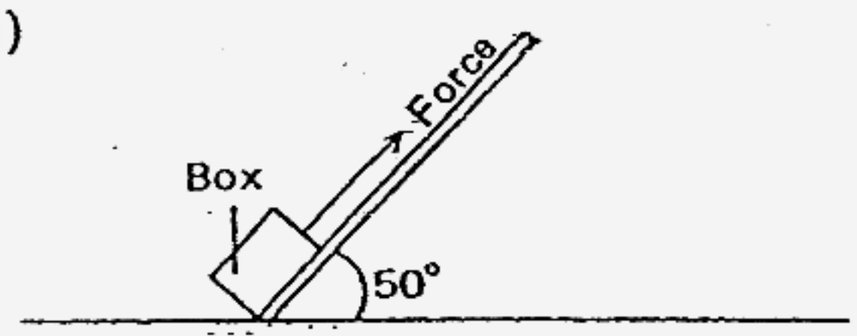


(4)

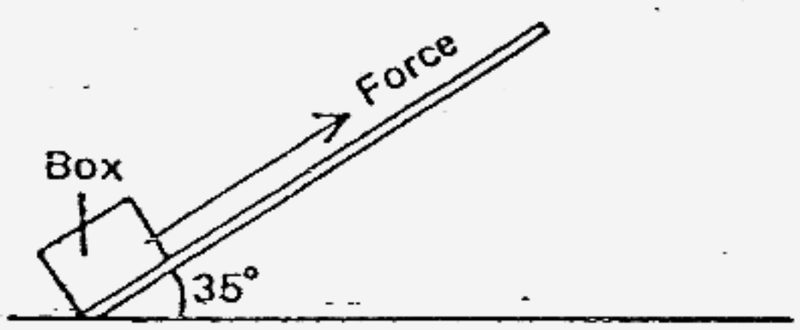


26. Which one of the following requires the <u>least</u> effort to move the box up the inclined plane?

(1)



(2)



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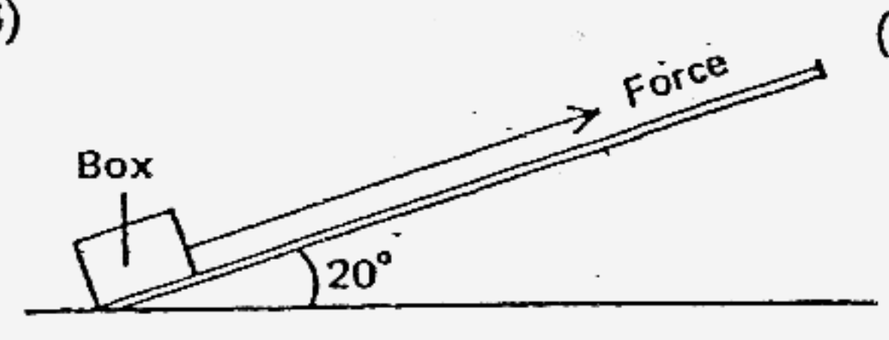
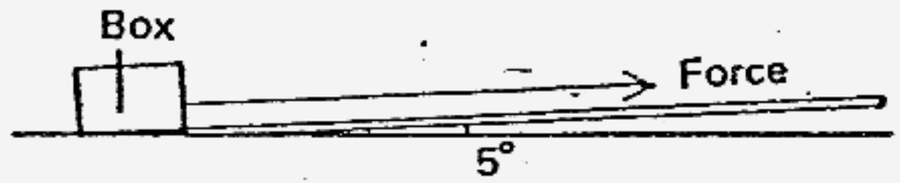
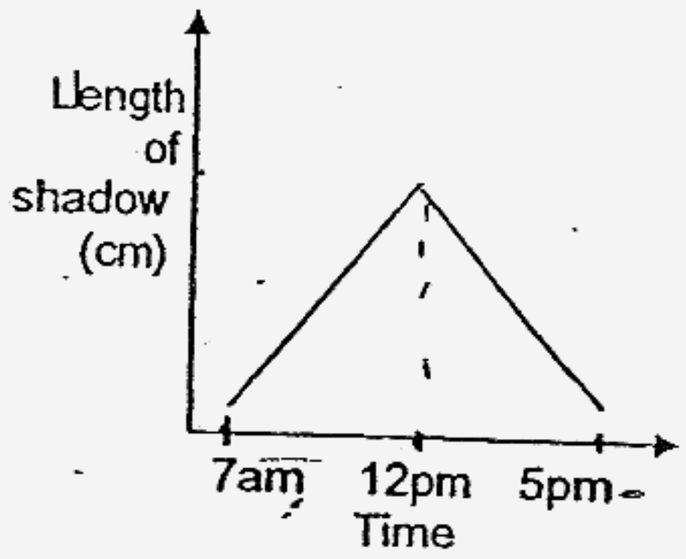


(4)

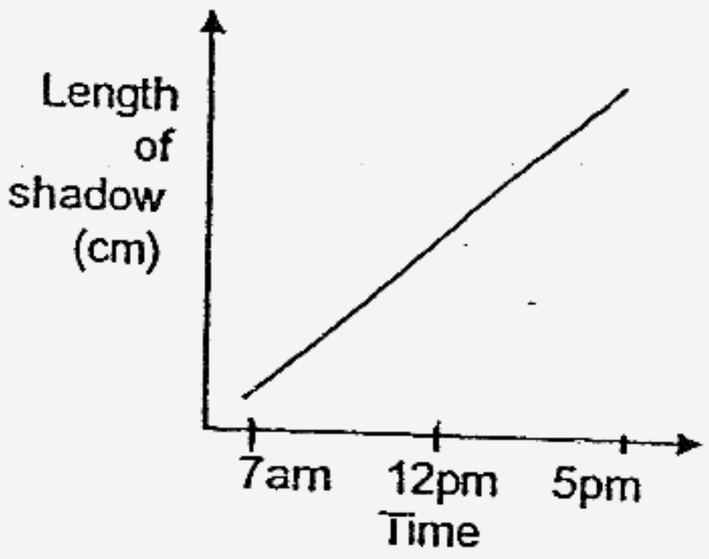


27. Yan Qing measured the length of the shadow of a lamp post at hourly intervals from 7 am to 5pm. Which one of the following graphs shows **correctly** the results that Yan Qing obtained?

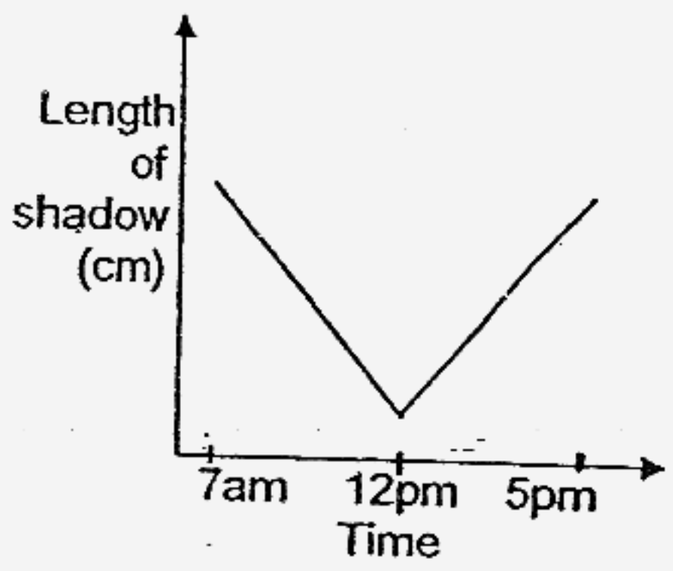
(1)



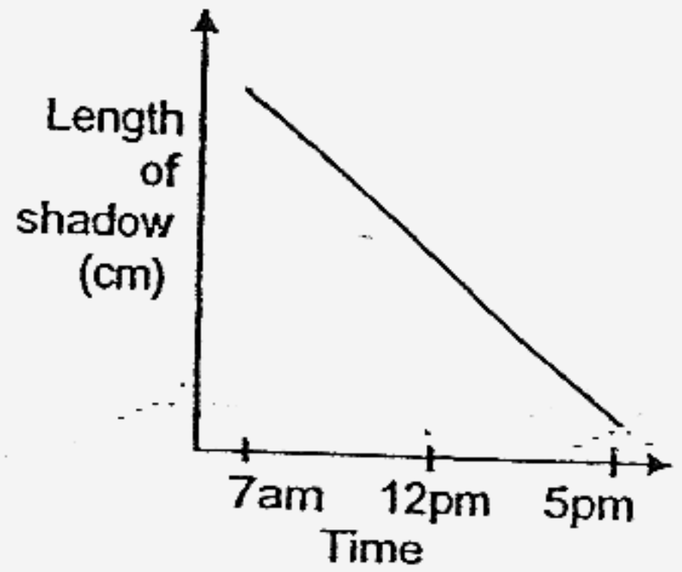
(2)



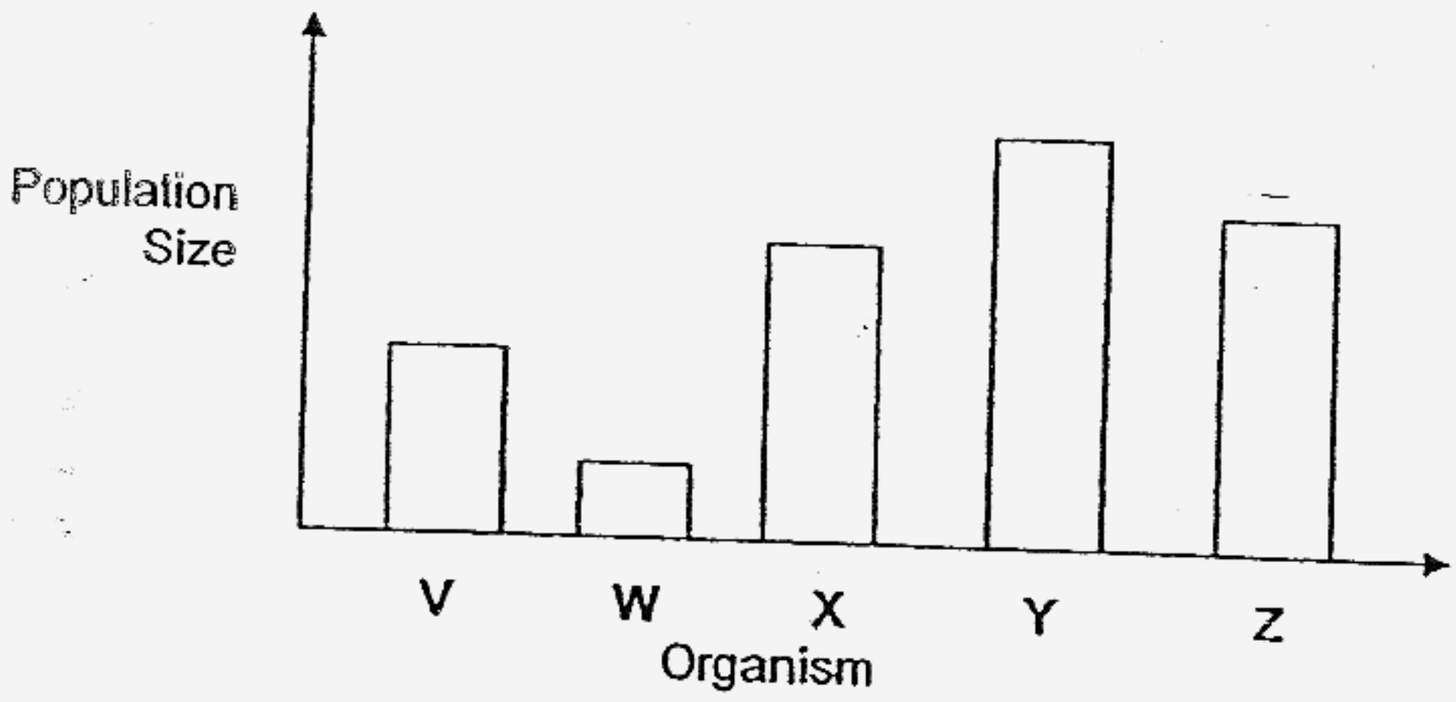
(3)



