Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME	
CENTRE NUMBER	
CANDIDATE NUMBER	

6367955412

BIOLOGY **0610/32**

Paper 3 Extended **February/March 2015**

1 hour 15 minutes

Candidates answer on the Question Paper.

No Additional Materials are required.

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on all the work you hand in.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.

Electronic calculators may be used.
You may lose marks if you do not show your working or if you do not use appropriate units.

At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.

The syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

This document consists of **22** printed pages and **2** blank pages.

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CAMBRIDGE International Examinations

[Turn over

1 Fig. 1.1 shows a diagram of a cross-section of a dicotyledonous leaf, as seen using a light microscope.

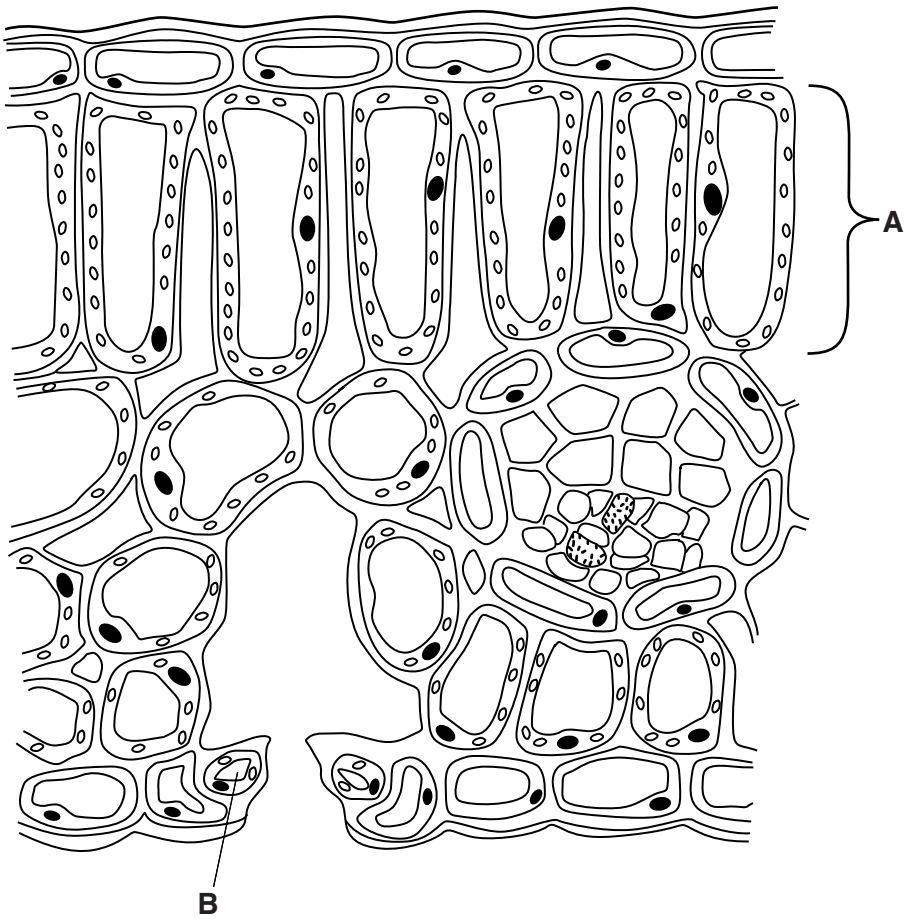


Fig. 1.1

(a) (i) Name tissue **A** and cell **B**.

A .....

B ..... [2]

(ii) Describe **two** ways in which tissue **A** is adapted for maximum photosynthesis.

1 .....

.....

2 .....

..... [2]

(b) Plants use carbon dioxide for photosynthesis.

(i) Describe where and how carbon dioxide enters a leaf.

.....

.....

.....

.....

.....

.....

..... [3]

(ii) State the **two** products of photosynthesis.

