



BOARD OF STUDIES
NEW SOUTH WALES

**SCHOOL
CERTIFICATE
EXTERNAL
TEST**

SPECIMEN

**SCIENCE
SECTION 1**

**QUESTION
BOOKLET**

Directions to students

- 1 You should allow about 45 minutes to answer Section 1.
- 2 Section 1: Questions 1–25 (25 marks)
- 3 Attempt **ALL** questions in Section 1.
- 4 Calculators may be used in Section 1.
- 5 Write your answers to Section 1 on the separate Answer Sheet.

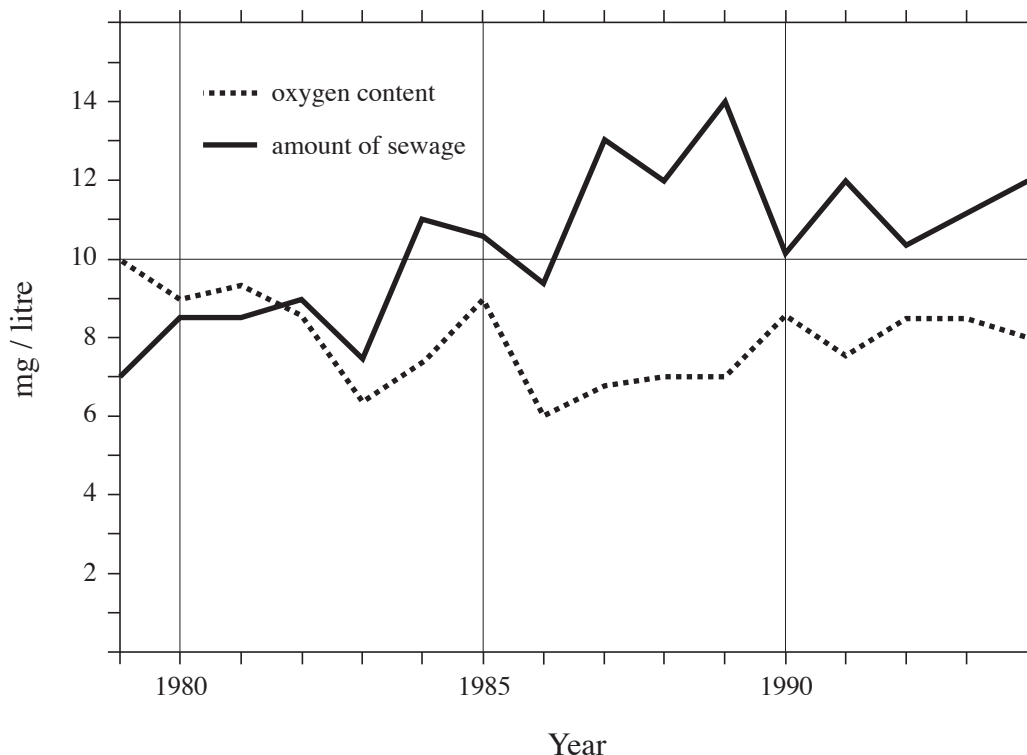
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1. The photograph below shows a large group of stars.



The photograph shows

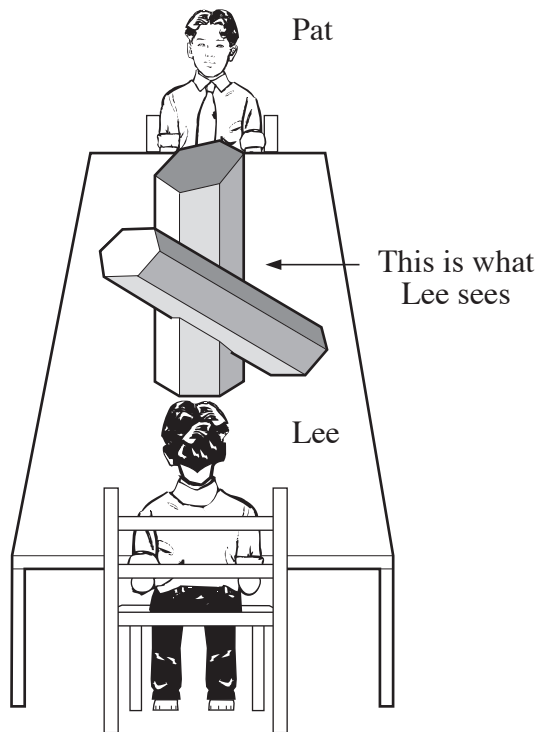
- (A) a galaxy. (B) the solar system.
 (C) a constellation. (D) the rings of Saturn.
2. This graph shows the dissolved oxygen content and the amount of sewage present in a river over time.