(4)



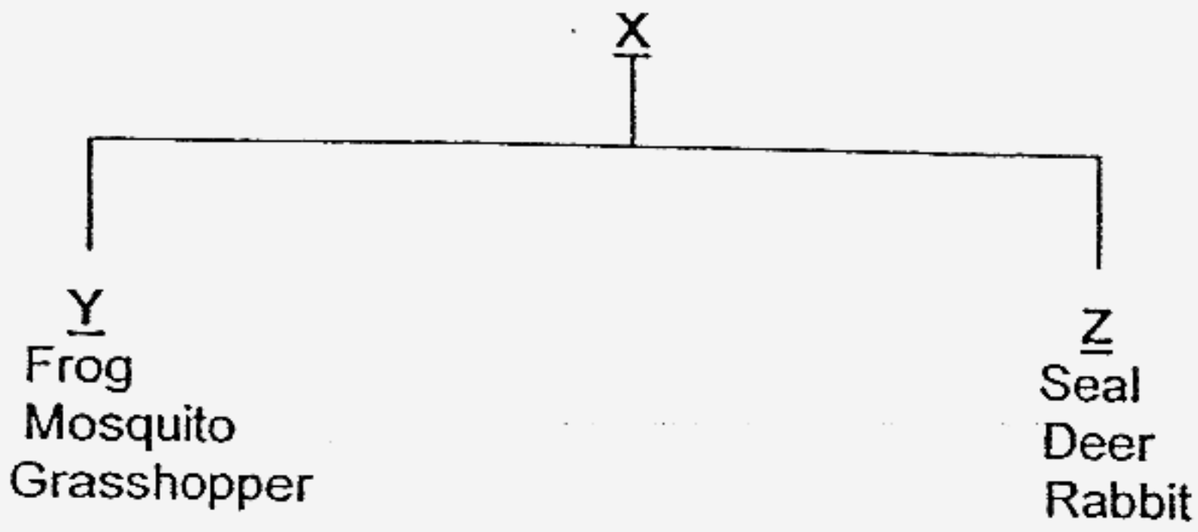
28. The bar graph below shows the populations of 5 organisms, V, W, X, Y and Z, in a food chain in a field community.



Which one of the following is a predator of organism X?

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

29. Study the chart below.



Which one of the following shows how the organisms are grouped?

	X	Y	Z
(1)	Animals	Have wings	Do not have wings
(2)	Number of legs	Has 6 legs	Has 4 legs
(3)	Number of stages in life cycle	4 stages	3 stages
(4)	Methods of reproduction	Lay eggs	Give birth to young

30. Shixuan carried out an experiment to compare the amount of water in 4 different vegetables, A, B, C and D. Firstly, she weighed the vegetables. Then she dried the vegetables in the sun for a few days and weighed them again. She recorded her results in the table below.

Vegetable	Weight before drying (g)	Weight after drying (g)	Difference in weight (g)
A	160	40	120
B	120	48	72
C	120	56	64
D	80	16	64

Which of the following statements is/are **true** for her experiment?

(A) Vegetable D has the highest water content.
(B) Vegetable B has more water than vegetable C.
(C) Vegetable C has as much water as vegetable D.
(D) Vegetable A and B have more water than vegetable C and D.

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

END OF PART 1

Maha Bodhi School

2007 Preliminary Examination

Science

Name : _____( )

Class : P 6 (_____)

Duration : 1 h 45 min (Parts I & II)

Date : 23 August 2007

Parent's Signature : _____

Part I (60 marks)	
Part II (40 marks)	
Total (100 marks)	

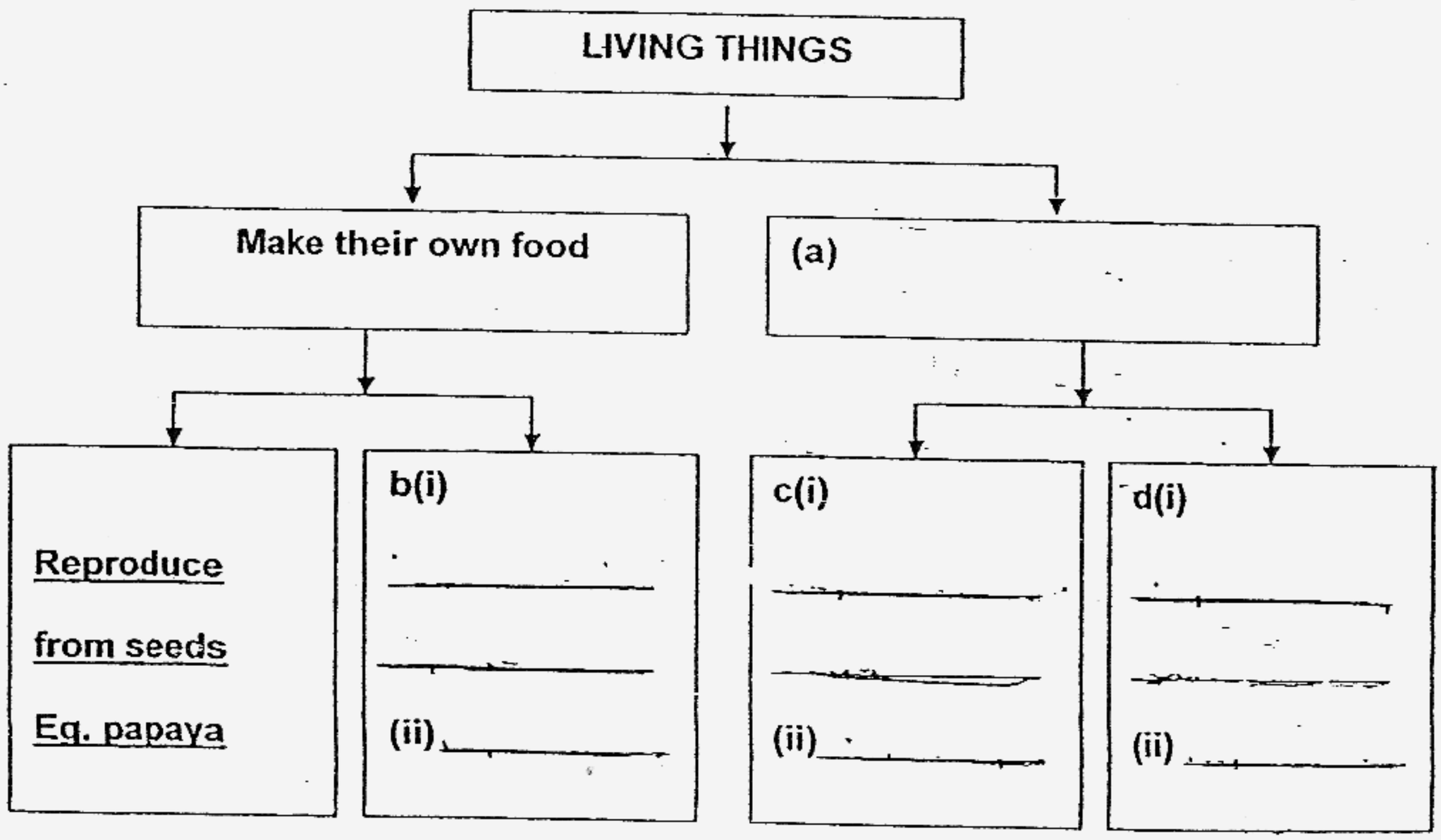
Part II: (40 marks)

Write your answers to questions 31 to 46 in this script.

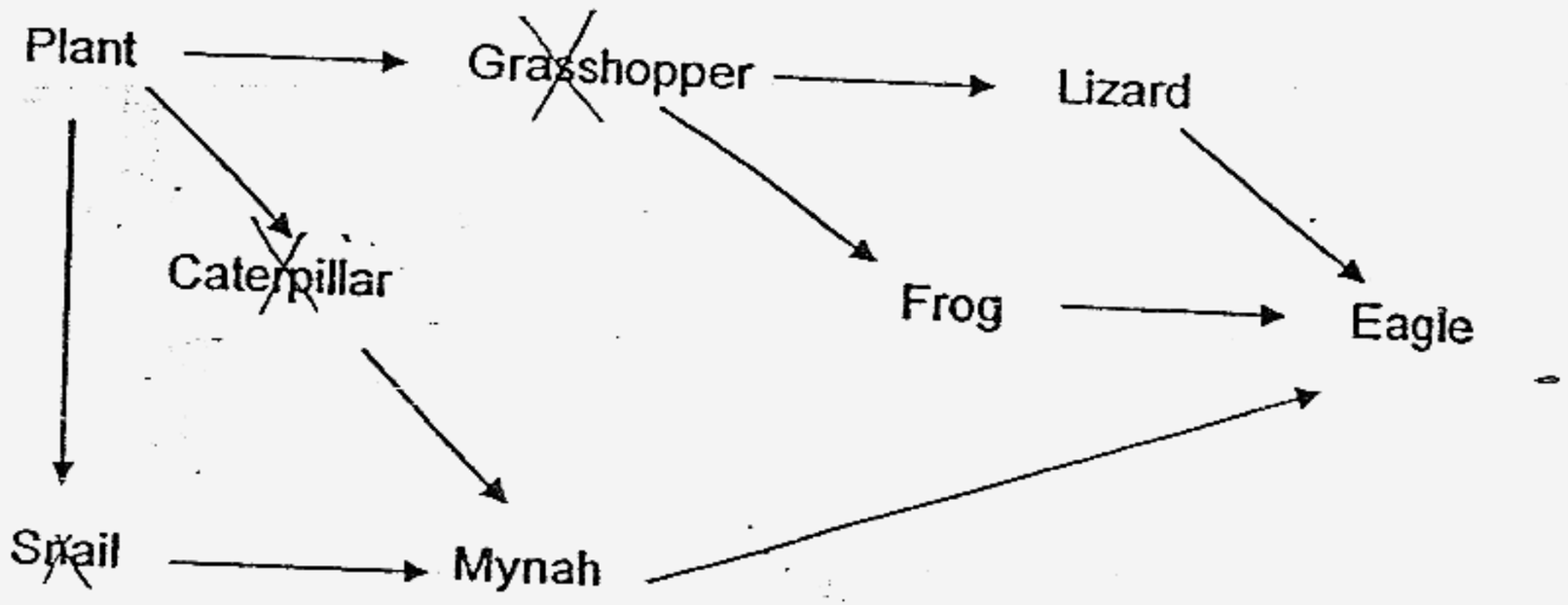
31. Use the chart below to classify the following organisms into **4 groups**. Give an appropriate heading for each group.