..... [1]

(c) Hydrophytes are plants that grow in water. Fig. 1.2 shows a photograph of Indian lotus, *Nelumbo nucifera*, which is a hydrophyte.



Fig. 1.2

Describe **and** explain **two** adaptations of hydrophytes to their environment.

adaptation .....

.....

explanation .....

.....

.....

adaptation .....

.....

explanation .....

.....

..... [4]

[Total: 12]

2 Coat colour in cattle is inherited in a very similar way to blood groups in humans. The gene for coat colour has two codominant alleles:

C^B which is the allele for brown coat

C^W which is the allele for white coat.

Table 2.1 shows the genotypes and phenotypes of different coat colours seen in a herd of cattle.

Table 2.1

genotype	phenotype
C^BC^B	brown
C^WC^W	white
C^BC^W	roan

(a) (i) Explain the term *codominance*.

.....

.....

.....

.....

..... [2]

(ii) A farmer crossed several roan coloured cows with a roan coloured bull.
Complete the genetic diagram to show the ratio of expected phenotypes among the offspring.

parental phenotypes roan cow × roan bull

parental genotypes C^BC^W × C^BC^W

gametes ....

offspring genotypes ....

offspring phenotypes ....

phenotypic ratio

..... [4]

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(b) A farmer has a herd of cows that produce milk. The farmer wants to improve the milk yield of the herd by using artificial selection (selective breeding). The farmer buys semen (fluid containing sperm) to inseminate the cows artificially.

(i) Describe how the farmer could improve the milk yield of the cows using artificial selection.

.....

.....

.....

.....

.....

.....

..... [3]

(ii) Suggest **one** useful feature, other than milk yield and coat colour, which a farmer might wish to develop in a herd of cows.

.....

..... [1]

(c) Milk yield can also be increased by injecting cows with the hormone bovine somatotropin (BST).

Explain why there may be concerns about the use of this hormone to increase milk yield.

.....

.....

.....

.....

.....

.....

..... [3]

[Total: 13]

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Question 3 begins on page 8.

3 Excretion is the process of removing waste products of metabolism from the body.

(a) Name the **two** main products of metabolism that need to be excreted from the human body.

..... [2]

(b) The kidney is one of the main excretory organs of the body. Its role is to filter the blood. Some substances leave the blood and are removed from the body in the urine. The concentration of protein in the blood entering the kidneys in the renal arteries is 83 g dm^{-3}.

State the concentration of protein that you would expect in the urine of a healthy person and explain your answer.

concentration ..... g dm^{-3}

explanation .....

.....

.....

..... [2]

(c) Dialysis can be used to treat people whose kidneys do not function properly.

Fig. 3.1 shows dialysis treatment.

