

19 What is produced by anaerobic respiration in human muscles?

	carbon dioxide	lactic acid	water
A	✓	✓	✗
B	✓	✗	✓
C	✗	✓	✗
D	✗	✗	✓

key

✓ = substance is produced

✗ = substance is **not** produced

20 Which statements are correct for a healthy person?

- 1 Blood leaving a glomerulus has the same concentration of glucose as blood entering a glomerulus.
- 2 There is no glucose in the fluid leaving a nephron.
- 3 A nephron reabsorbs all of the water and some of the ions filtered out of the blood by a glomerulus.

A 1 and 3

B 1 only

C 2 and 3

D 2 only

21 When moving from an area with low light intensity to an area with high light intensity, how do the circular and radial muscles of the iris react?

	circular muscles	radial muscles
A	contract	no change
B	contract	relax
C	relax	contract
D	relax	no change

23 A gardener has a strawberry plant that produces large, sweet fruits.

How does the gardener grow more strawberry plants that **all** produce large, sweet fruits?

- A** Use asexual reproduction to produce offspring with no genetic variation.
- B** Use asexual reproduction to produce seeds that will grow into new plants.
- C** Use sexual reproduction and self-pollination as they only have one plant.
- D** Use sexual reproduction to reduce variation in the offspring.

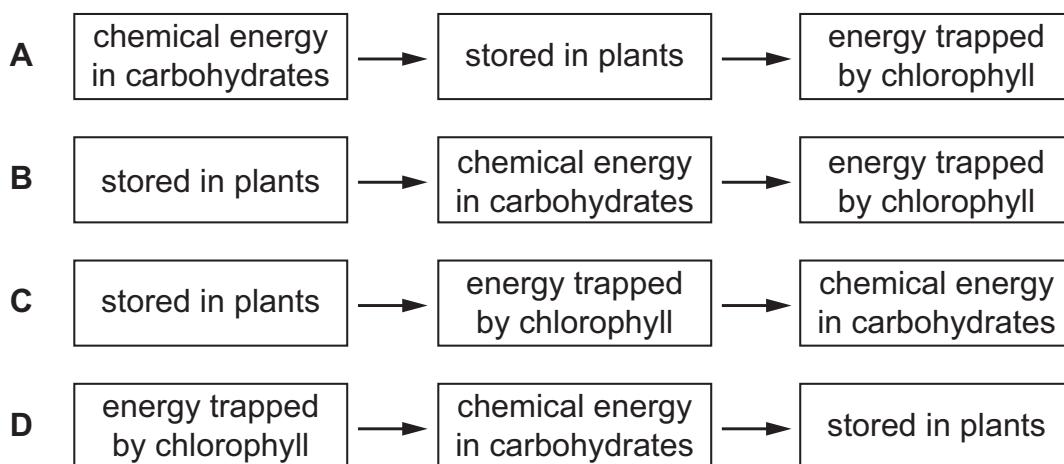
28 Which statement describes the effect of meiosis on chromosome number?

- A** A diploid parent cell produces diploid daughter cells.
- B** A diploid parent cell produces haploid daughter cells.
- C** A haploid parent cell produces diploid daughter cells.
- D** A haploid parent cell produces haploid daughter cells.

30 What is a source of genetic variation that alters the base sequence of DNA?

- A** gene mutation
- B** mitosis
- C** random fertilisation
- D** random mating

32 Which flowchart shows how energy is transferred from the Sun to an organism?



38 What are reasons for using chemical fertilisers in food production?

	to reduce the use of herbicides	to increase crop yields	to reduce competition between crops and weeds
A	yes	yes	yes
B	no	yes	no
C	yes	no	no
D	no	no	yes

39 Why is pectinase useful in fruit juice production?

- A** Cloudier juice is produced.
- B** More juice can be extracted from the fruits.
- C** Proteins in the fruit are digested.
- D** Starch is digested to produce more sugar.

