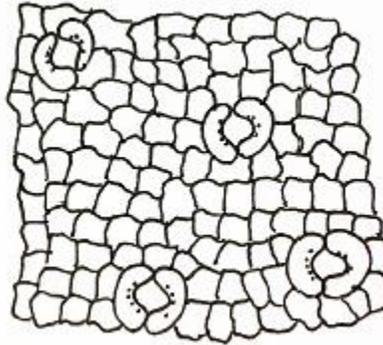


Booklet B

For questions 17 to 28 , write your answers in this booklet. The number of marks available is shown in brackets () at the end of each question or part question. (38 marks)

(M)*

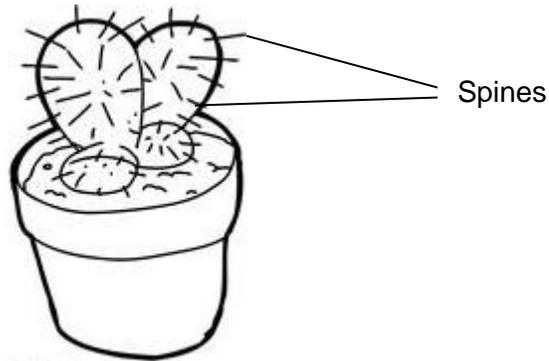
17. Nabila observed a leaf under a microscope.



(a) Label the stomata in the diagram. (1m)

(b) State one function of the stomata. (1m)

(c) Cacti are known to have modified leaves, called spines.



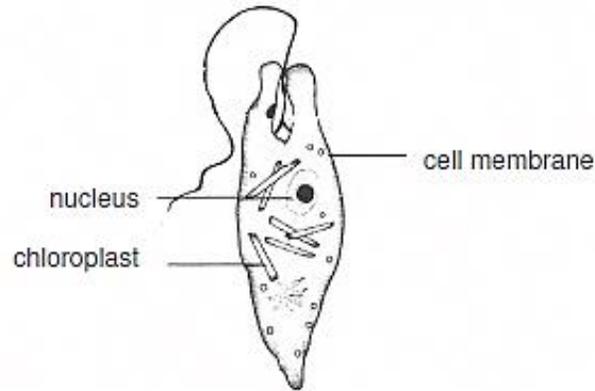
Suggest two ways in which cacti benefit from having spines. (2m)

Benefit 1: _____

Benefit 2: _____

(M)*

18. The diagram below shows a single-celled organism X which lives in freshwater ponds and moves around from one place to another.

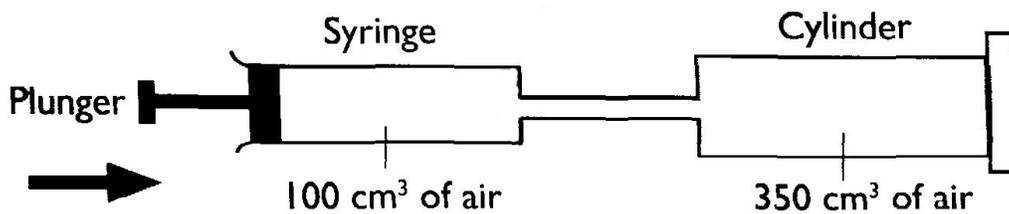


(a) State one function of the nucleus. (1m)

(b) Give two reasons why organism X cannot be considered a plant cell even though it has chloroplasts. (2m)

(S)

19. Study the set-up below carefully.



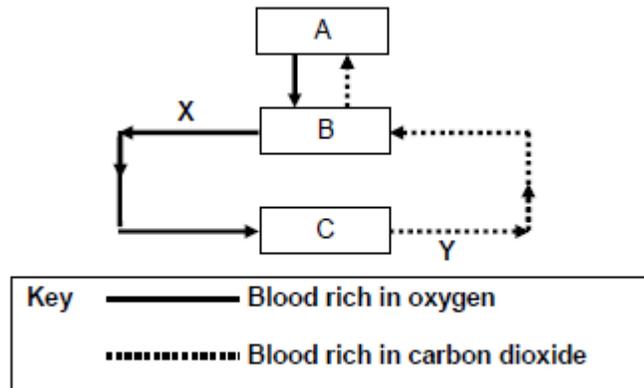
(a) What is the volume of air in the cylinder when the plunger is pushed all the way into the syringe? (1m)

(b) Explain your answer in (a). (1m)

(c) Explain why electricity is not a matter. (1m)

(S)

20. The diagram below shows how blood flows in certain parts of the human body.



(a) Which of the following, A, B or C represents the lungs and which one is the heart? (2m)