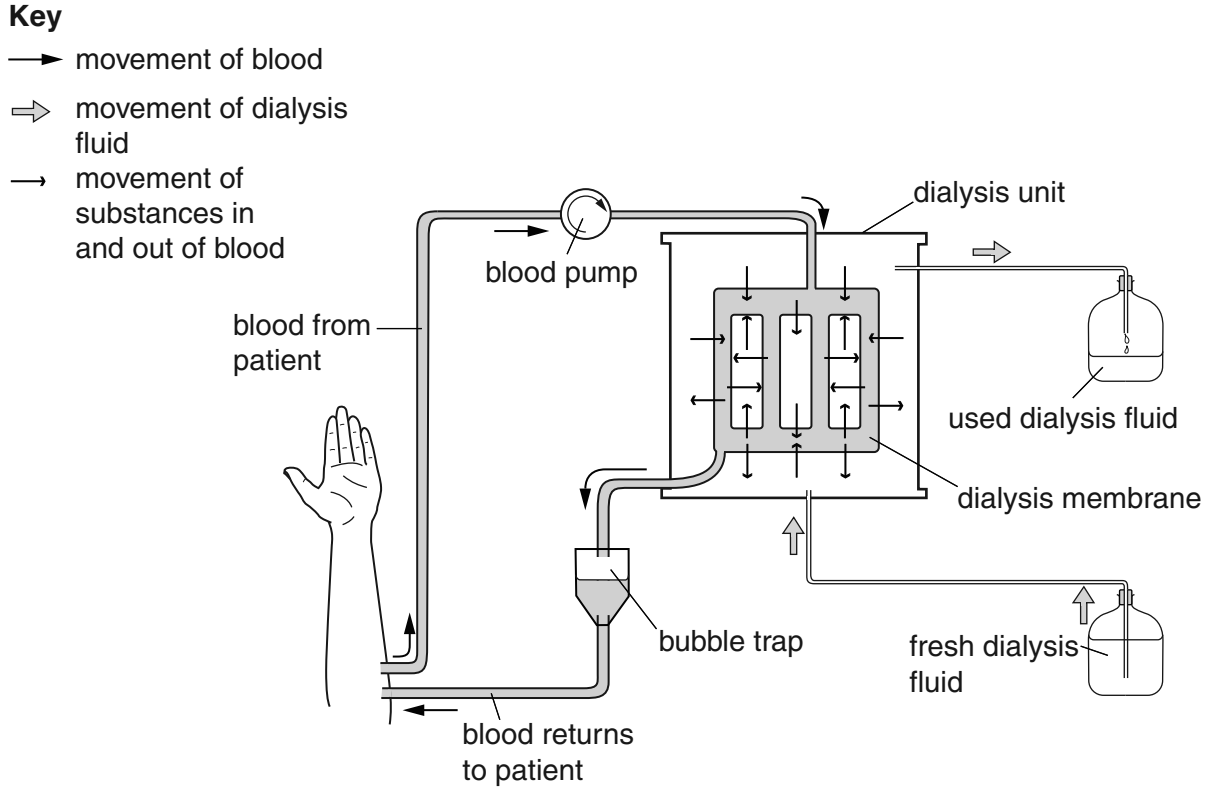


Fig. 3.1

Use Fig. 3.1 to describe the process of dialysis **and** explain changes that occur in a person's blood.

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.....

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..... [5]

(d) Some people with kidney failure are given a kidney transplant.

State **one** advantage and **one** disadvantage of having a kidney transplant instead of dialysis treatment.

advantage .....

.....

disadvantage .....

..... [2]

(e) The liver is another excretory organ of the body. The liver breaks down hormones and drugs, such as alcohol.

(i) State **one** function of the liver **other than** the breakdown of hormones and drugs.

.....

.....

..... [1]

(ii) Describe **two** effects on the body of long-term, excessive consumption of alcohol.

1 .....

.....

2 .....

..... [2]

(iii) Suggest **one** social implication of alcohol misuse.

.....

..... [1]

[Total: 15]

Question 4 begins on page 12.

4 **(a)** Fig. 4.1 shows the structure of a typical fish.