14 Which row names the blood vessel containing the highest blood urea concentration and the blood vessel containing the lowest blood urea concentration?

	highest blood urea concentration	lowest blood urea concentration
A	hepatic artery	hepatic vein
B	hepatic vein	renal vein
C	hepatic portal vein	renal artery
D	renal vein	hepatic portal vein

17 A person exercised vigorously for one minute and then rested for one hour.

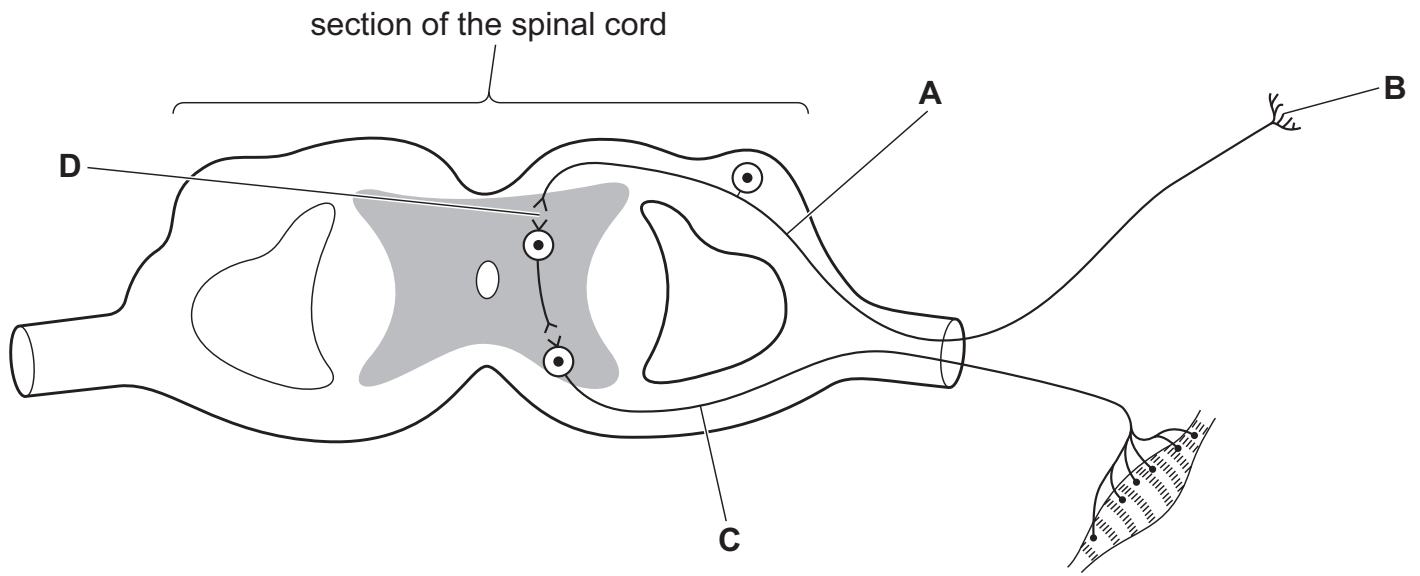
Which statements about lactic acid are correct?

- 1 During exercise, lactic acid is produced in the muscles and diffuses into the blood.
- 2 The blood transports lactic acid to the liver.
- 3 Lactic acid is broken down by anaerobic respiration.

- A** 1, 2 and 3 **B** 1 and 2 only **C** 2 and 3 only **D** 2 only

18 The diagram shows the parts of the nervous system involved in a reflex arc.

Which letter identifies a synapse?