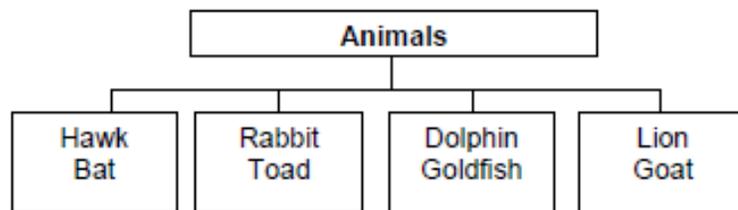
(i) Lungs : _____

(ii) Heart : _____

(b) Why is the amount of oxygen in the blood lower at Y than at X? (1m)

(C)*

21. Study the classification chart below.



(a) How are the above animals grouped? (1m)

- (b) Gary re-grouped the animals as seen in the table below. His friend, Joshua pointed out that one of the animals was in the wrong group.

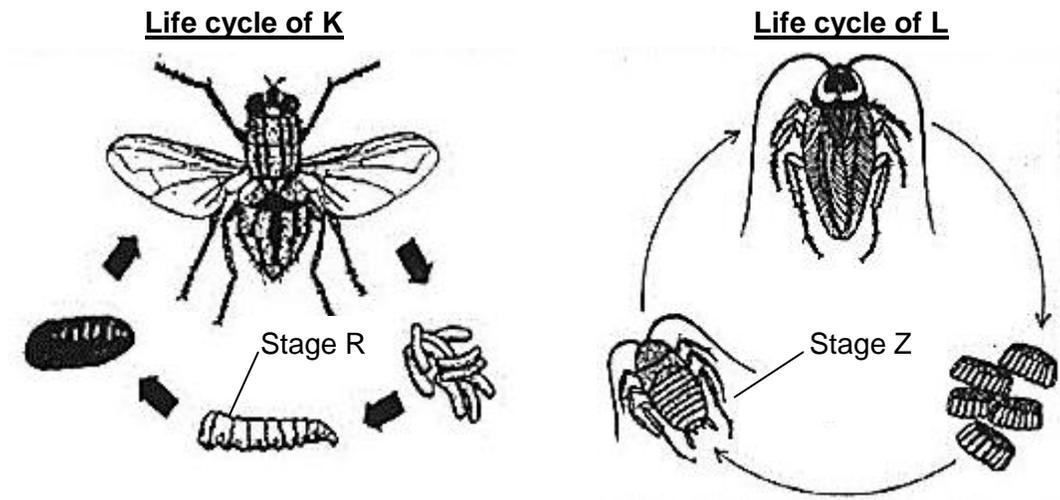
| A | B |
|----------|----------|
| Lion | Goldfish |
| Goat | Toad |
| Rabbit | Hawk |
| Dolphin | Bat |

- (i) Which animal is in the wrong group? (1m)

- (ii) State the reason for it to be in the other group. (1m)

(S)

22. The diagram below shows the life cycles of two different organisms, K and L.



- (a) Based on the above diagram, state how organism K at stage R is different from organism L at stage Z. (1m)

- (b) Based on the above diagram, state one similarity between the young and the adult organism L. (1m)

(S)

23. The Pollutant Standard Index (PSI) values show the quality of the surrounding air. The table below shows the range of PSI values and their indication of the air quality.

| PSI Value | Air Quality |
|------------------|--------------------|
| 1 to 50 | Good |
| 51 to 100 | Moderate |
| 101 to 200 | Unhealthy |
| 201 to 300 | Very unhealthy |
| Above 300 | Dangerous |

The average monthly PSI values in Singapore for 5 months are shown in the table below.