Frog	Papaya	Fern	Yeast

[2]



32. Study the food web shown below.



(a) If all the herbivores in the food web were killed, state <u>two</u> <u>possible outcomes</u> for the carnivores. Give a reason for each outcome.

(i) _____

_____

_____

_____

[1,1]

(b) If the different populations in the food web are kept in balance, are there likely to be more lizards or more grasshoppers? Give a reason for your answer.

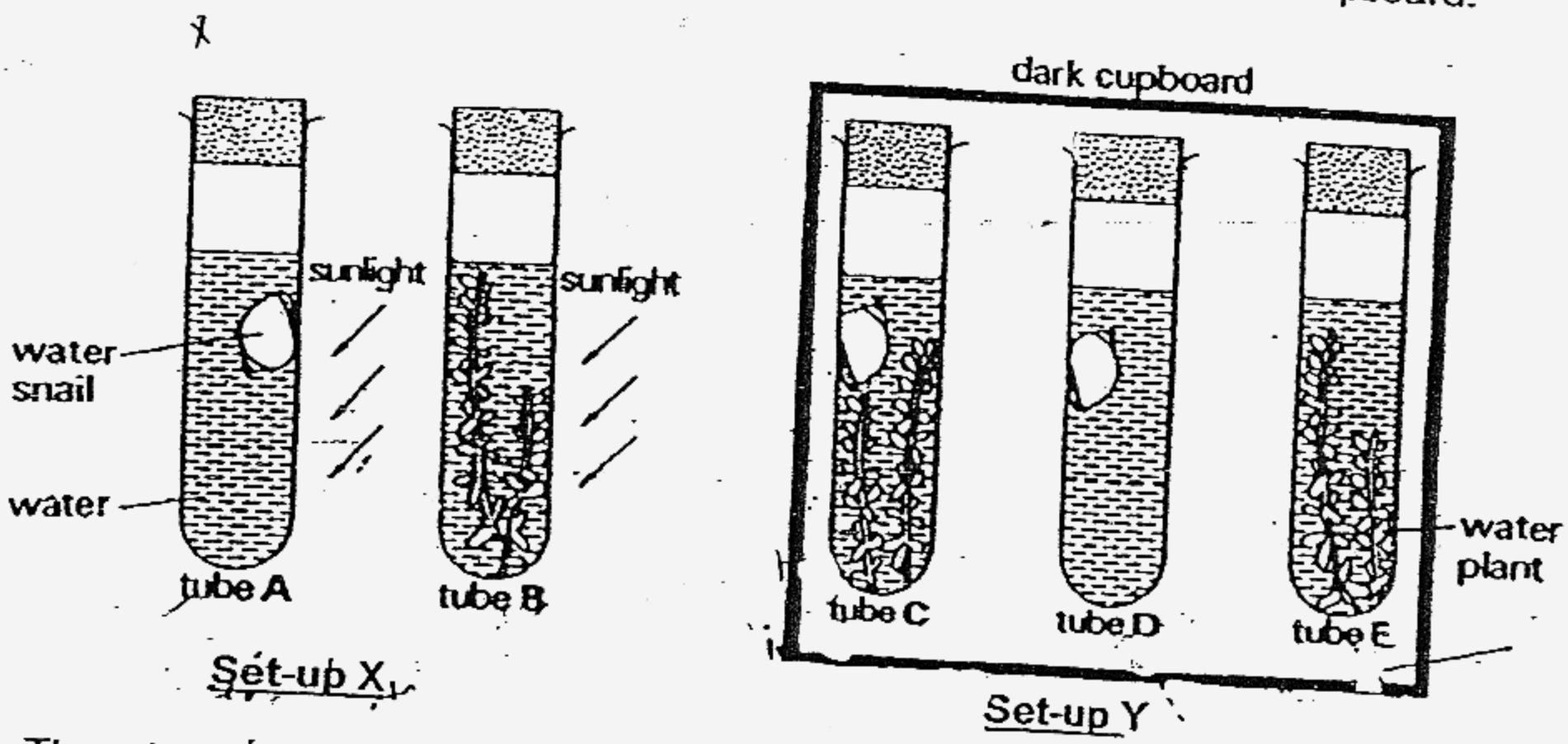
_____

_____

_____

[½, ½]

33. Ker Shen set up the experiment below.
He put Tubes A and B in bright sunlight and Tubes C, D and E in a cupboard.



Three hours later, he measured the amount of carbon dioxide in the water in each tube.

(a) Which tube had the <u>least</u> amount of carbon dioxide? Explain your answer.

[½, ½]

(b) Which tube had the <u>highest</u> amount of carbon dioxide? Explain your answer.

[½, ½]

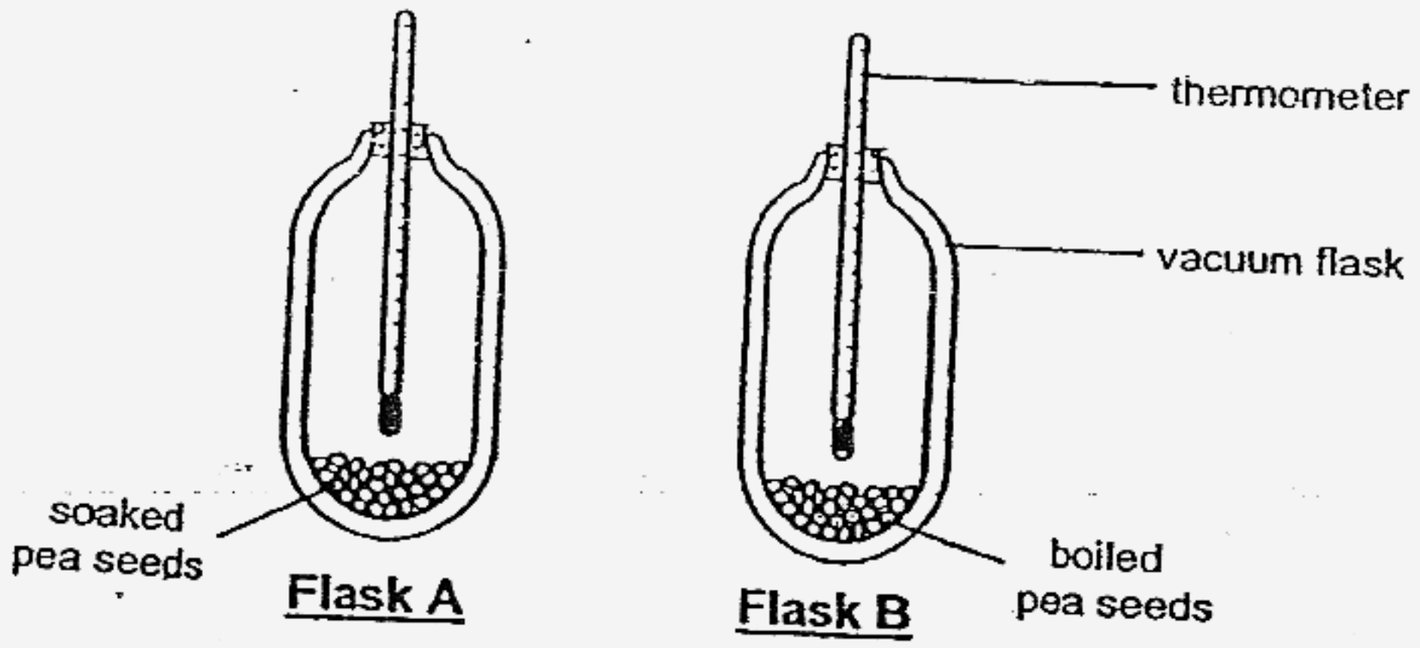
(c) Ker Shen did not set up any control for his experiment.
If he wants to conclude that the change in carbon dioxide in the water is due to the organisms, what kind of control should he have for

(i) Set-up X:

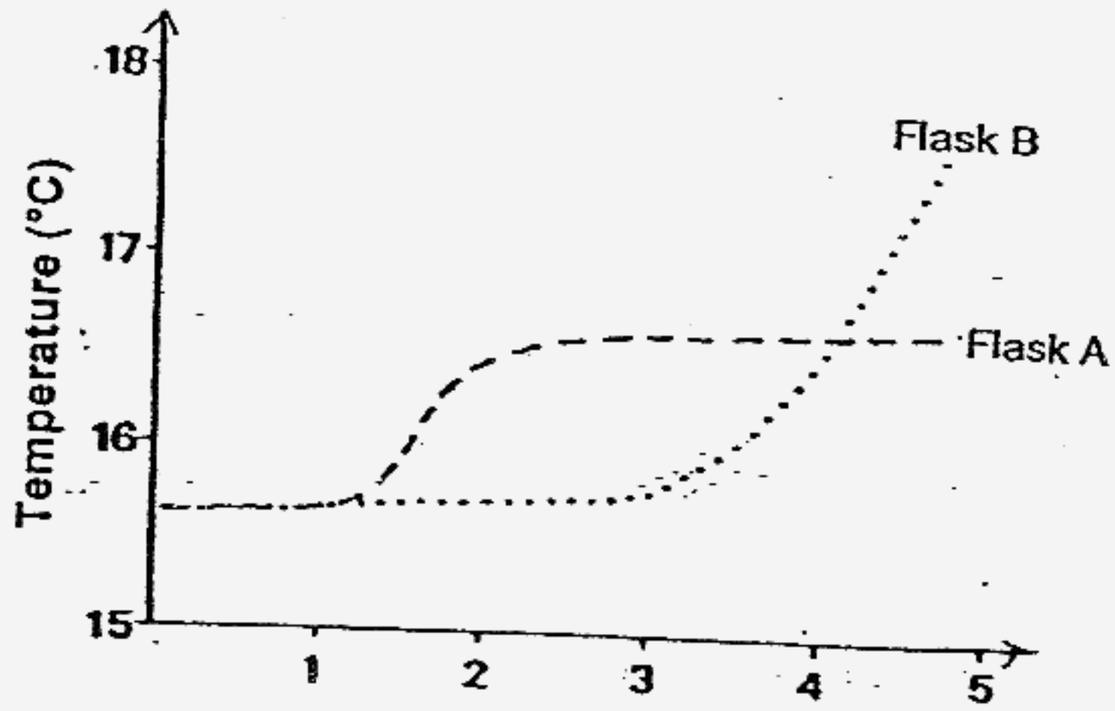
(ii) Set-up Y:

[½, ½]

34.



Tyne set up an experiment to show that heat is produced when seeds germinate.
She recorded the change in temperature in Flask A and B for 5 days and plotted the graphs below.



(a) In which flask did the seeds germinate?