3 Fig. 3.1 is a diagram of the nitrogen cycle.

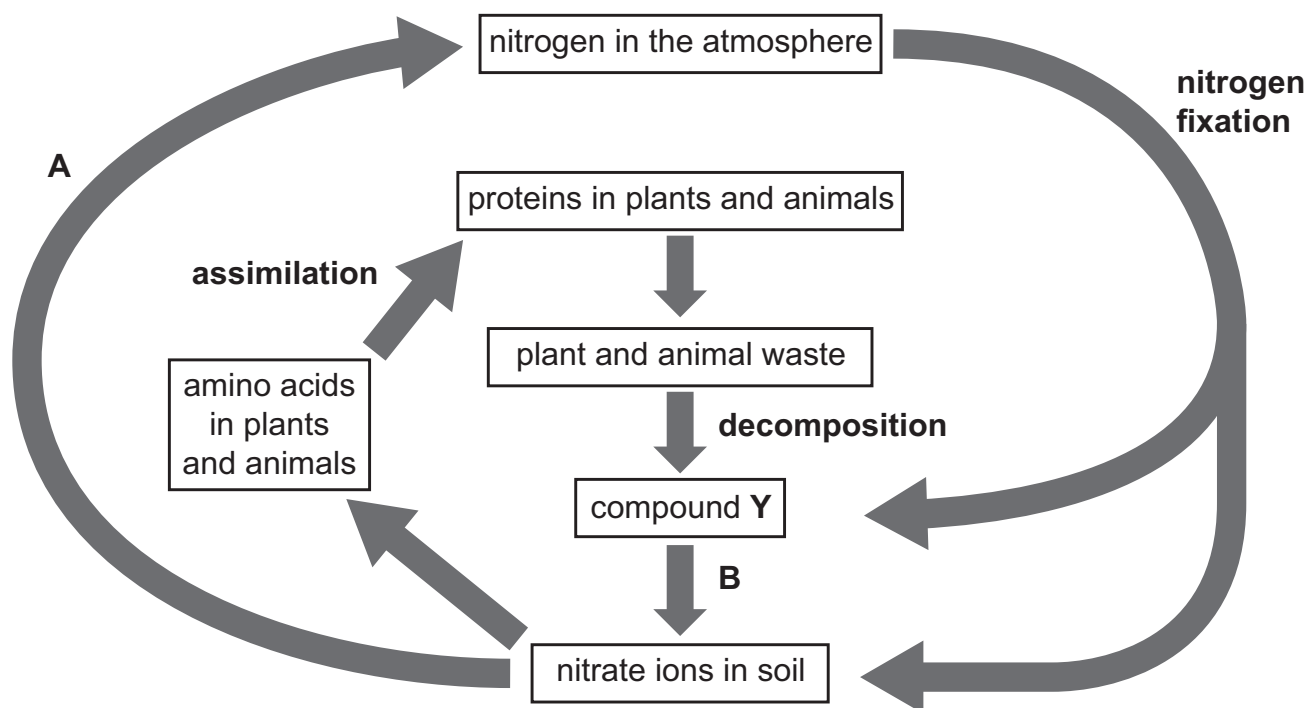


Fig. 3.1

(a) (i) State the names of processes **A** and **B** in Fig. 3.1.

A

B

[2]

(ii) State **two** ways that nitrogen fixation can occur.

1

2

[2]

(iii) State the name of compound **Y** in Fig. 3.1.

..... [1]

(iv) State the name of an organ in animals, where assimilation **and** deamination of amino acids occurs.

..... [1]

(v) Describe the process of deamination.

.....

.....

.....

.....

..... [2]

(b) Complete the sentences about pollution of the air by writing the appropriate words or phrases in the spaces provided.

Methane is a pollutant gas that contributes to the enhanced
and climate change. Methane is released into the atmosphere from cattle and from the
farming of crops.

..... is a gas that is absorbed by trees in the process
of This gas is released into the atmosphere by the
..... of fossil fuels, where it also contributes to climate change. [5]

(c) Explain the process of eutrophication in aquatic ecosystems.

[6]

[Total:19]

2 (a) Dicotyledons and monocotyledons belong to the plant kingdom.

(i) State **two** main features of plants.

1

2 [2]

(ii) State the names of **two** other kingdoms.

1

2 [2]

(b) Fig. 2.1 is a diagram of a cross-section of a monocotyledonous stem.