From a study of this graph it is most reasonable to say that, in this river

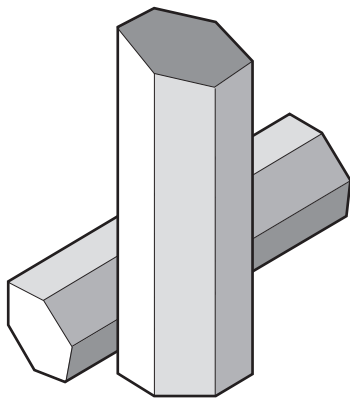
- (A) the decomposing sewage uses up dissolved oxygen in the river water.
 (B) there could be a relationship between the dissolved oxygen and the amount of sewage present.
 (C) in the year in which the amount of sewage was greatest (1989), the oxygen level was least.
 (D) the release of sewage into the river commenced in 1981.

4. Two students are looking at a large crystal from opposite ends of a table.

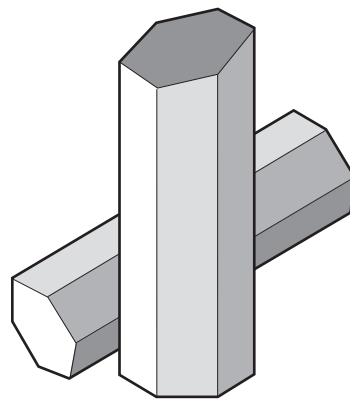


Which view of the crystal does Pat see?

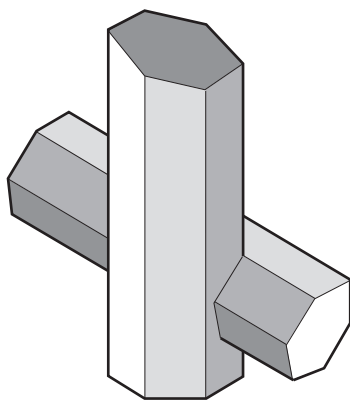
(A)



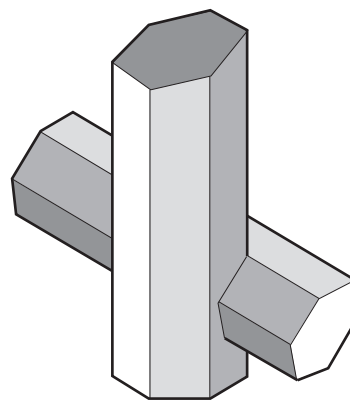
(B)



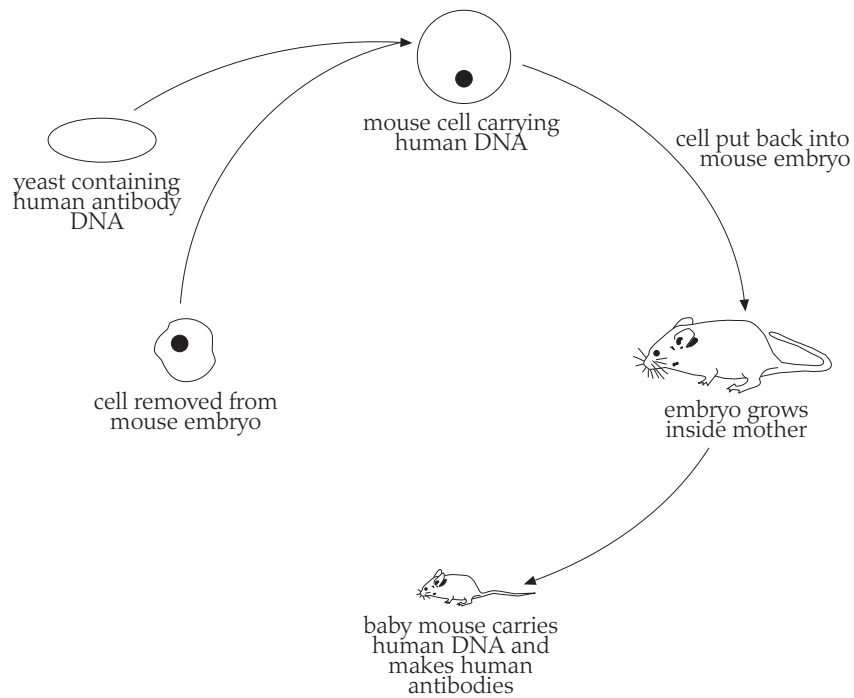
(C)



(D)