_____

[½]

(b) Why did the temperature in Flask B increase after Day 3?

_____

_____

[1]

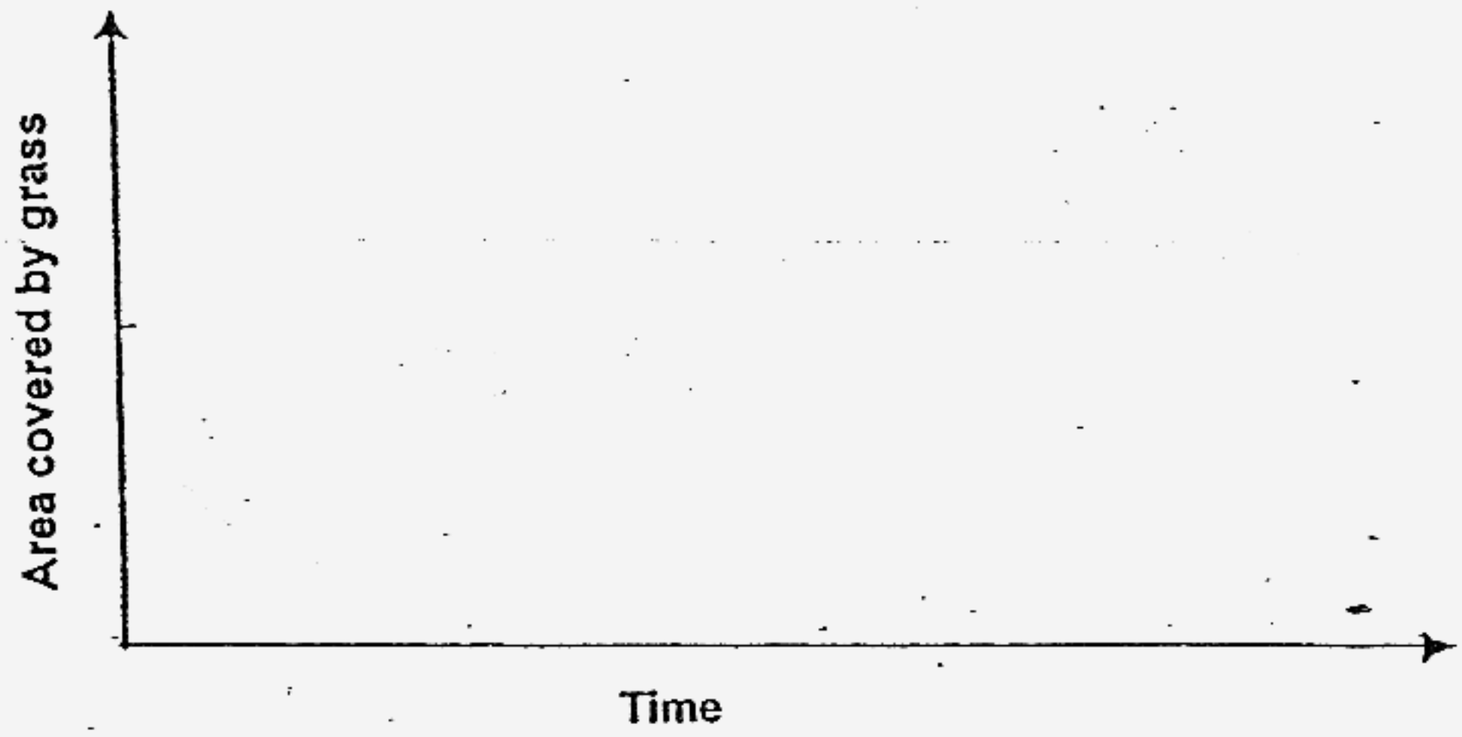
(c) Tyne expected a larger increase in temperature in Flask A.
Suggest <u>one</u> way she could improve her set-up to obtain a larger increase in temperature after 5 days, without changing the apparatus and the amount of peas used.

_____

_____

[1]

35. The graph below shows the areas covered by grass in a field.



(a) Mark with an 'X' on the graph above to show when a <u>new animal population</u> was introduced into the field community. [½]

(b) What <u>type</u> of animal do you think was introduced into the field community?

_____

[½]

(c) Explain how this <u>type</u> of animal in (b) could cause the change in the area covered by grass.

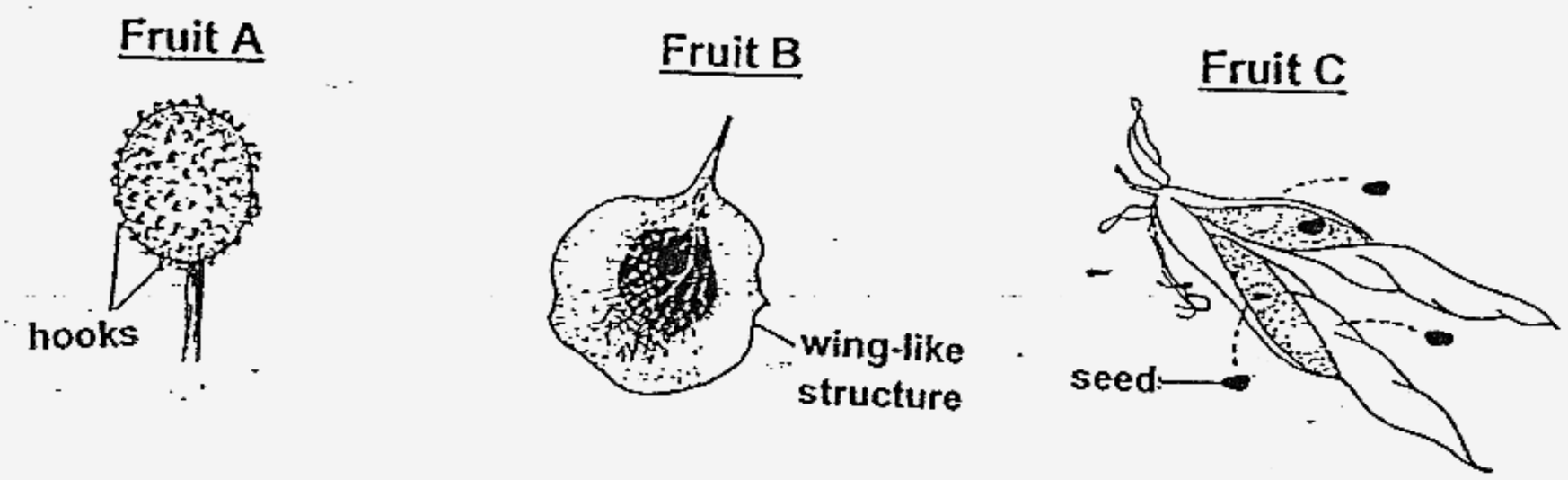
_____

_____

_____

[1]

36. The diagrams below show the fruits of 3 different plants.



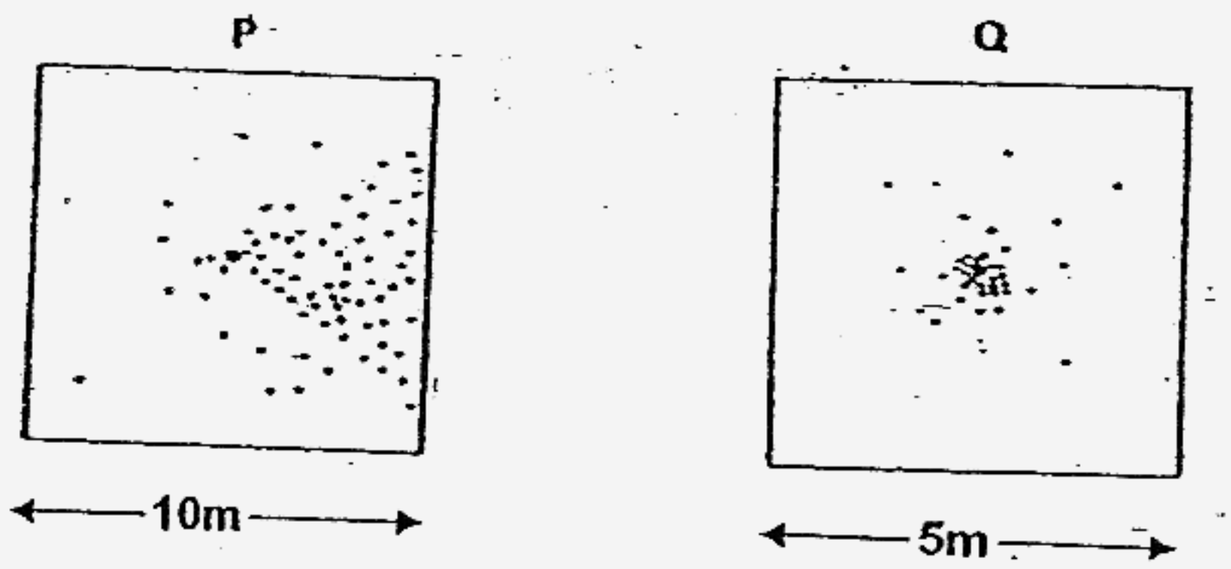
(a) State how the seeds are dispersed;

Fruit A:_____ Fruit B:_____

Fruit C:_____

[1½]

The dispersal patterns P and Q, of the seeds are shown below.



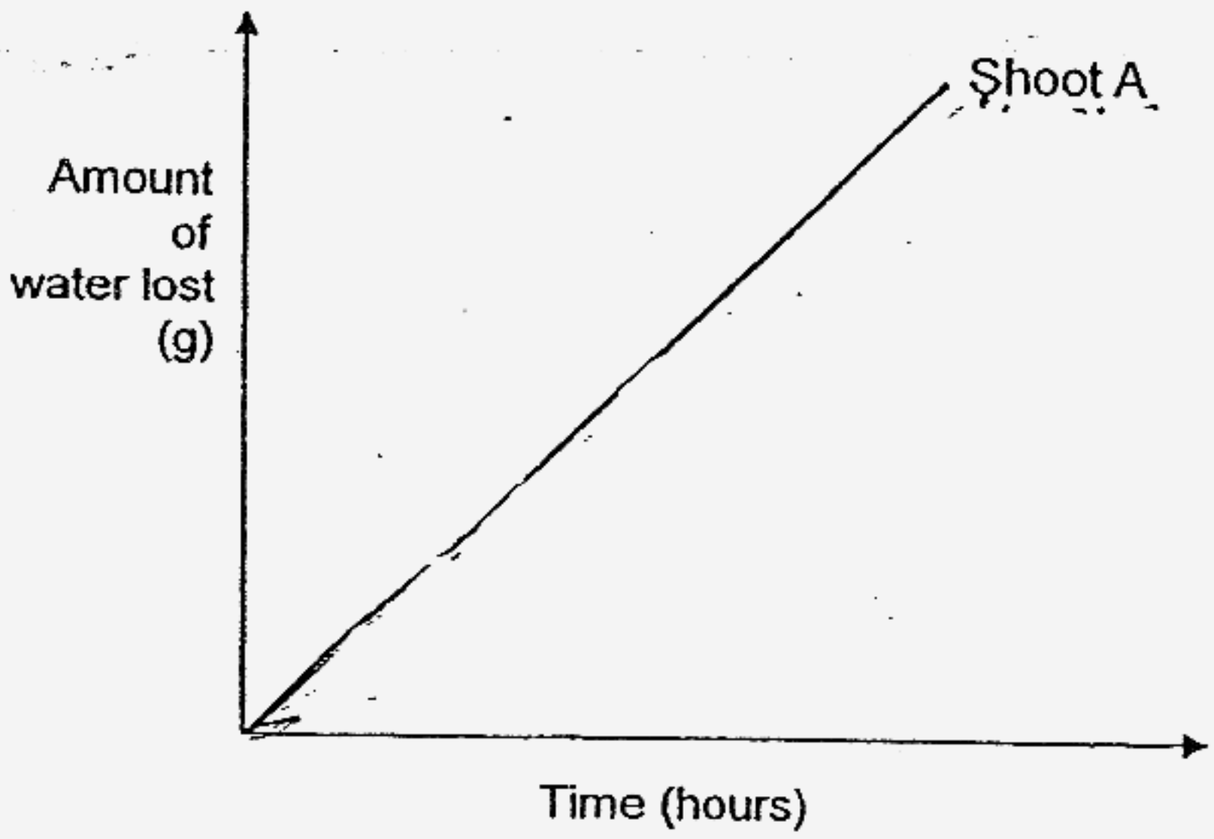
(b) Complete the table below to show which dispersal pattern relates to the seeds of Fruits B and C above and give a reason for each answer.