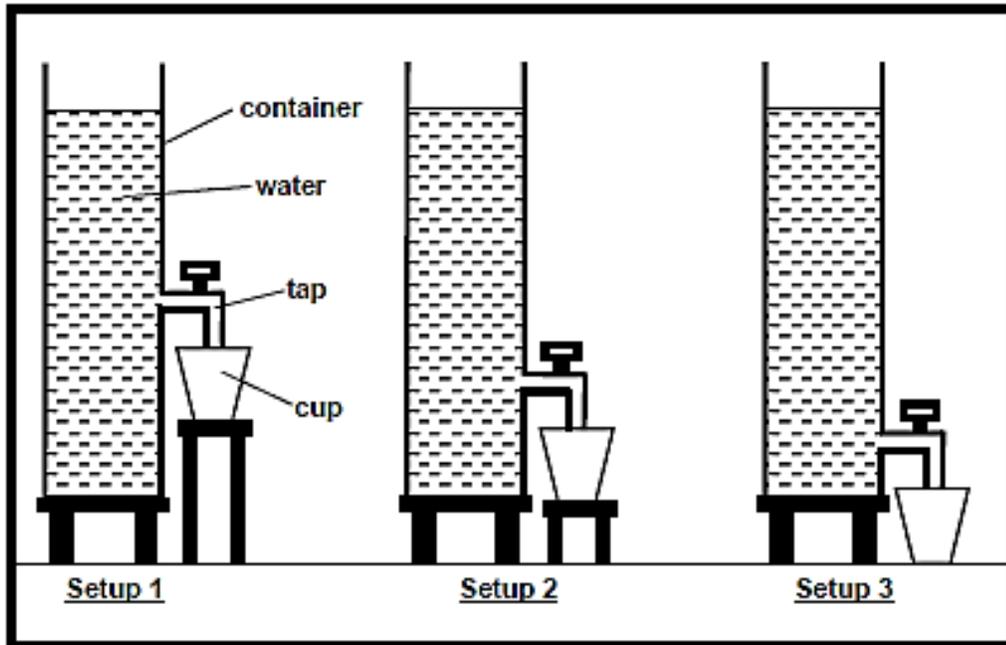
| Month | PSI Value |
|--------------|------------------|
| April | 36 |
| May | 56 |
| June | 37 |
| July | 108 |
| August | 42 |

(a) There were forest fires in a neighbouring country in one of the months. Based on the PSI values recorded, which month could that most likely be? Give a reason for your answer. (2m)

(b) Besides air pollution, state one other negative impact forest fires bring to the environment. (1m)

(C)*

24. John conducted an experiment using the following setup. The tap, cup and amount of water in the container are kept the same. The only difference in the container is the position of the tap.

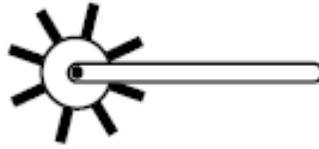


Using a stop-watch, John recorded the time taken for the cup to be filled with water when the tap is turned on fully. He recorded his findings in the table below.

| Setup | Time taken (s) | | | Average |
|-------|---------------------|---------------------|---------------------|---------|
| | 1 st try | 2 nd try | 3 rd try | |
| 1 | 10.9 | 10.8 | 11.0 | 10.9 |
| 2 | 8.2 | 8.1 | 8.0 | 8.1 |
| 3 | 6.5 | 6.3 | 6.4 | 6.4 |

(a) What can he conclude from the experiment? (2m)

Andy borrowed setup 3 from John and replaced the cup with a spinning wheel like the one below.

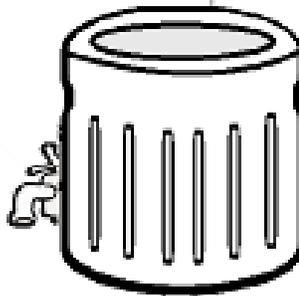


When Andy turned on the tap fully, the water from the tap spun the wheel. He observed that the wheel turned slower and slower until it eventually stopped.

(b) Explain briefly Andy's observation. (2m)

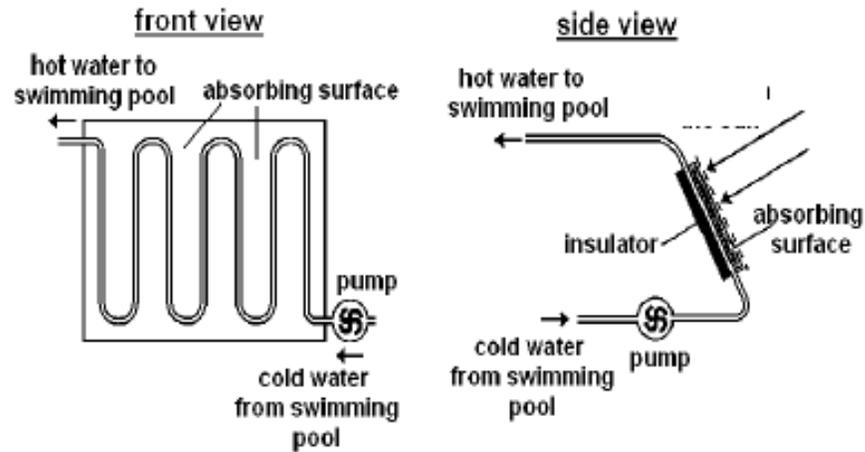
(C)*

25. (a) Maya's mother asked her to prepare some ice to chill the drink in a cooler. She used 300 cm^3 of water to make ice cubes and another 300 cm^3 of water to make ice blocks. Both the ice cubes and ice blocks could fit nicely into the cooler.