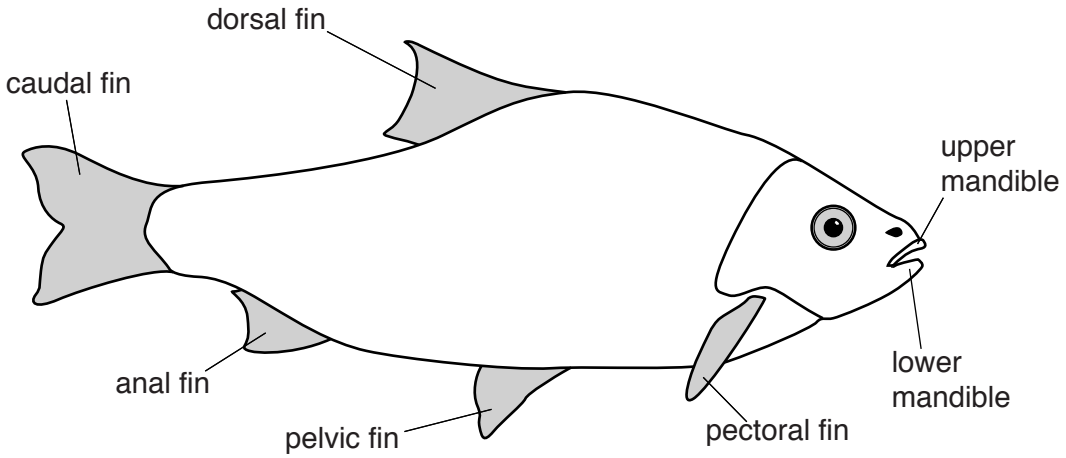
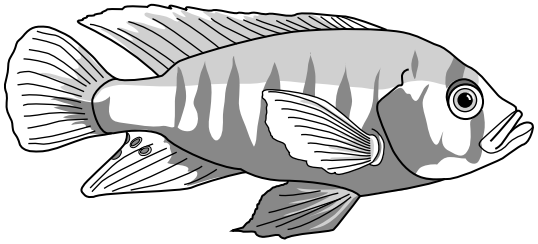
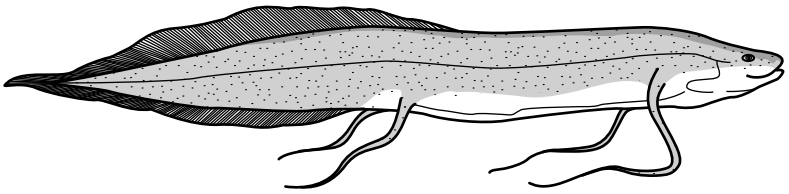


Fig 4.1

Fig. 4.2 shows four species of freshwater fish, **A**, **B**, **C** and **D**.

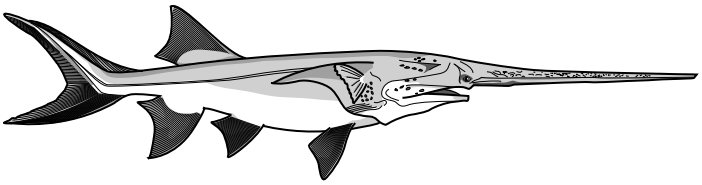


A
Haplochromis nyererei



B
Protopterus dolloi

Image removed due to copyright restrictions



C
Salmo trutta

D
Polyodon spathula

not drawn to the same scale

Fig. 4.2

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Biologists use dichotomous keys to identify different species.

Describe **one** visible feature of each species of fish **A**, **B**, **C** and **D**, that could be used to distinguish it from the other three species in Fig. 4.2.

Only use descriptions of the features **labelled in Fig. 4.1** in your answers.

Write your answers in Table 4.1.

Table 4.1

fish	distinguishing feature
A	
B	
C	
D	

[4]

(b) Pollution is harm done to the environment by release of substances produced by human activities. Acid rain is one form of pollution that damages many lakes, ponds and rivers.

(i) State one pollutant that causes acid rain.

..... [1]

(ii) Fig. 4.3 shows the effect of pH on the mean number of species of fish found in lakes in New York State, USA.