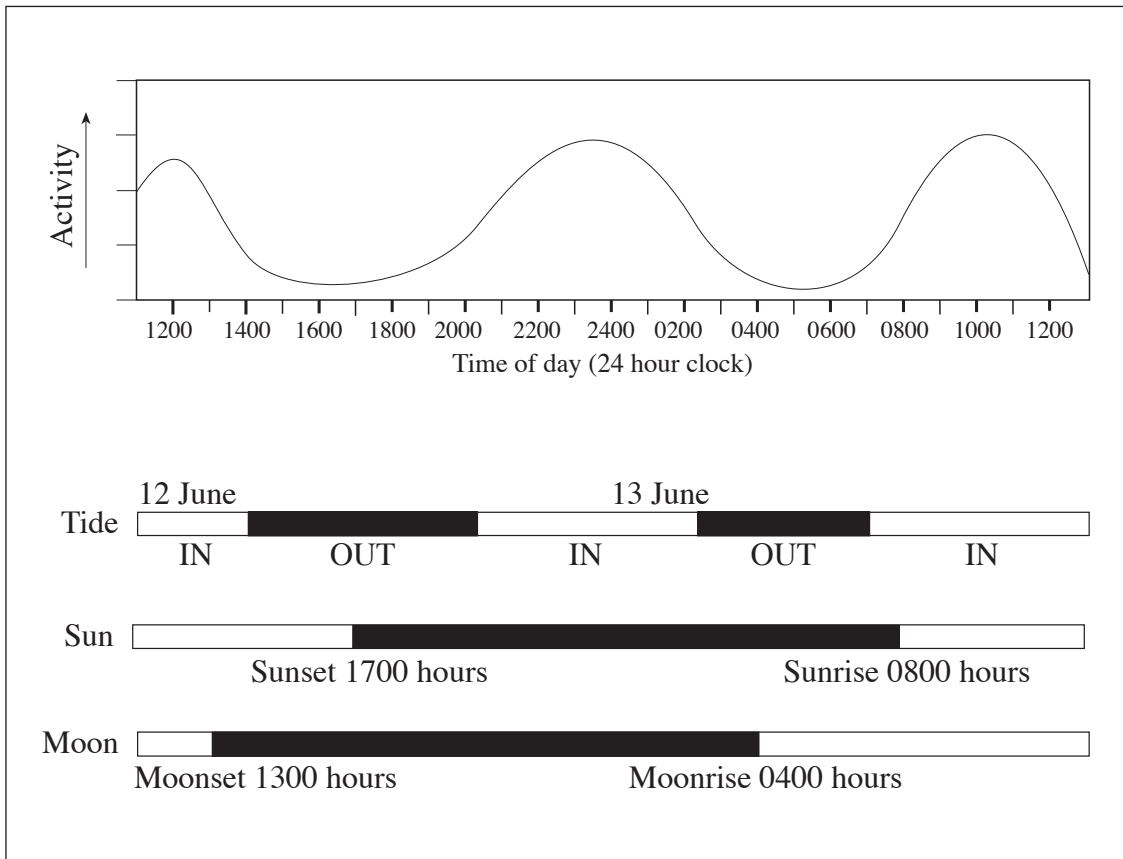
5. The diagram shows the sequence of events in an experiment.



The purpose of the experiment was to show that

- (A) mice can make human antibodies.
- (B) mice do not die if given human antibodies.
- (C) yeast cells contain human antibody DNA.
- (D) human DNA can make human antibodies.

6. The chart shows the activity of fish in Bass Strait over 24 hours.



The activity of fish is most affected by the

- (A) time of the day.
- (B) presence of sunlight.
- (C) movement of tides.
- (D) presence of moonlight.

7. The following symbols are used in electric circuit diagrams.

KEY

———— Connecting wire

—|—|— Power source

⊙ Light globe

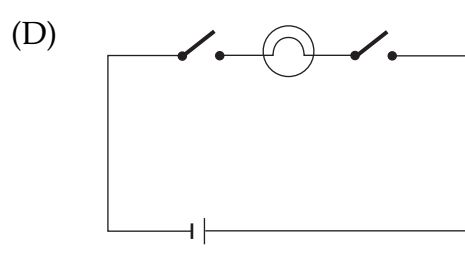
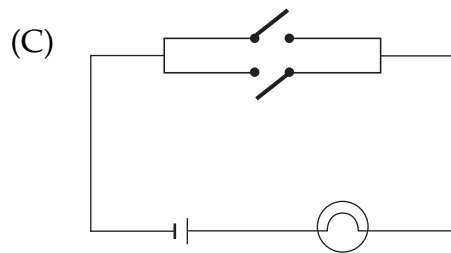
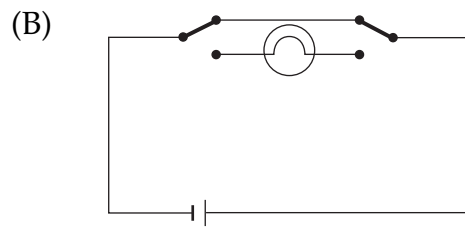
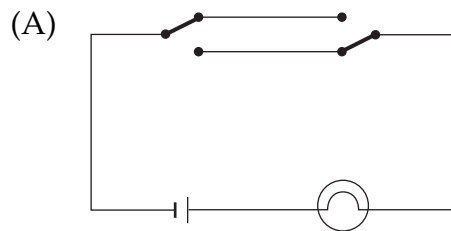
— / — • — Switch (open)