Should Maya put ice cubes or ice blocks into the cooler so that the drink would be chilled as quickly as possible? Why? (1m)

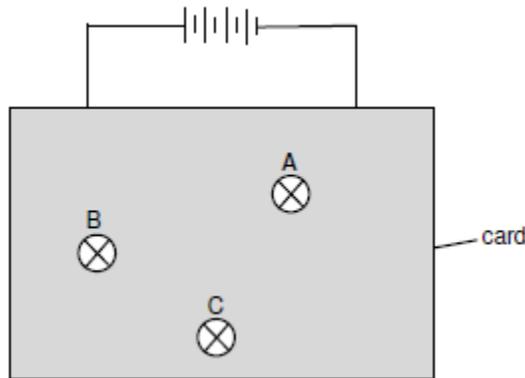
- (b) Joel lives in an apartment. The swimming pool at her house is heated by a solar heater. Two views of the solar heater are shown in the diagram below.



- (i) What form of energy reaches the absorbing surface of the solar heater on a sunny day? (1m)
-
- (ii) The colour black is usually painted on the absorbing surface of the solar heater? Give a reason for your answer. (1m)
-
-
- (iii) She observed that the water pipe that passed through the solar heater was bent into the shape as shown in the front view above. Give the reason why it was bent.(1m)
-
-

(C)*

26. Sam built a circuit with three identical bulbs and four batteries. He covered the wires connecting the bulbs with a piece of card as shown below. The bulbs could be seen through the holes of the card.

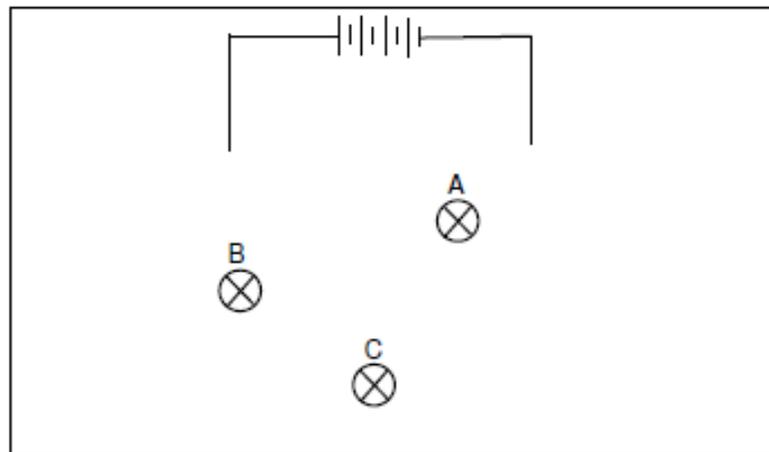


All the bulbs were lit but their brightness was different.

Sam removed bulbs A, B and C one at a time. Before connecting each bulb back into the circuit, he observed and recorded the effect on the other two bulbs.

| Bulb removed | Observations |
|--------------|-----------------------------------|
| A | B and C remained lit |
| B | C became unlit and A remained lit |
| C | B became unlit and A remained lit |

(a) Complete the circuit diagram below to show how the three bulbs were connected. (2m)



(b) Sam added a switch to the circuit so that he could turn on and off all the three bulbs at the same time. Write letter "S" in the circuit diagram above to indicate where this switch should be placed. (1m)

(S)*

27. The table below shows the boiling point of the substances, P, Q and R.

| Substance | Boiling Point (°C) |
|-----------|----------------------|
| P | 105 |
| Q | 130 |
| R | 220 |