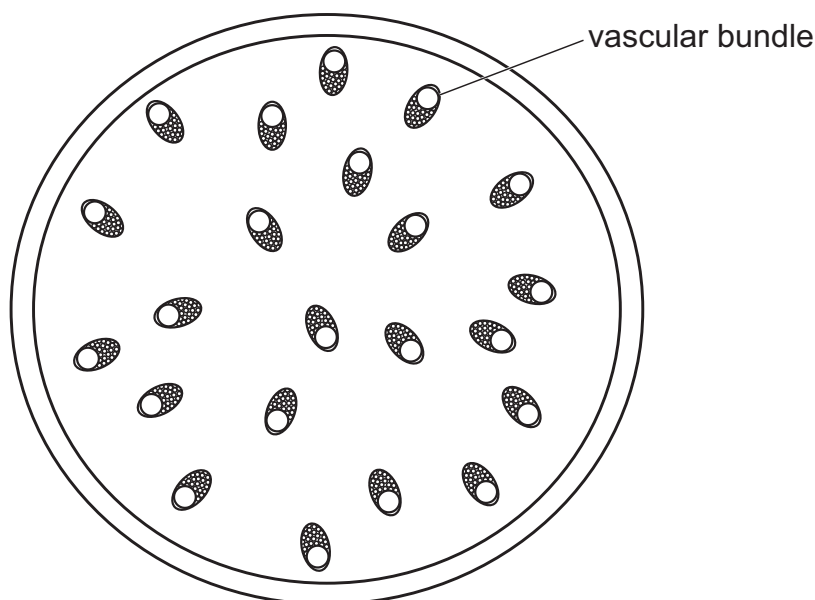


Fig. 2.1

Describe how the distribution of vascular bundles in a dicotyledonous stem would differ from the monocotyledonous stem shown in Fig. 2.1.

.....

.....

..... [1]

(c) Fig. 2.2 is an incomplete drawing of a cross-section of a dicotyledonous root.

Complete Fig. 2.2 by:

- sketching the distribution of phloem and xylem
- labelling the phloem, xylem and a root hair.

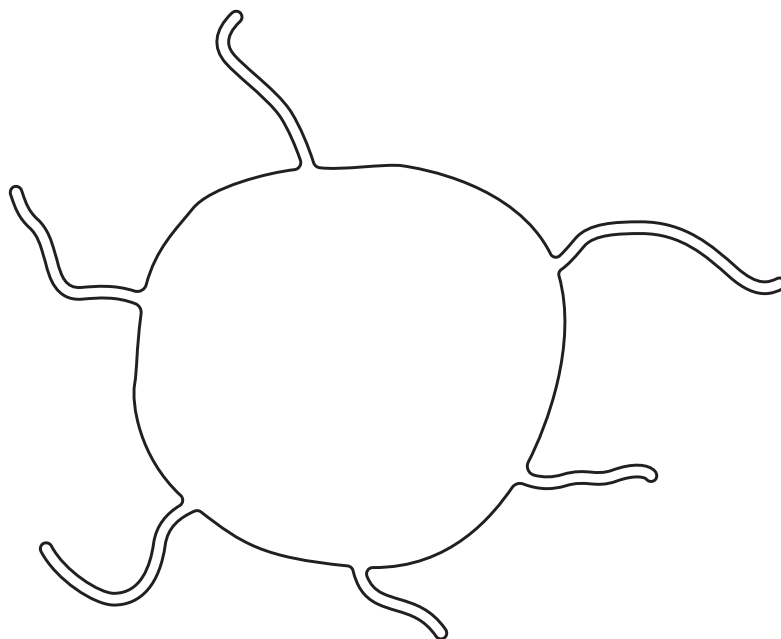


Fig. 2.2

[3]

(d) State **two** functions of xylem.

1

2

[2]

(e) A farmer investigated the effect of girdling on the mass of apple fruit produced by apple trees.

The farmer removed a 3 mm strip of bark and phloem tissue from the branches that produce the fruit, as shown in Fig. 2.3.