Seeds of fruit	Dispersal Pattern	Reason
B		
C		

[2]

37. Eileen carried out an experiment to investigate loss of water from 3 similar leafy shoots placed in the same room. The leafy shoots were treated as follows:

Shoot	Treatment
A	Upper leaf surface covered with waterproof vaseline
B	Lower leaf surface covered with waterproof vaseline
C	Untreated



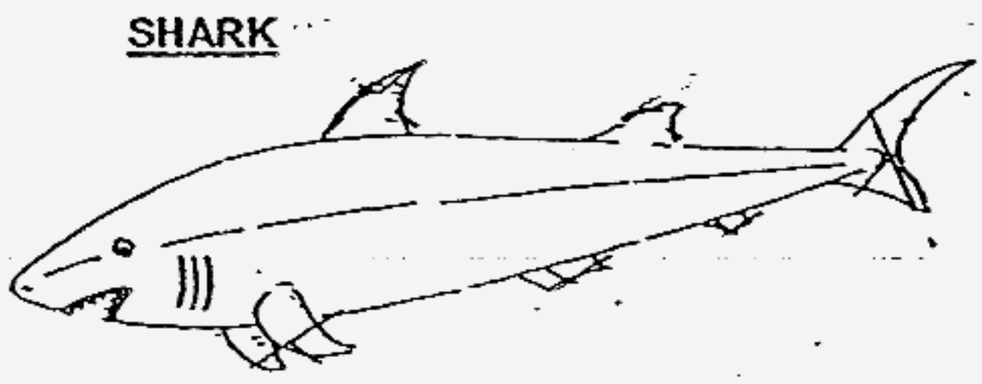
(a) The graph above shows the water loss from Shoot A.
Use the same axes above to **draw and label** the graphs for water loss from Shoot B and Shoot C.
[2]

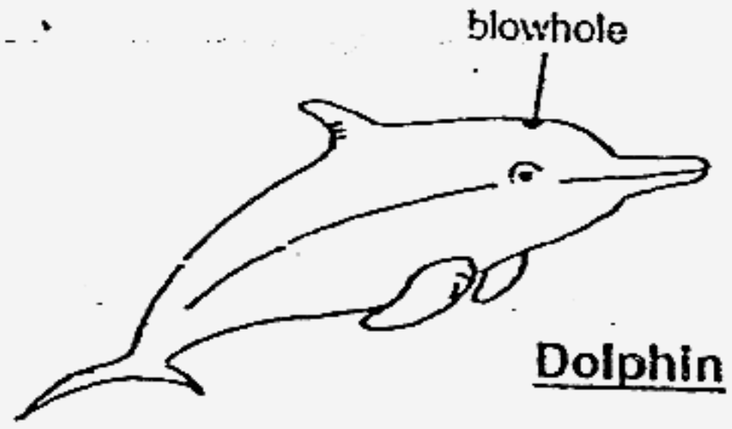
(b) Eileen observed that there was no significant difference in loss of water in shoots A and C.
Explain Eileen's observation.

(c) A similar shoot D that was untreated was left in **another room**.
Eileen observed that the amount of water lost was much higher than shoots A, B or C.
Give one possible reason for her observation.

[1]

38.





(a) Mark 'X' on <u>all</u> the parts of the shark's body that help it to keep balance and move forward.

[2]

(b) In the diagram above, the nostril of the dolphin (blowhole) is located at the top of its head.
What is the advantage of having the nostril at this position?

[1]

39. Priscilla wants to find out the **least** number of batteries that would cause the bulb in a circuit to fuse.

She is given 5 new batteries of the same type, some wires and a bulb.

She suggests the method below to carry out this investigation.

	Priscilla's Method
Step 1	Connect 5 batteries to the circuit
Step 2	Remove one battery from the circuit
Step 3	Observe whether the bulb lights up
Step 4	Repeat steps 2 and 3 until the bulb fuses

(a) Her teacher said that her method is not correct.
Explain why her method is not correct.

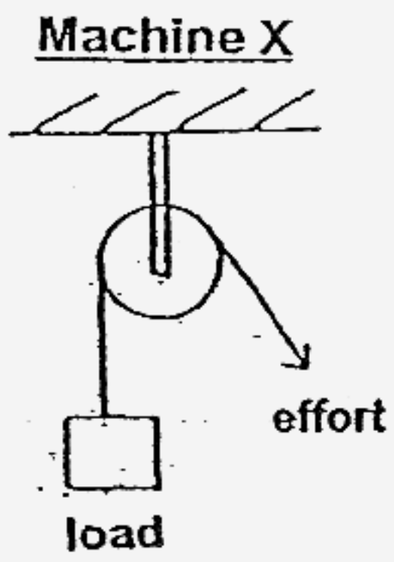
[1]

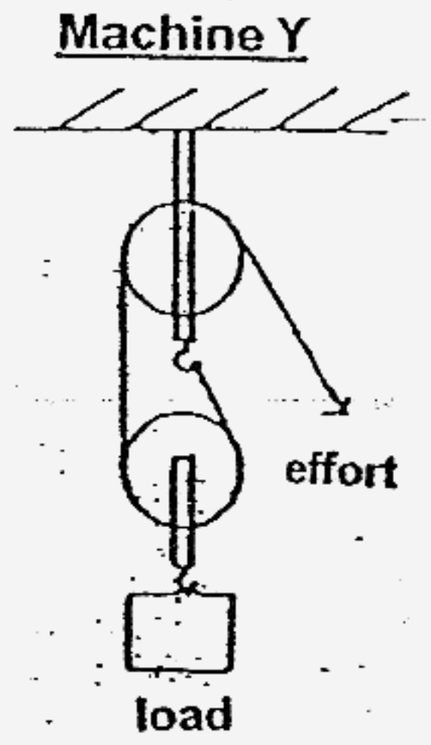
(b) How could you improve on her method? Write down the steps for your investigation in the table below. The number of steps is not fixed.

	YOUR METHOD
Step 1	

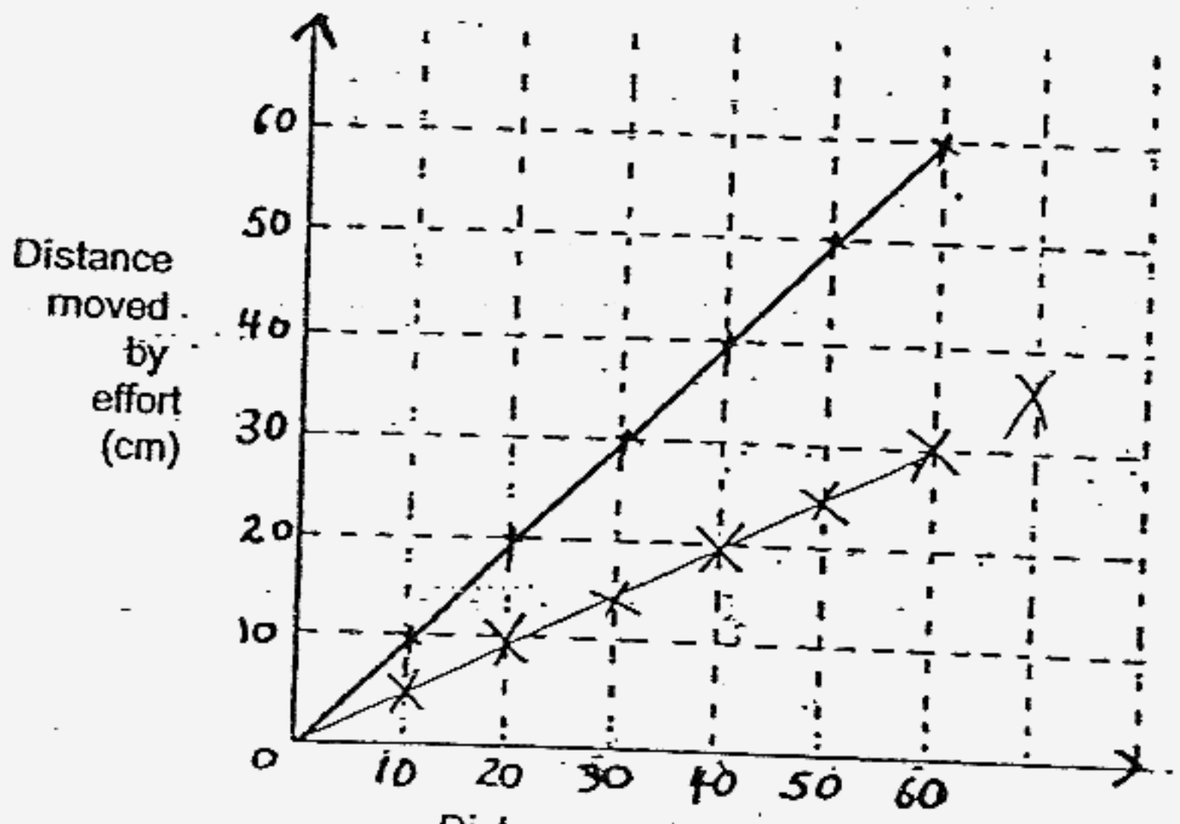
[1]

40.





The graph below shows the distance moved by the load and effort of one of the machines above.



(a)(i) Which one of the machines, X or Y, would produce the result shown on the graph?

_____

[½]

(ii) How does the machine in (a) make work easier?