— • — • — Switch (closed)

— / — • — Two-way switch

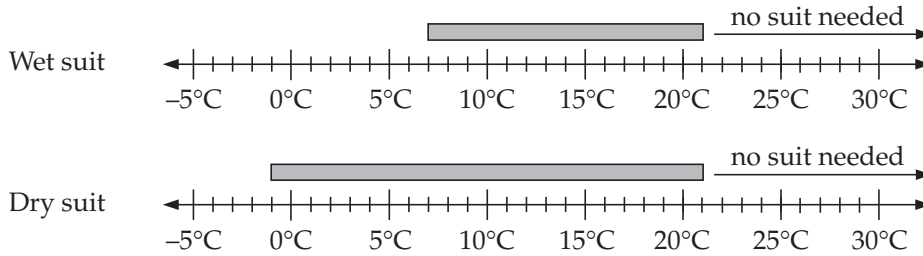
In a car, there is an electric circuit for the inside cabin light. The inside cabin light will turn on when either one or both of the front doors is opened.

Which of the following circuit diagrams shows an electrical circuit that will allow this to happen?



Use the following information to answer Questions 8 and 9.

Divers can wear either a wet suit or a dry suit to keep warm in water. Dry suits trap a thin layer of air next to the body of the diver. Wet suits trap a thin layer of water next to the body.



KEY

Recommended temperature range

8. Which alternative shows the appropriate suit to be worn for the following temperature ranges?

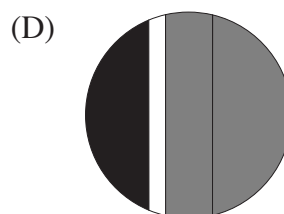
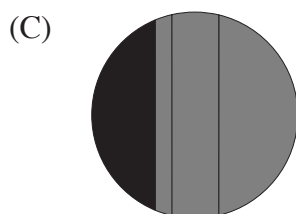
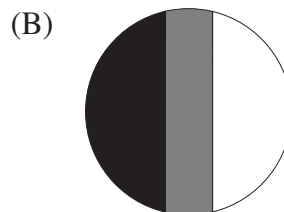
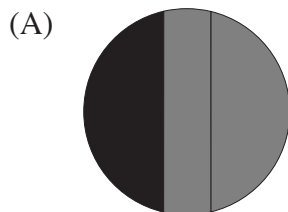
TEMPERATURE RANGES

	-1°C to 4°C	5°C to 10°C	19°C to 24°C	23°C to 28°C
(A)	dry	dry	wet or dry	no suit needed
(B)	dry	dry	wet or dry	wet or dry
(C)	dry	wet or dry	no suit needed	no suit needed
(D)	wet	wet or dry	wet or dry	no suit needed

9. Which of the following diagrams shows how a dry suit works?

KEY

suit
 body
 water
 air



Use the following information to answer Questions 10 and 11.

A group of students built a bird table in their school playground. They collected the following data by counting the birds that fed from the bird table.

TIME OF DAY	Fantails	Blackbirds	Magpies	Honeyeaters	Finches	Others
Before school						
Recess						
Lunchtime						
After school						

10. Which question do you think the above data answers?
- (A) Do any types of birds eat only certain types of food?
 - (B) Do the same birds visit the bird table every day?
 - (C) Do any types of birds feed only at certain times of the day?
 - (D) Do the same birds feed as much when it is raining?
11. The students also wanted to find out whether birds prefer to eat with other birds of the same type.

Which of the following would best provide them with an answer?

- (A) Put another five bird tables around the playground.
- (B) Move their bird table to a different part of the playground.
- (C) Take their bird table to the playground of another school.
- (D) Observe the birds visiting the bird table after school.

Use the following information to answer Questions 12 and 13.

Whales are the largest marine mammals on Earth. Many species were hunted almost to extinction for their blubber. After commercial whaling was outlawed by international agreement, scientists continued to make careful observations of whale behaviour. They have been particularly interested in whale communication, group behaviour and growth rates.

The table below shows some information collected about whales over many years.

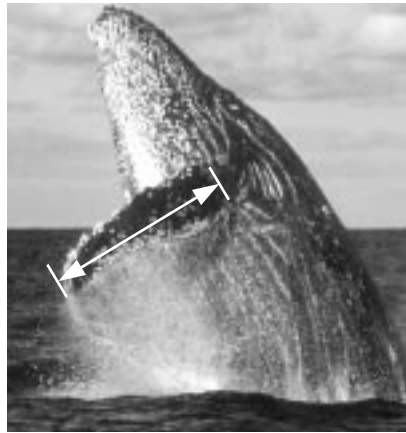
<i>Type of whale</i>	<i>Do they live in groups or by themselves?</i>	<i>Average length of adult</i>	<i>Shape</i>	<i>Breaching* rate</i>
Blue	by themselves	45 m	thin	rare
Finback	by themselves	30 m	thin	rare
Grey	groups	15 m	round	often
Humpback	groups	15 m	round	often
Right	groups	17 m	round	often
Sei	by themselves	18 m	thin	rare
Sperm	groups	30 m	round	often

* *Breaching* means breaking the surface of the water.