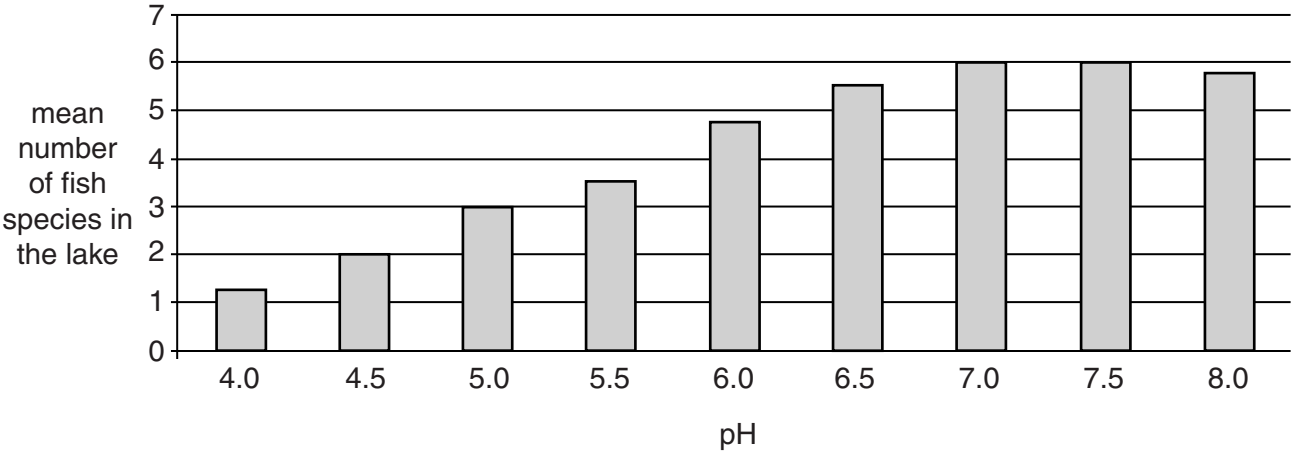


Fig. 4.3

Describe the results shown in Fig. 4.3.

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..... [3]

(iii) Explain the effects of acid rain on the environment.

.....

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.....

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..... [2]

[Total: 10]

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Question 5 begins on page 16.

5 Many flowering plants can reproduce sexually and asexually.

(a) (i) Define the term *asexual reproduction*.

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.....

.....

.....

..... [2]

(ii) State **one** advantage and **one** disadvantage of asexual reproduction for flowering plants.

advantage .....

.....

disadvantage .....

..... [2]

(b) Fig. 5.1 shows a potato plant, *Solanum tuberosum,* grown from a tuber. The tubers that potato plants are grown from are commonly referred to as seed potatoes.

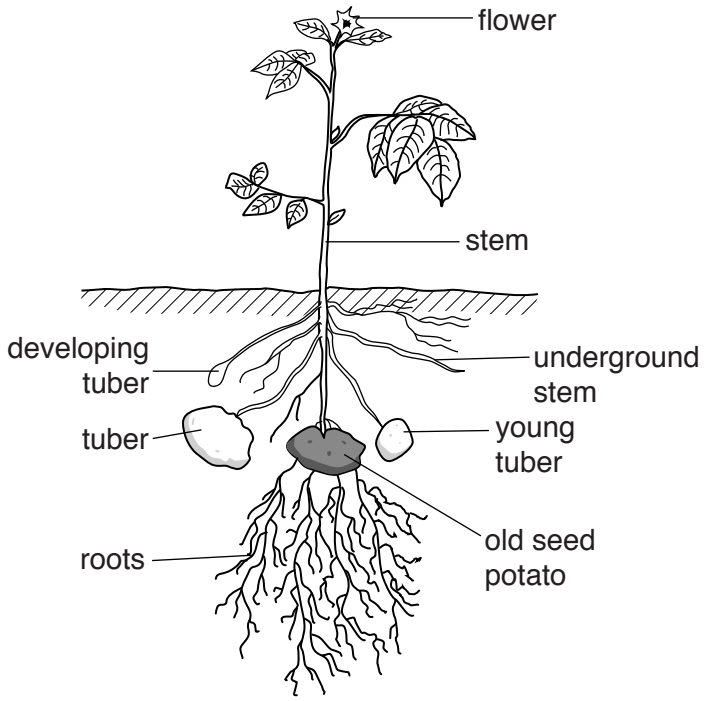


Fig. 5.1

(i) Define the term *growth*.

.....

.....

.....

.....

..... [2]

(ii) Potatoes can reproduce asexually by means of tubers. The parent plant produces underground stems, which eventually form tubers.