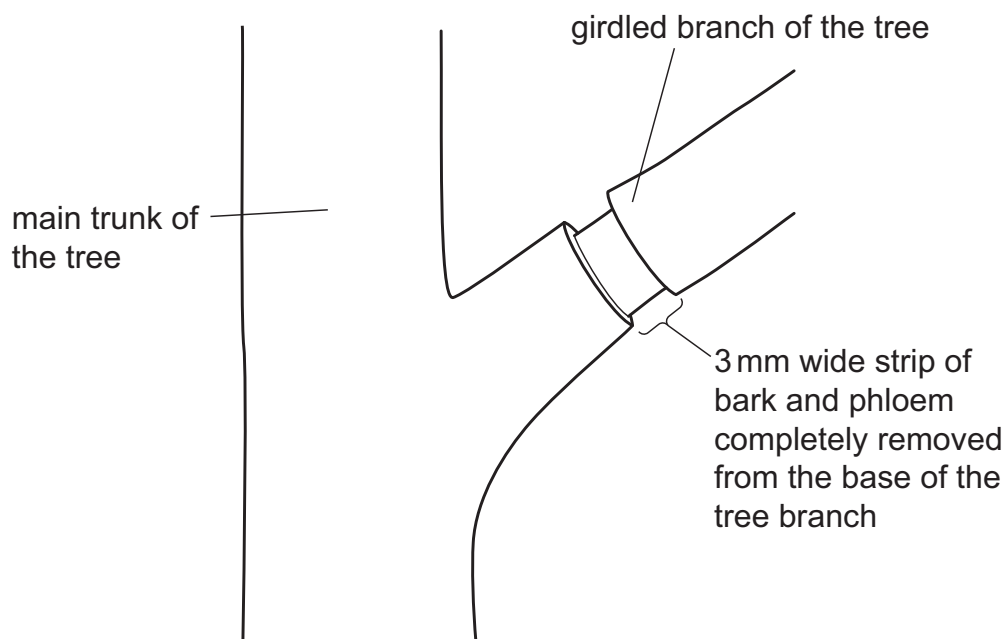


Fig. 2.3

The farmer girdled nine apple trees and left nine apple trees ungirdled.

The mass of ten fruits from the girdled trees and the mass of ten fruits from the ungirdled trees were compared.

Table 2.1 shows the results.

Table 2.1

treatment of trees	mass of ten fruits/g
girdled	1796
ungirdled	958

Describe the results shown in Table 2.1 **and** suggest an explanation for them.

[5]

(f) Apples are used to make apple juice.

State **one** enzyme used in fruit juice production.

..... [1]

[Total: 16]

- 6 (a) An athlete monitored their heart rate and breathing rate before, during and after vigorous exercise.

Fig. 6.1 shows the results.