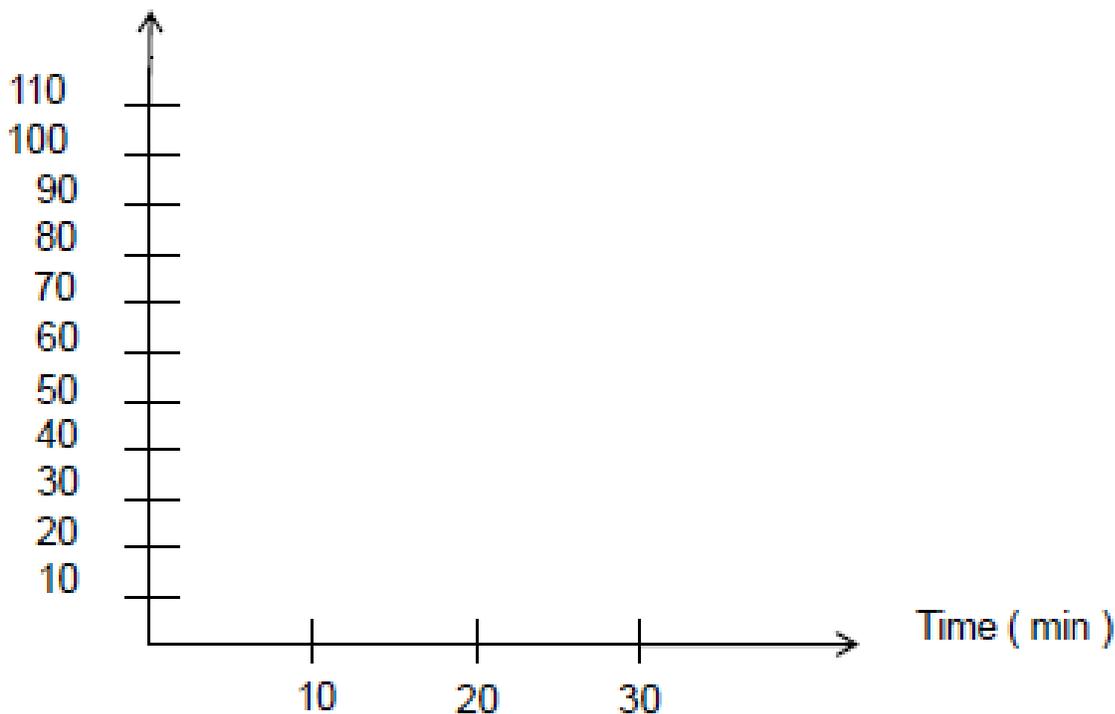
Answer the following questions based on the information given above.

(a) What is the state of substance Q at 105°C? (1m)

(b) Which of the substance(s) can exist in a gaseous state at 220°C? (1m)

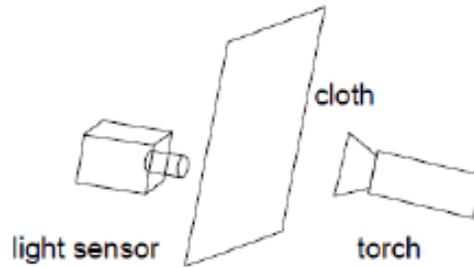
(c) Substance P has a freezing point of 5°C. Sam heated substance P in its solid state for 20 minutes until it started to boil. She continued boiling it for a further 10 minutes. Draw a line graph below to show the changes in substance P over 30 minutes. (1m)

Temperature (° C)



(S)*

28. Sandy wanted to make a curtain for her living room which would allow minimal sunlight from entering. She set up the following experiment to test out the cloth samples for the curtain.



The cloth samples were of the same size and the experiment was conducted in a dark room.

The table below shows the results of her experiment.

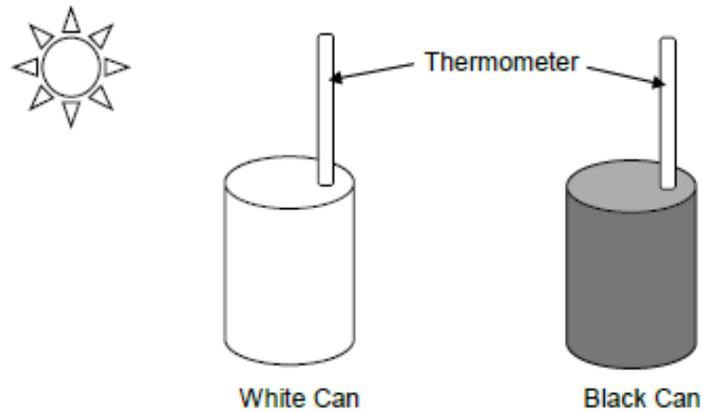
| Cloth sample | Light intensity (lux) |
|--------------|-----------------------|
| Sample 1 | 123 |
| Sample 2 | 10 |
| Sample 3 | 69 |

- (a) Besides the size of the cloth and darkness of the room, state two other variables that she should keep constant. (1m)

- (b) Which cloth sample should she use to make the curtain? Give a reason for your answer. (1m)

After choosing the type of cloths based on the results of her experiment, Sandy wanted to choose the colour of the cloth for her curtain.

She conducted another experiment with two cans, one black and one white.



The temperature of the air in each can is as shown in the table below:

| Can | Temperature of the air in the can ($^{\circ}\text{C}$) |
|----------------|--|
| White-coloured | 31 |
| Black-coloured | 35 |

(c) Based on the results, should Sandy choose a light or dark colour for her curtain in order to keep the living room cool? Explain your answer. (1m)