With reference to Fig. 5.1, describe how tubers are formed from the underground stems in potatoes.

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..... [3]

(c) A student conducted an experiment to investigate the percentage change in mass of potato tuber tissue when placed in different concentrations of sucrose solution. The potato tuber tissue was cut into cubes of the same size.

Fig. 5.2 shows a graph of the results.

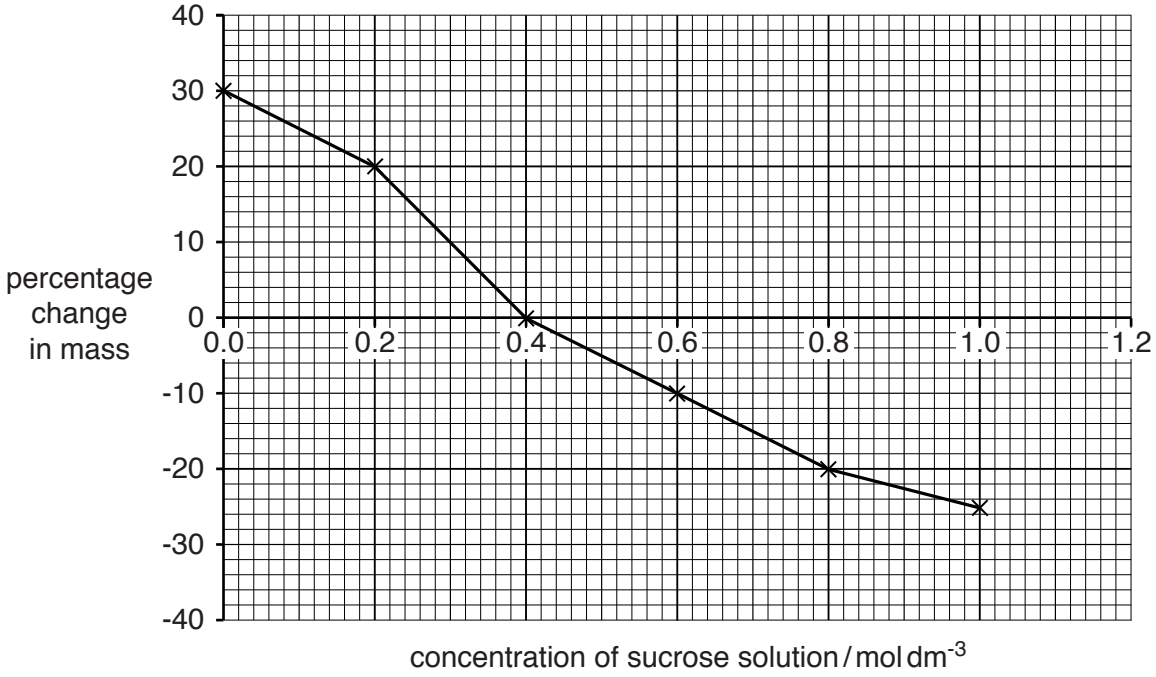


Fig. 5.2

(i) Use Fig. 5.2 to predict the percentage change in mass of a cube of potato tuber tissue placed in 1.2 mol dm^{-3} sucrose solution.

..... [2]

(ii) Explain the results shown in Fig. 5.2 in terms of water potential:

- between sucrose concentrations of 0.0 – 0.4 mol dm^{-3}
- at sucrose concentration 0.4 mol dm^{-3}
- between sucrose concentrations of 0.4 – 1.0 mol dm^{-3}.

between 0.0 – 0.4 mol dm^{-3} .....

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at 0.4 mol dm^{-3} .....

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.....

between 0.4 – 1.0 mol dm^{-3} .....

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.....

.....

..... [5]

(d) Pollination is the transfer of pollen from the anther to the stigma. Pollen can be transferred to the stigma by being carried by the wind or by animals.