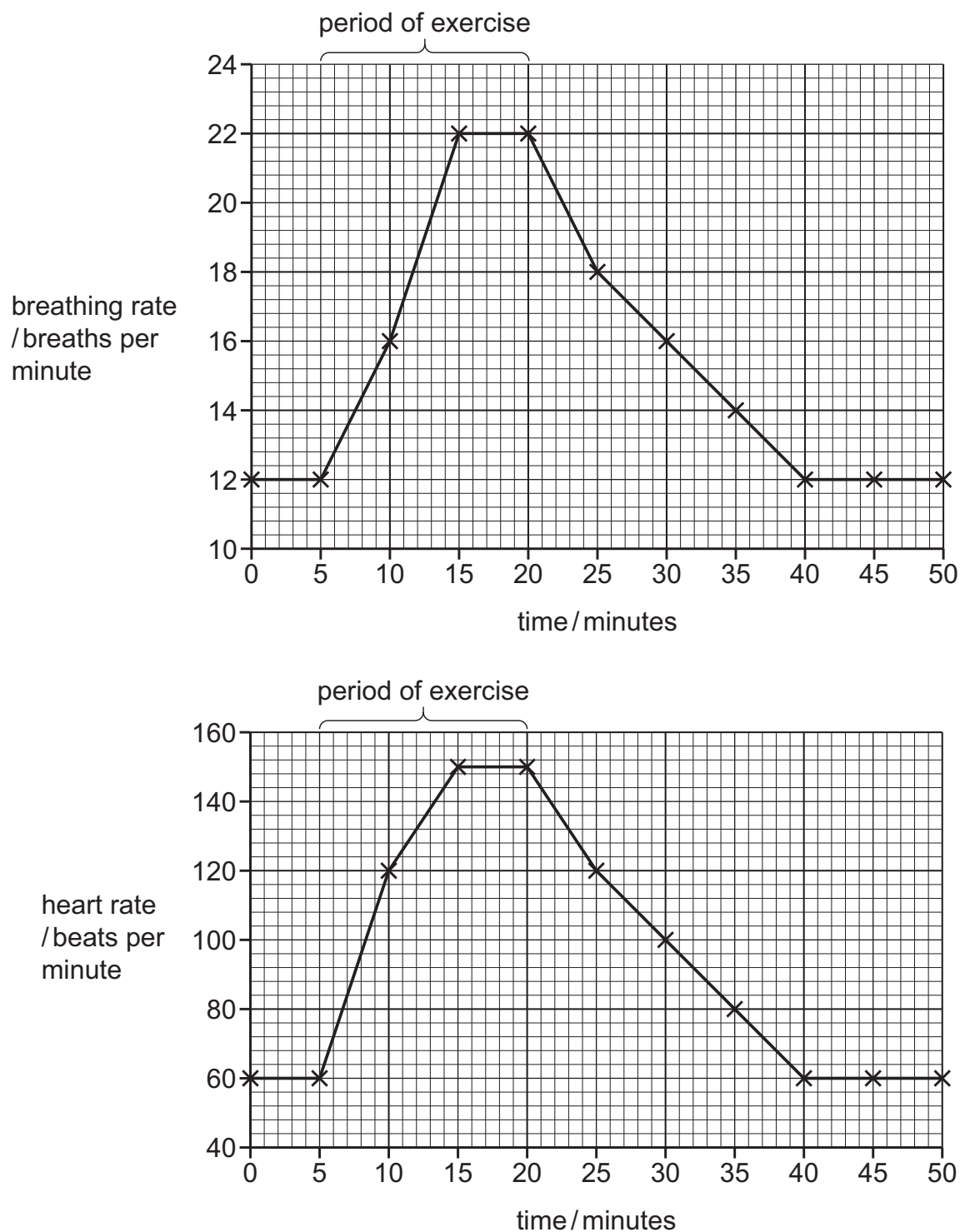


Fig. 6.1

Complete the sentences to describe **and** explain the results shown in Fig. 6.1.

After exercise, it takes minutes for the athlete's breathing rate to return to its resting rate.

The heart rate decreases by beats per minute between 20 and 40 minutes.

The heart rate and breathing rate do not immediately return to their resting rates because anaerobic respiration has occurred.

Lactic acid has built up in causing an oxygen

The heart rate remains high to transport lactic acid to the

The breathing rate remains high to supply for the respiration of lactic acid.

[7]

(b) The carbon dioxide produced during exercise is excreted. Urea is another substance that is excreted.

(i) State the name of the organ that produces urea.

..... [1]

(ii) State the name of the organ that excretes urea.

..... [1]

(c) State the balanced chemical equation for anaerobic respiration in yeast.

..... [2]

(d) State **one** food product that is made using anaerobic respiration in yeast.

..... [1]

[Total: 12]

1 A student investigated the rate of respiration in yeast using different concentrations of glucose.

They used a 5% glucose solution to make a 1% glucose solution and a 4% glucose solution.

The student used this method:

Step 1 Label two small test-tubes **1%** and **4%**.

Step 2 Use a syringe to put 1 cm^3 of 5% glucose solution into the small test-tube labelled **1%**.

Put 4 cm^3 of 5% glucose solution into the small test-tube labelled **4%**.

Step 3 Use a clean syringe to put 4 cm^3 of distilled water into the small test-tube labelled **1%**.

Put 1 cm^3 of distilled water into the small test-tube labelled **4%**.

Step 4 Pour yeast suspension into the small test-tube labelled **1%** until it is completely full.

Step 5 Keep the small test-tube upright and carefully place a large test-tube over the top of the small test-tube labelled **1%**. Push the small test-tube up to the top of the large test-tube, as shown in Fig. 1.1A. Quickly invert the test-tubes, as shown in Fig. 1.1B.