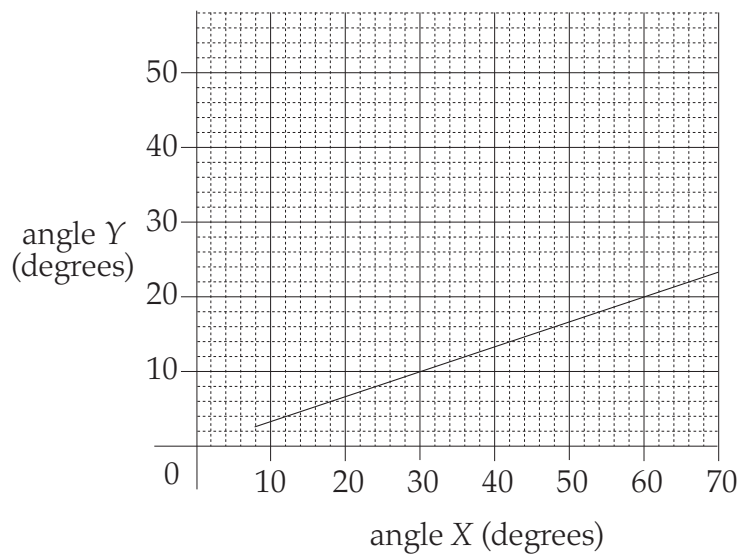
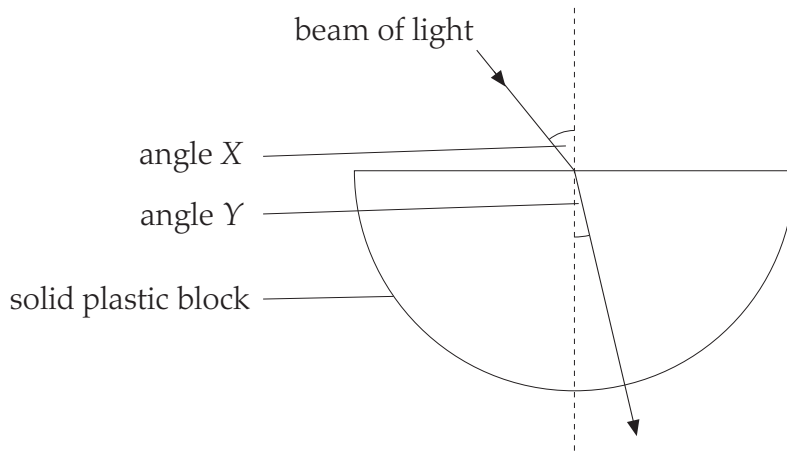
12. Which observation best supports the hypothesis that whales breach to communicate with each other?
- (A) Thin whales breach less often than round whales.
 (B) Whales that breach the most live in groups.
 (C) Long whales breach less often than shorter whales.
 (D) Breaching whales make a loud clap as their bodies re-enter the water.
13. Which of the following hypotheses is also supported by the observations?
- (A) Round whales need more air than thin whales.
 (B) Whales breach so that they can dive more deeply.
 (C) Whales breach to keep their backbone flexible.
 (D) Long whales breach more often than short whales.

14. This photograph of a whale has been reproduced at a scale of 1:200.

How long is the flipper of this whale?



15. The information below shows what happens to a beam of light when it goes into a solid plastic block.

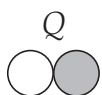


Complete the diagram on the Answer Sheet to show the path of the beam of light through the plastic block.

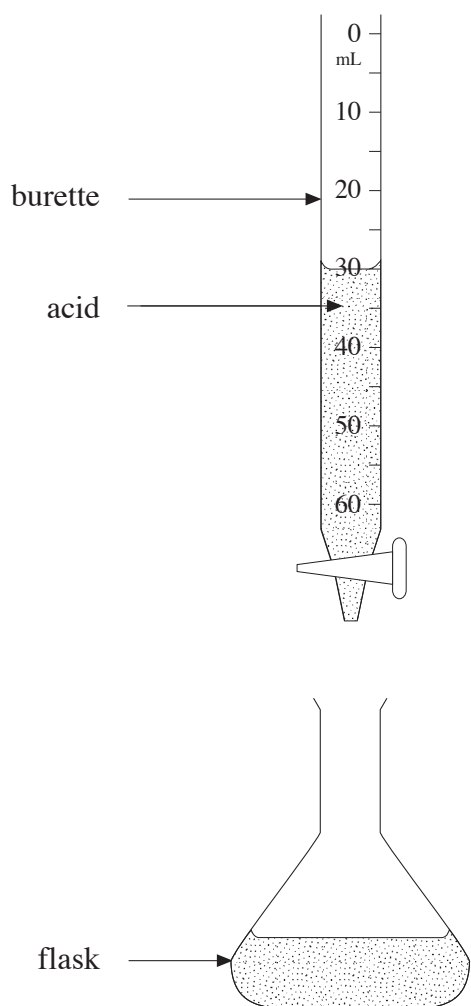
16. Atoms can be represented by symbols like these:



Which TWO of the following, *P*, *Q*, *R* and *S* represent compounds?



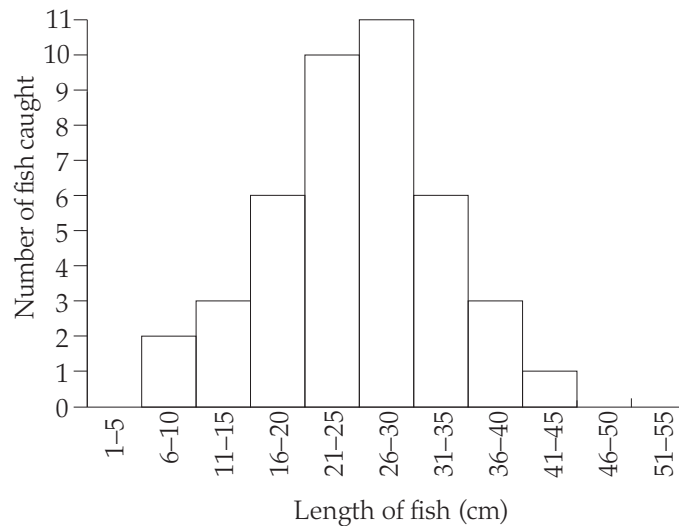
17. 25 mL of acid was added to the flask from the burette.



At the beginning

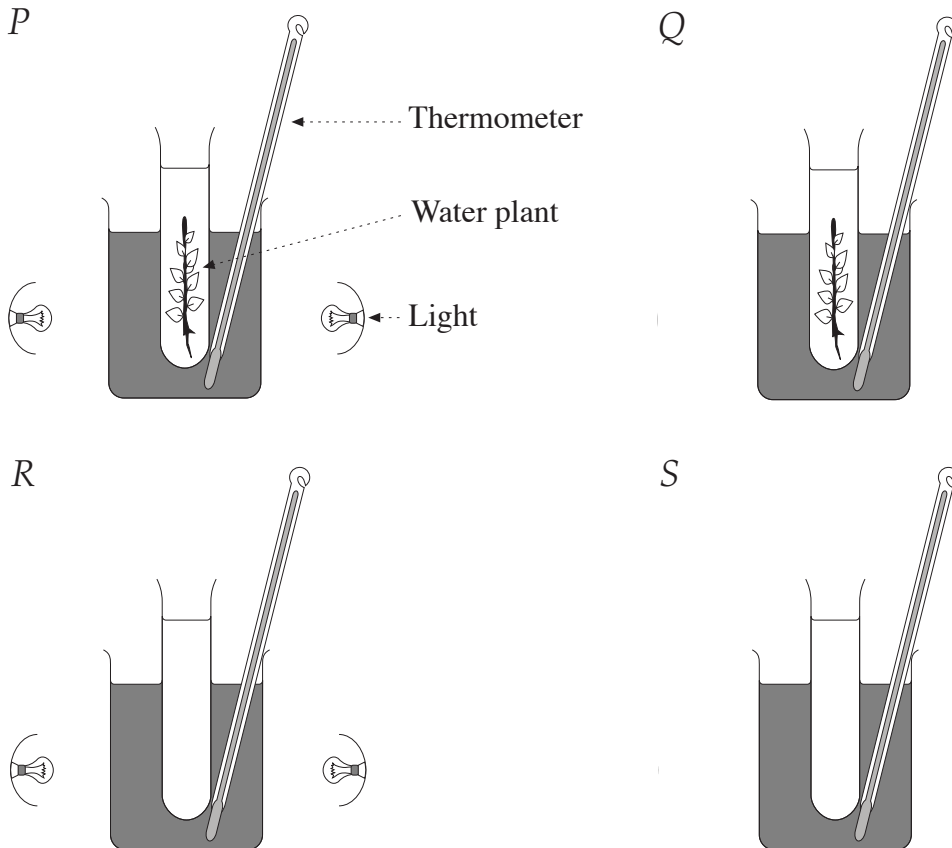
Shade the burette on the Answer Sheet to show the amount of acid left at the end.