_____

_____

[½]

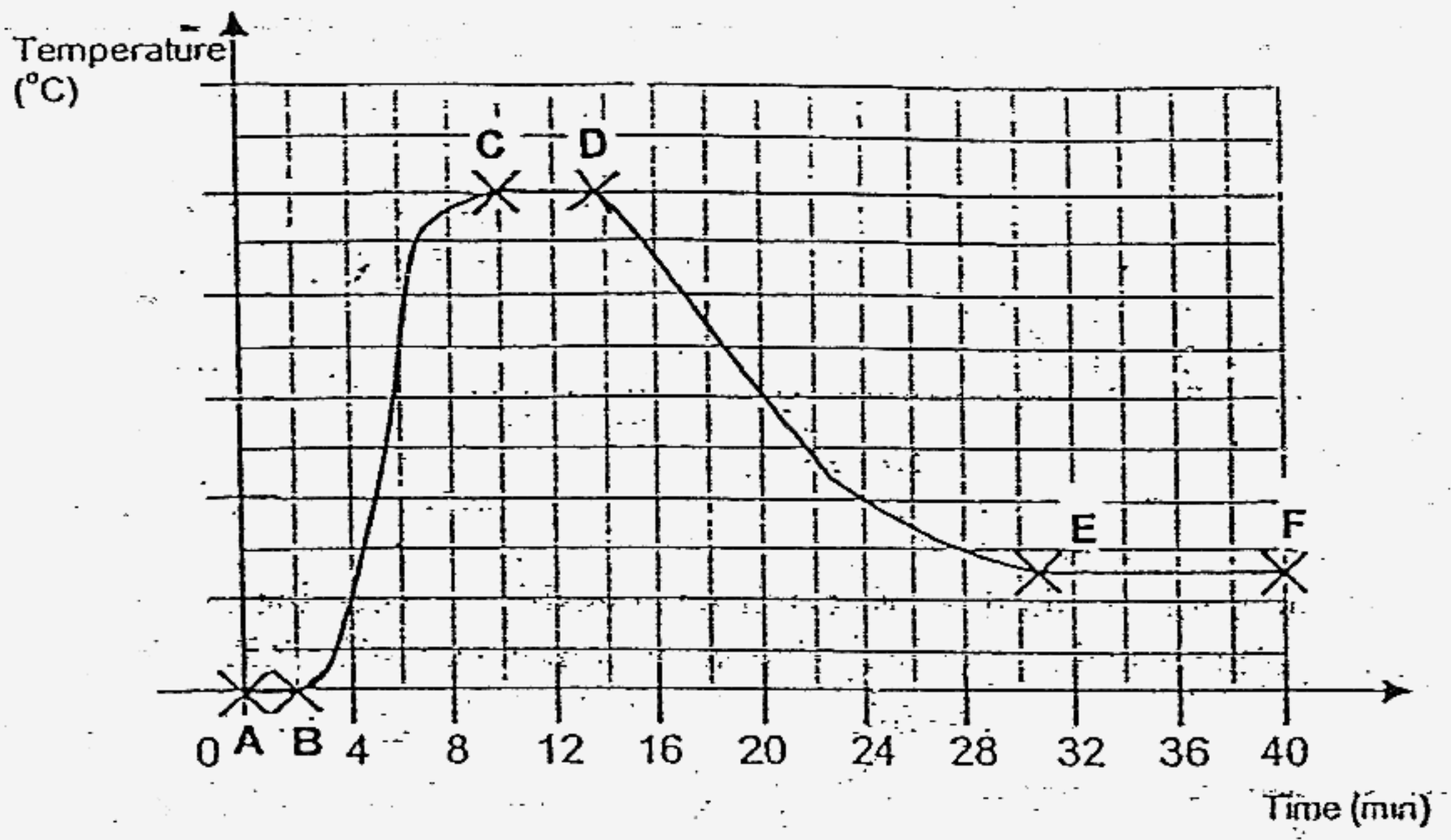
(b) Use the same axes above to plot and label the graph for the other machine not named in (a) above.

[1]

25

41. Richard heated a container of ice cubes until boiling occurs. He turned off the flame and left the contents in the container to cool in the room.

He measured the temperature in the container at 2-minute intervals for 40 minutes and plotted the graph shown below.



(a) Mark **100° C** on the axis of the graph. [½]

(b) Why does the temperature of water remain constant at EF?

_____

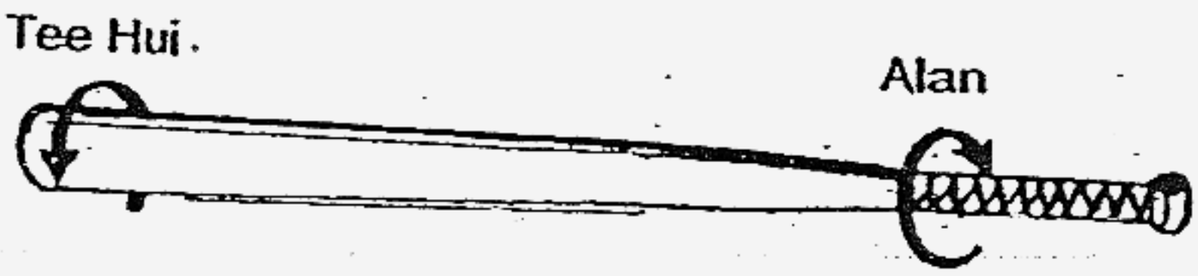
[½]

(c) Determine the heat change at each section of the graph by putting a tick (√) in the appropriate boxes in the table below.

	Heat Lost	Heat gained	Heat is neither lost nor gained
AB			
BC			
DE			
EF			

[2]

42. Tee Hui and Alan applied equal amount of force to twist the bat in the direction shown.



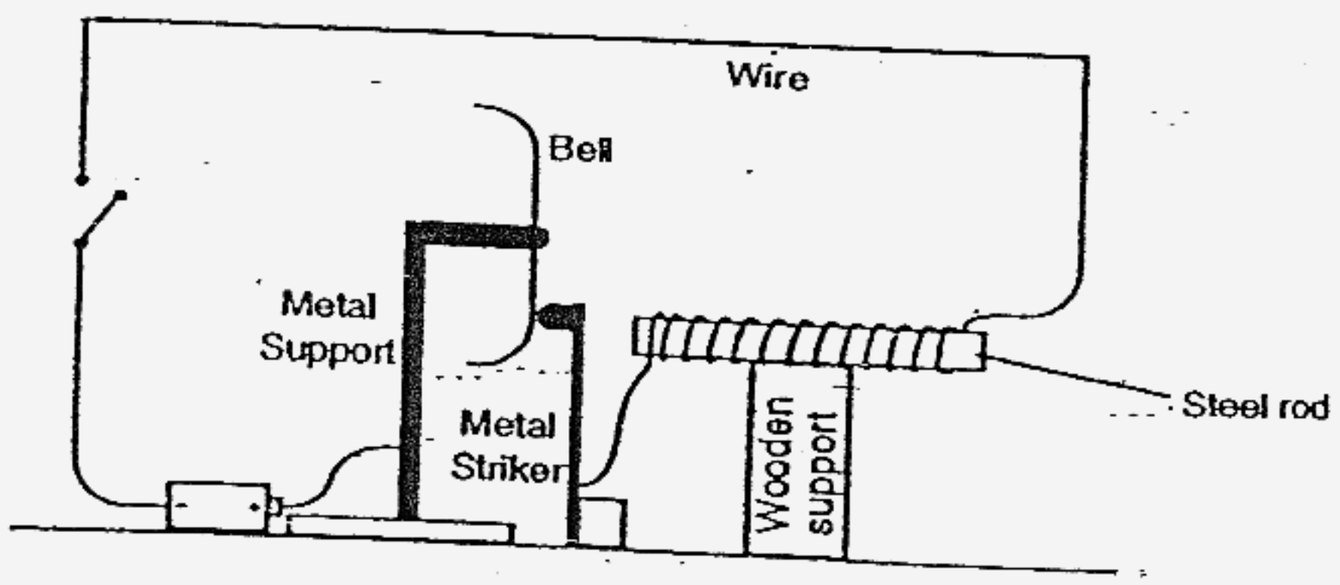
(a) Who is likely to make the bat turn more?

[½]

(b) Explain your answer in (a) above.

[1]

43. Study the set-up carefully.



(a) Explain why the metal striker is pulled towards the steel rod when the switch is closed.

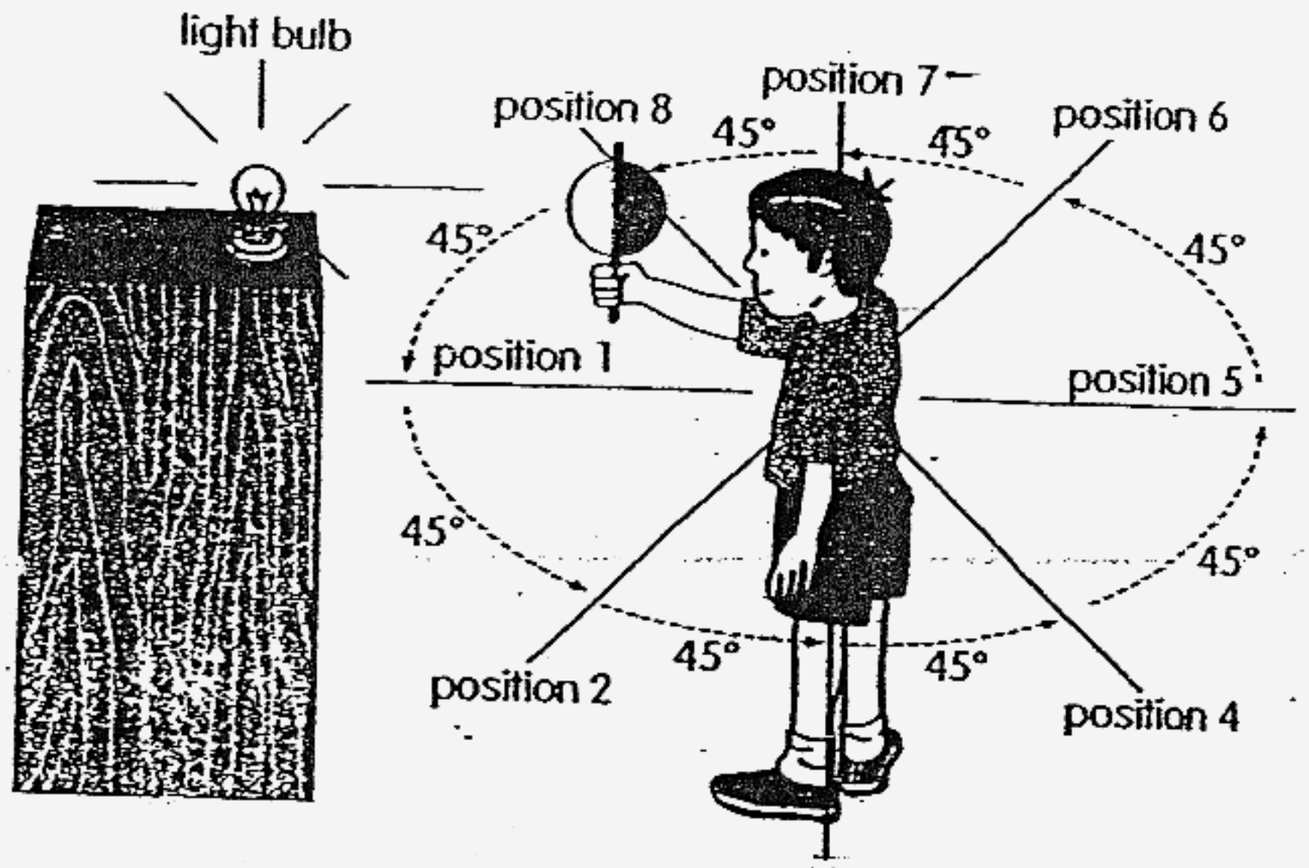
[1]

(b) Trace the energy change that should occur for the bell to ring.

energy → energy → energy → Sound energy (Bell rings)

[1]

44.