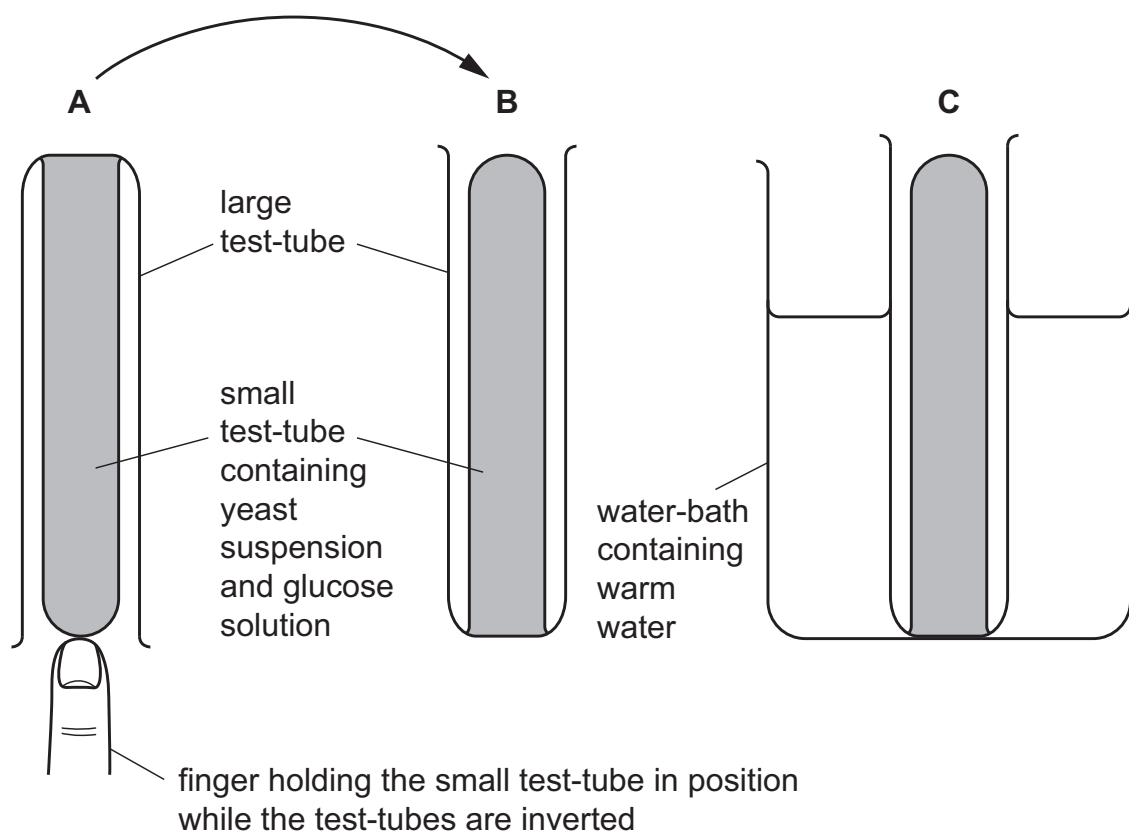


Fig. 1.1

Step 6 Put the large test-tube and the small test-tube labelled **1%** into a warm water-bath, as shown in Fig. 1.1C.

Step 7 Start the stop-clock and wait for five minutes.

Step 8 After five minutes, stop the stop-clock and use a ruler to measure the height of the yeast suspension in the **large** test-tube, as shown in Fig. 1.2.

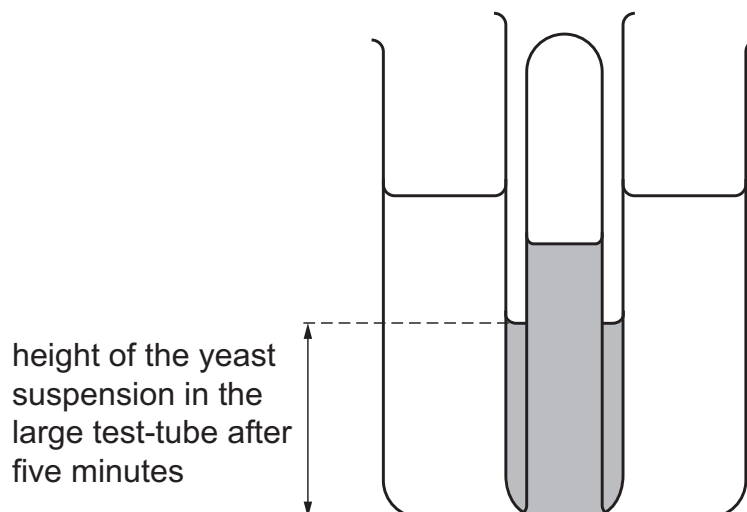


Fig. 1.2

Step 9 Remove the test-tubes from the warm water-bath and discard them.