18. Fish caught in a net were sorted into different groups based on length.



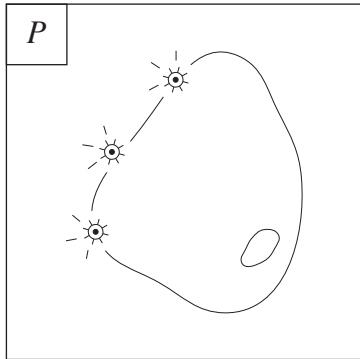
How many fish were between 11 and 25 centimetres in length?

19. Some students wanted to test the effect of light on oxygen production by water plants. Which TWO of the following, *P*, *Q*, *R* and *S* should be set up?

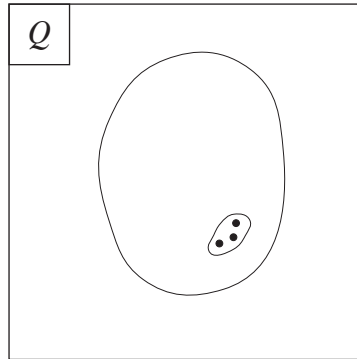


20. The virus known as HIV causes AIDS. The virus lives and reproduces in the human body. It destroys the white blood cells.

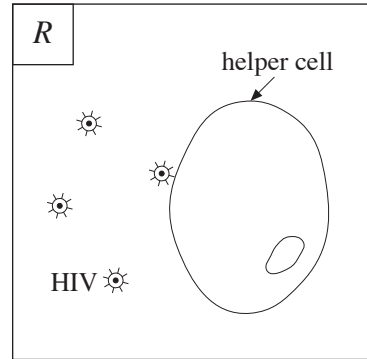
The following diagrams are NOT in the correct order.



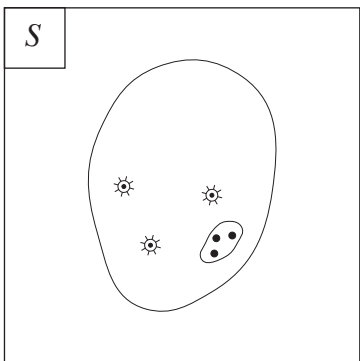
The new HIVs break out of the helper cell.



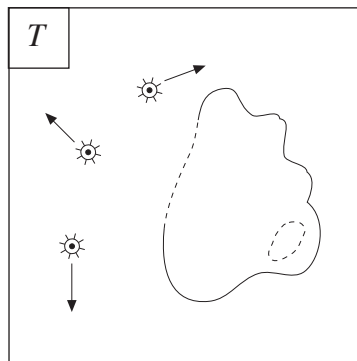
HIVs become part of the helper cell's nucleus. They may lie hidden for years.



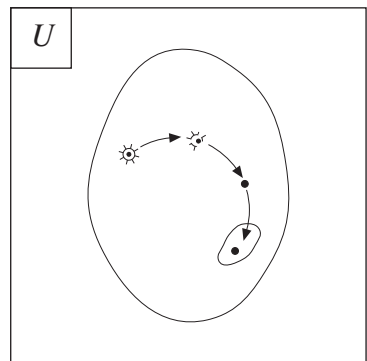
HIVs enter the blood. They attach themselves to helper cells.



The helper cell is activated. It has HIV in its nucleus, so it starts making new HIVs.



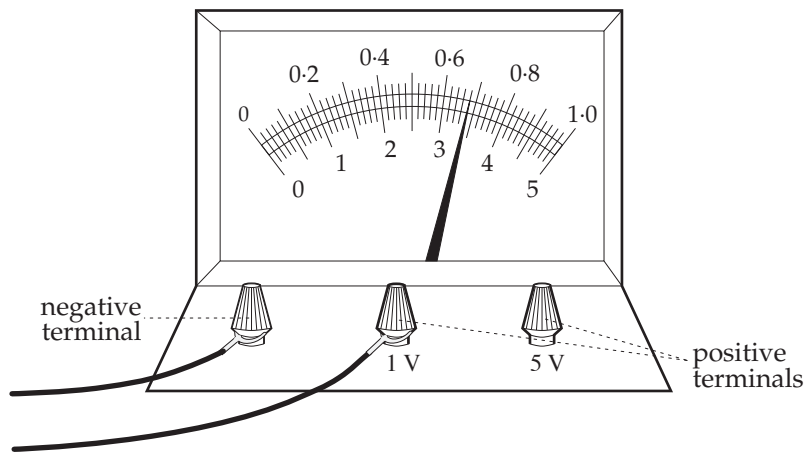
The helper cell dies and HIVs then invade more helper cells.