The diagram above shows an experiment that Ryan carried out in a dark room to simulate the phases of the moon. He used a light bulb to represent the Sun and a styrofoam ball mounted on a stick to represent the Moon.

At Position 1, he observed the half of the ball that is facing him. Then he turned to Position 2. Again he observed the half of the ball that is facing him. He repeated his observation as he moved to each position.

(a) Complete the table below to show the **lighted part** of the ball in each position. The lighted part of the ball in Position 2 has been drawn for you. Your drawing must be of proportionate size as in the given example. [1]

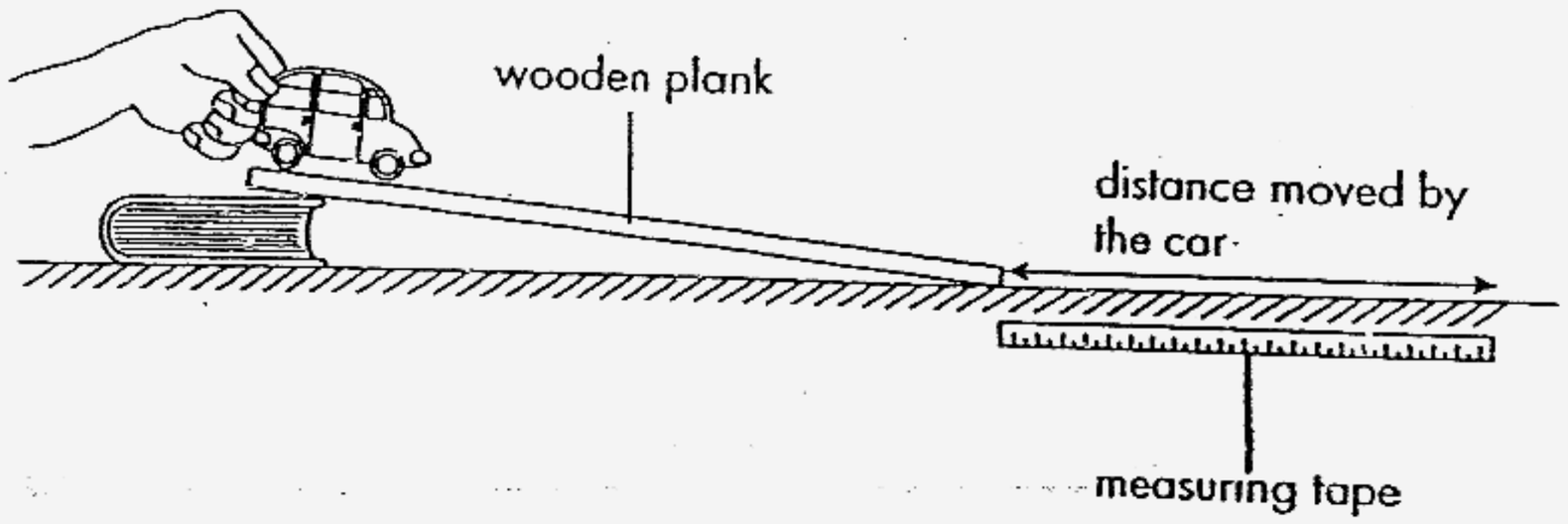
Position	Draw the lighted part of the ball
2	
5	
7	

(b) Which position represents the phase when the Moon cannot be seen on Earth?

_____

[½]

45.



Mathew set up the experiment above to find out if(the height of the ramp affects the distance a toy car moved along the ground.)

He used the same toy car and released it in the same way from a fixed starting point on the ramp. He recorded the distance moved by the toy car along the ground using a measuring tape in the table below.

Height of ramp (cm)	Distance moved by toy car along the ground (cm)			
	1st try	2nd try	3rd try	Average
10	34	33	38	35
15	48	52	53	51
25	89	84	88	87

(a) Why did Mathew take 3 readings for each height?

_____

_____

[½]

(b) Keith said that Mathew did not conduct a <u>fair test</u>?

(i) What is meant by a <u>fair test</u>?

_____

_____

[1]

(ii) Was Keith correct? Give a reason for your answer.

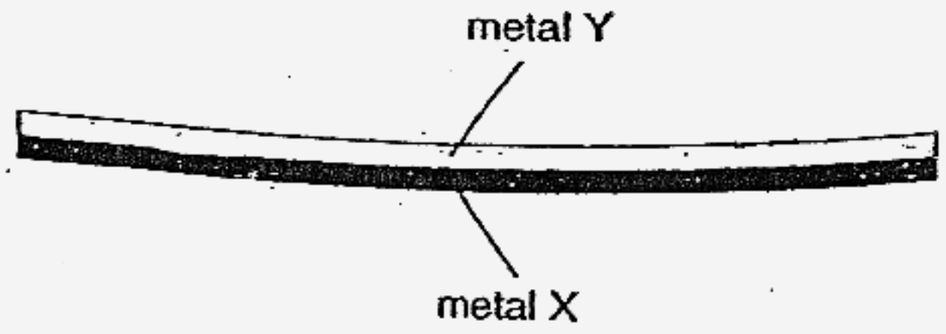
_____

_____

_____

[½, ½]

46. Dun Jie joined 2 metal strips of the same size together to form a bar. He heated the metal bar for 2 minutes. He observed that it bent as shown below.



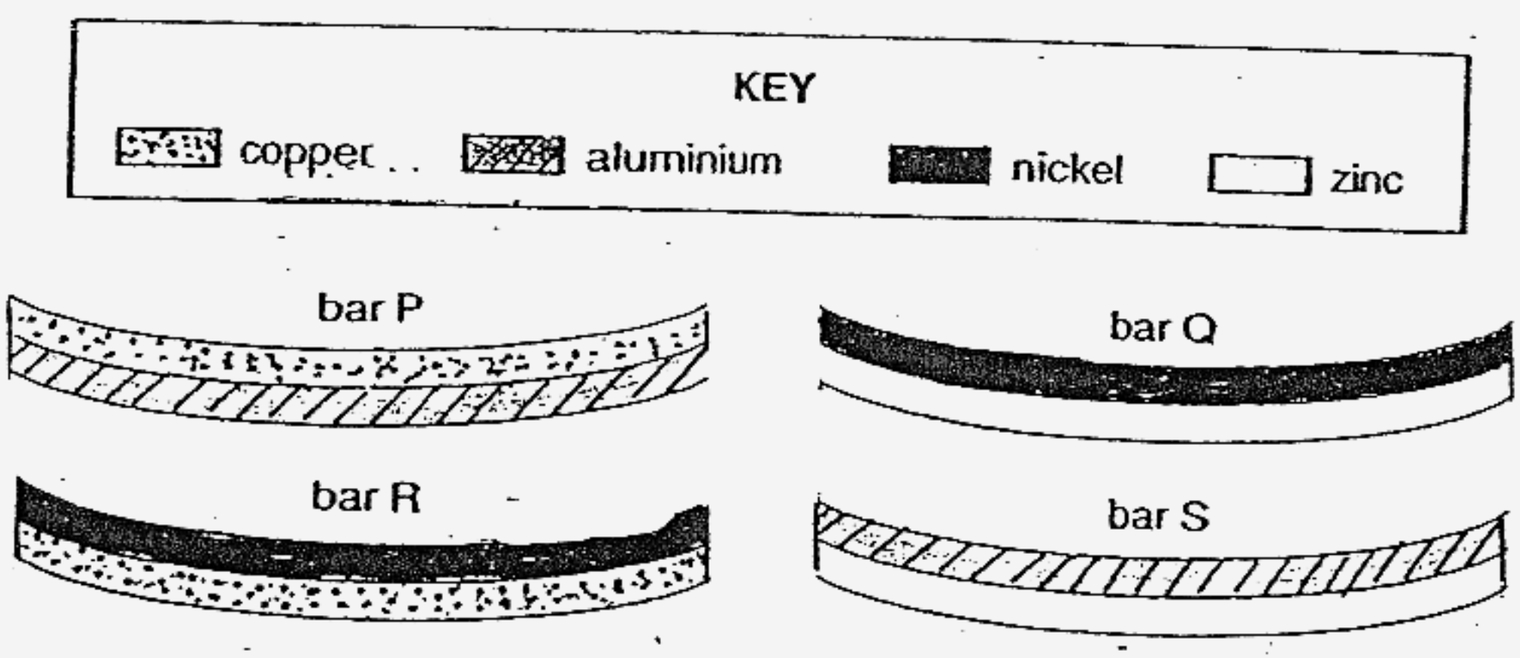
(a) Which metal strip, X or Y, expanded more? Explain your answer.

[½, ½]

(b) What conclusion can Dun Jie make about the expansion of metals when heated?

[1]

Next Dun Jie heated 4 of the metal bars below for 2 minutes each. His results are shown below.



(c) Arrange the metals in order, starting from the metal that expands the **least** to the metal that expands the **most** when heated.

[1]

END OF PAPER

1)2 2)2 3)3 4)3 5)4 6)3

7)3 8)2 9)1 10)3 11)3 12)1

13)2 14)1 15)3 16)2 17)2 18)2

19)2 20)3 21)4 22)3 23)1 24)1

25)1 26)4 27)3 28)1 29)4 30)2

31)a. cannot make their own food.

31)b.i.Reproduce from spores ii.eg.fern

31)c.iReproduce from eggs ii.eg.frog

31)d.i.Reproduce by budding ii.eg.yeast.

32)a.i.The carnivores will die as they do not have any food to eat, when the herbivore are killed.

32)a.ii.The carnivores may eat each other or turn to eat other sources of food in an attempt to survive as they do not have any food left to eat when the herbivore are killed.

32)b.There are likely to be more grasshoppers. The grasshoppers are the prey of the lizards and if there are more lizards than grasshoppers, the grasshoppers will extinct as they will be eaten up by the lizards quickly.

33)a.Tube B. As Tube B only had plants in the tube and was left in the sunlight, the plant photosynthesize to take in carbon dioxide and give out oxygen, while the other living things in the other tubes respirate and give out carbon dioxide, so Tube B had the least amount of carbon dioxide.

33)b.Tube C. Tube C had two living organisms inside that ewere respiring to take in oxygen and give out carbon dioxide while the other test tubes had only one living organism. As both organisms were giving out carbon dioxide, the carbon dioxide in the test-tube will be higher than the rest.