Step 10 Pour yeast suspension into the small test-tube labelled **4%** until it is completely full.

Step 11 Repeat steps 5 to 8 with the small test-tube labelled **4%**.

(a) Fig. 1.3 is a diagram of the water-baths in steps 8 and 11.

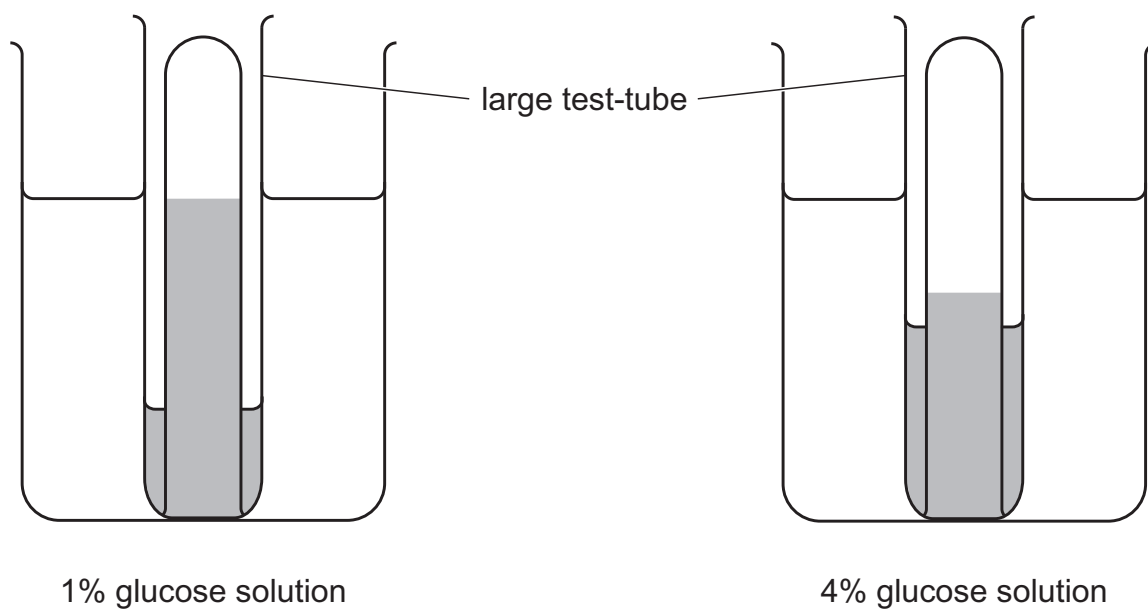


Fig. 1.3

- (i) Measure the height of the yeast suspension in each of the **large** test-tubes shown in Fig. 1.3.

Prepare a table for the results and record your measurements from Fig. 1.3.

(ii) State a conclusion for the results of this investigation.

[1]

(iii) State the independent and dependent variables in this investigation.

independent variable

dependent variable

[2]

(iv) Describe how the temperature of the water-bath could be maintained.

[1]

(v) Explain why a clean syringe was used in step 3.

[1]

(b) A student extended the investigation by using more concentrations of glucose solution.

Calculate the volumes of 5% glucose solution and distilled water that are needed to make 5 cm³ of a 3% glucose solution.

volume of 5% glucose solution cm³

volume of distilled water cm³

[1]

(c) Sports drinks often contain glucose, which is a reducing sugar.

State how you could test a sample of a sports drink for reducing sugar.

.....

.....

.....

.....

..... [2]

(d) (i) The ethanol emulsion test can be used to show that a sample of food contains fat.

State the result of a positive test.

..... [1]

(ii) Suggest **one** safety precaution that should be followed when using ethanol.

.....

.....

..... [1]

[Total: 14]