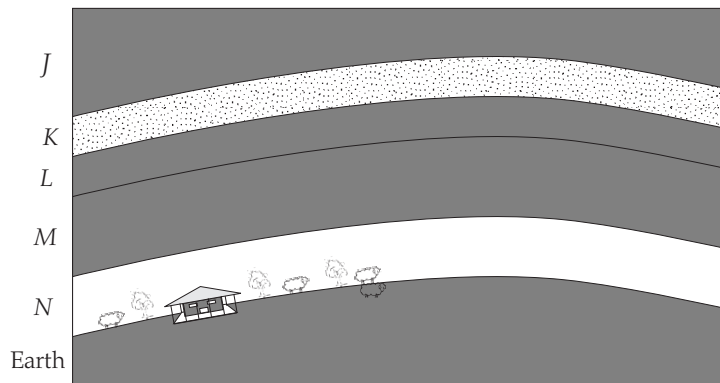
HIVs invade helper cells. HIVs lose their outer coating.

Starting with *R* and ending with *T*, order the diagrams in the correct sequence.

21. What is the reading on the meter?



22. The diagram shows layers in the Earth's atmosphere.



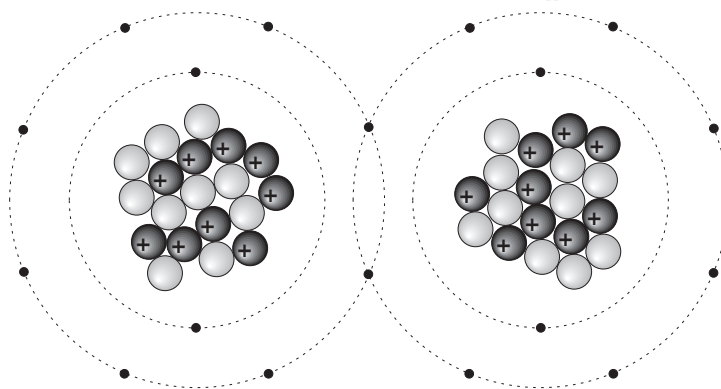
- The exosphere, being closest to the sun, is the hottest layer.
- The ionosphere is above the ozonosphere.
- The stratosphere is below the ionosphere but is not the middle layer.
- Most life is found in the troposphere.

Which layer, *N*, *M*, *L*, *K* or *J* is the ionosphere?

23. Use the following information to answer this question.

<i>Particles in an atom</i>	<i>Relative mass</i>
electron •	0.001 units
proton ⊕	1.007 units
neutron ○	1.009 units

A MOLECULE OF FLUORINE (F_2)

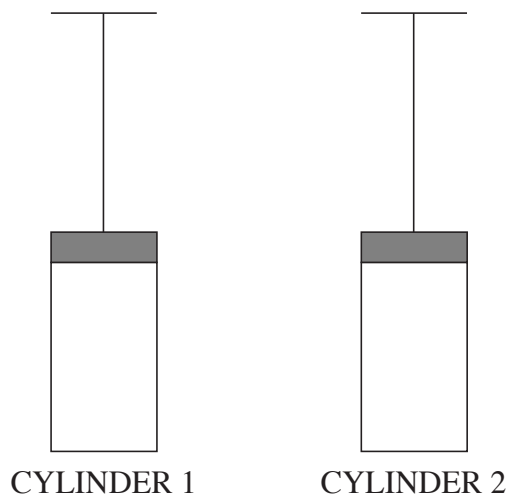


What is the relative mass of this fluorine molecule to the nearest whole number?

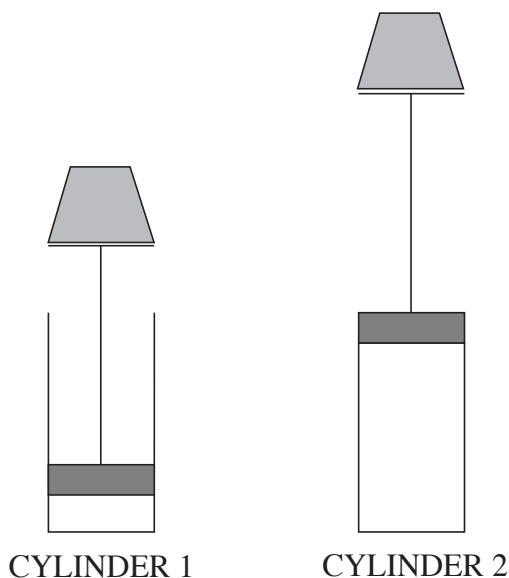
Use the following information to answer Questions 24 and 25.

The diagrams show TWO cylinders fitted with airtight pistons.

Each cylinder is completely filled with either air, nitrogen, water, oil or sugar.



Equal weights are placed on the pistons as shown below and the pistons take the positions indicated in the second set of diagrams. The temperature is kept at room temperature throughout.



24. Using the information above, name ONE substance that could be in cylinder (1) but not in cylinder (2).
25. Using the information above, name ONE substance that could be in cylinder (2) but not in cylinder (1).

End of Section 1

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