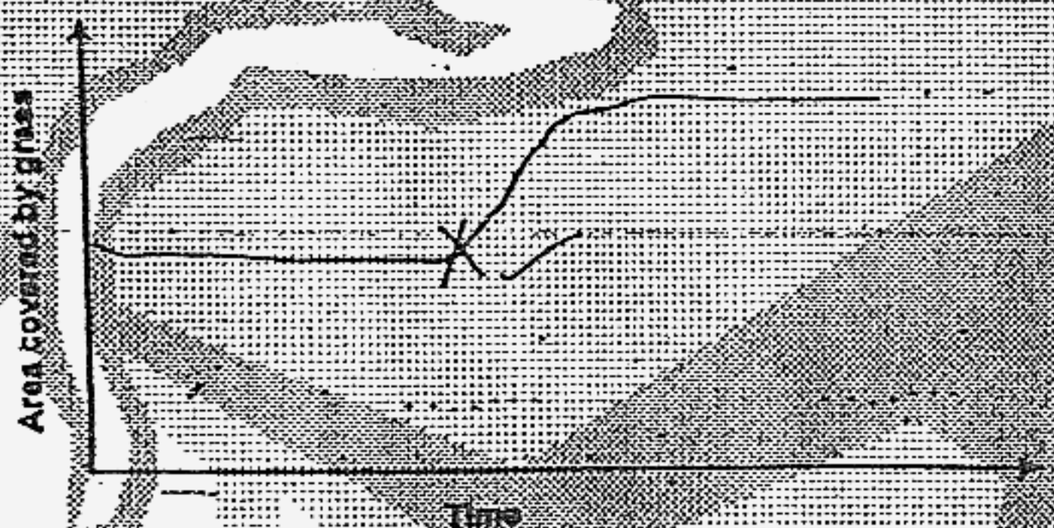
33)c.i.Tube with water only (In sunlight)

33)cii.Tube with water only (in dark)

34)a.Flask A 34)b.It started to decompose and heat is produced.

34)cInvert the flask and put the blub of the thermometer near where the seeds are.

35)



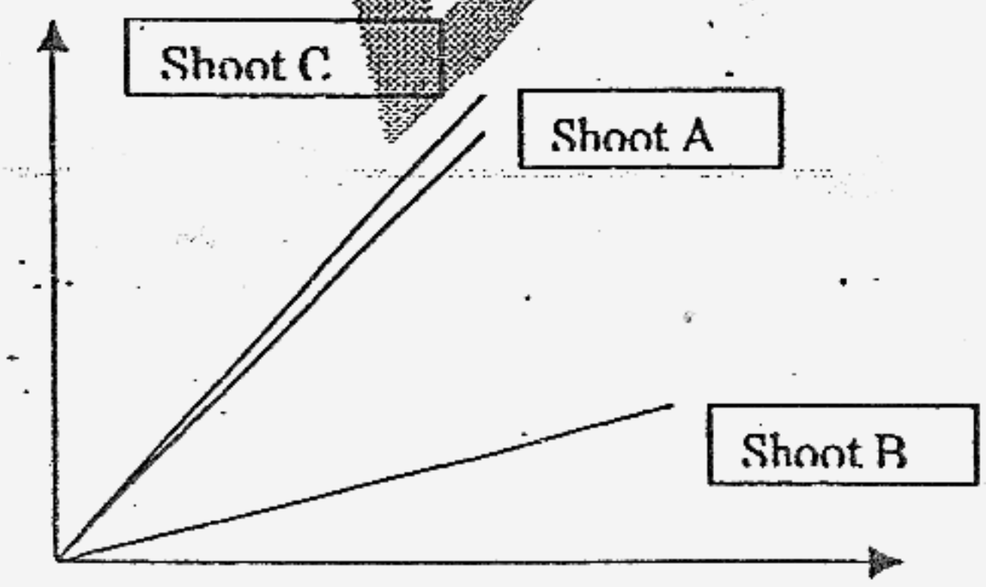
35)b.A predator of the herbivore.

35c)The predator of the herbivore will feed on the herbivore, decreasing its population. This will mean there will be less herbivores to feed on the grass, causing the area covered by grass to increase.

36)a.Fruit A: by animals Fruit B: by Wind Fruit C: By Splitting

36b)Seeds of Fruit B (Reason): The seeds are dispersed in general wind direction with the wind blowing from the left to the right.
Seeds of Fruit C (Reason):The seeds are not dispersed in any general direction but just spread out randomly when the fruit splits.

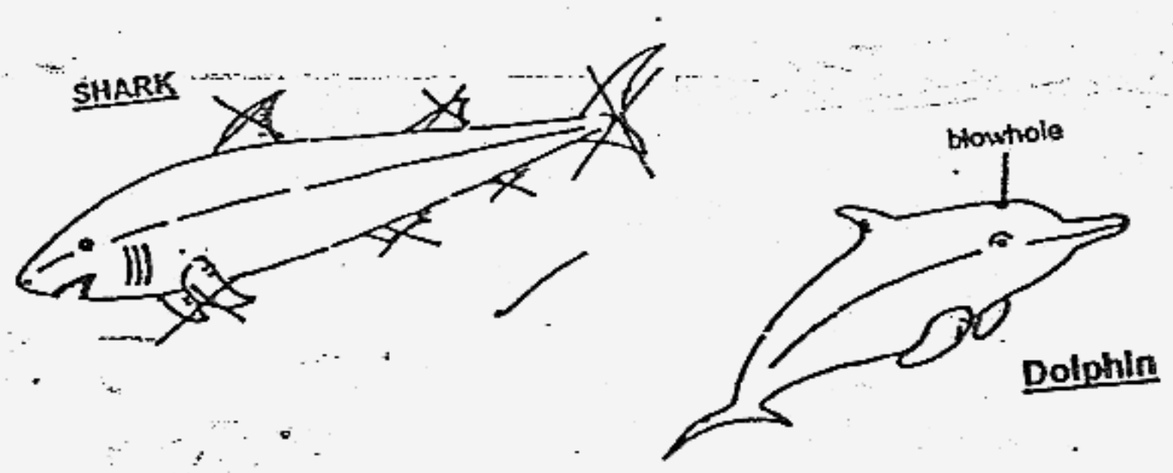
Q37a)



Q37b) The upper leaf surface only contains very little stomata as compared to the underside. Thus, in shoot A where the Vaseline is applied only on the

upper side, the Vaseline only reduced the amount of water loss by a little as compared to the untreated Shoot C.

Q37c) The temperature that shoot D was placed in was much higher than that of the room where shoots A, B and C are placed in. The leaves of shoot D try to cool down rapidly by losing water through the stomata.



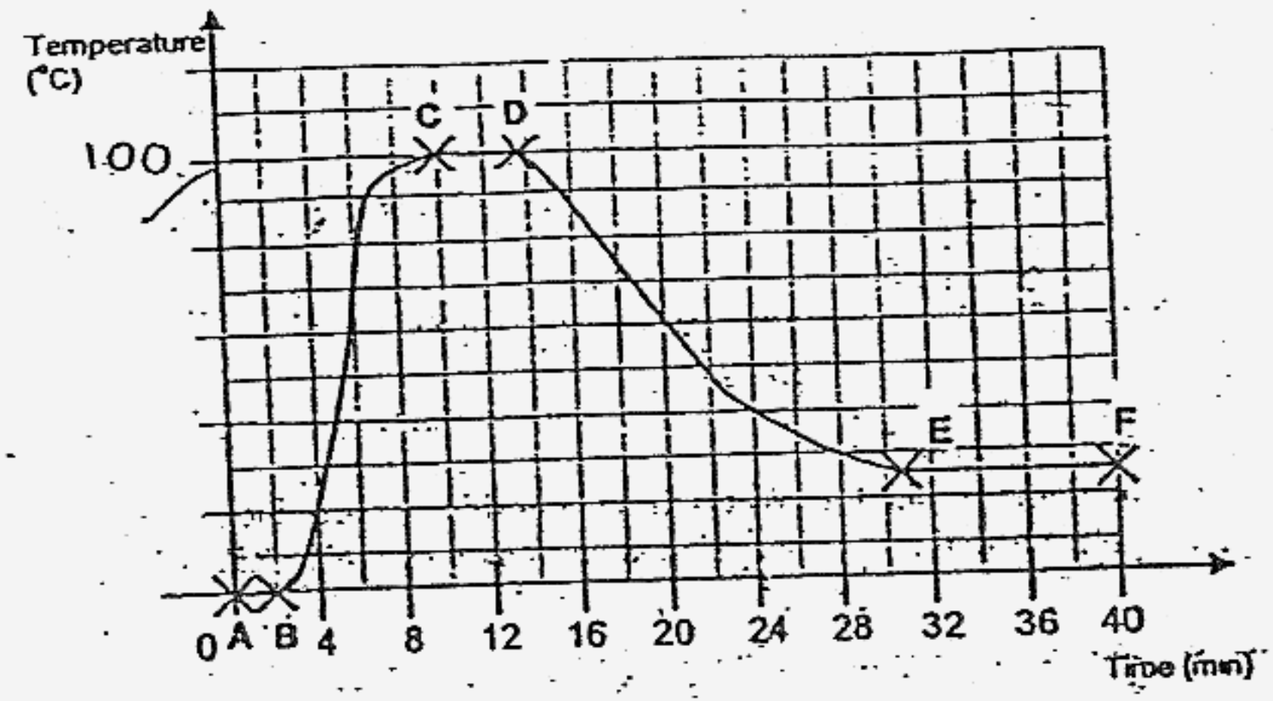
38)It can breath in the atmospheric air without having to surface entirely as the dolphin can just stick the blowhole out of the water.

39a) Her method is not correct as the bulb would have fused immediately when she started the experiment with the maximum number of 5 batteries.

39)b. step 1: connect 1 battery to the circuit
step 2: Observe if the bulb lights up.
step 3: If yes, add one more battery to the circuit.
Step 4: observe again if the bulb lights up.
Step 5: Repeat Steps 3 and 4 until the bulb fuses.

40)a.i. Machine X ii.It changes the direction of the effort.

41)



41)b.The water has cooled down to room temperature.

41)c. AB - Heat gained.
BC-heat gained
DE-heat lost
EF-heat is neither lost nor gained

42)a.Tee Hui

42b) Tee Hui is holding onto the larger side of the bat (wheel of the wheel and axle). As such Tee Hui is able to do more work with less effort as he exerts strength on his side, turning the bat more.

43)a.When the switch is closed, there is electric current in the circuit and the steel rod which is wrapped with wire will be a temporary magnet, so it will attract the metal striker.

43)b.Chemical energy→electrical energy→kinetic energy→sound energy (bell rings)

44a) Position 5:

Position 7:

44b) Position 1

45 a) He wanted to make sure that his results were reliable.

45 b) (i) A fair test would mean that all the variables are kept the same except for the variables that the experiment was testing for.

45 b) (ii) No. Keith had kept only the variable to be tested, the height of the ramp, different. Throughout the experiment, other variables such as the wooden plank, way of release and starting point on the ramp were all kept the same throughout.

46 (a) Metal X. Greater expansion of metal X caused the strip to bend away from metal X, bending towards metal Y.

46(b) Different metals expand at different rates upon heating.

46(c) nickel, copper, aluminium , zinc