Fig. 5.3 shows a photograph of a wind-pollinated flowering plant.



Fig. 5.3

(i) State **two** structural adaptations of a flower for wind-pollination.

1 .....

2 ..... [2]

(ii) State how self-pollination differs from cross-pollination.

.....

.....

..... [1]

(iii) Suggest **one** reason why self-pollination might be advantageous to a population of plants.

.....

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..... [1]

[Total: 20]

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6 Fig. 6.1 shows changes in the global human population between 1910 and 2010.

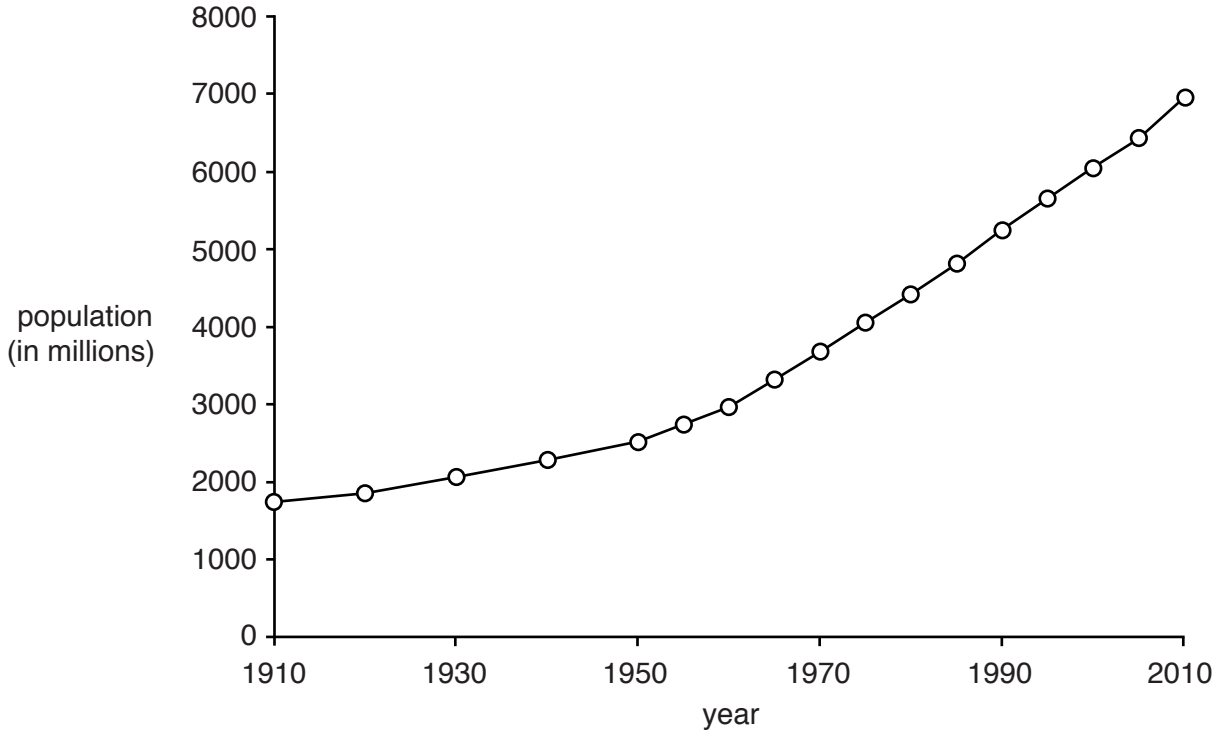


Fig. 6.1

(a) Improved food production has contributed to the increase in the human population.

(i) State **and** explain **two** ways in which modern technology has resulted in increased food production.

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.....

.....

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..... [2]

(ii) State **one** reason, **other than** food production, why the human population has increased so rapidly between 1910 and 2010.

.....

..... [1]

(b) In view of the increasing human population, people are sometimes encouraged to eat less meat and more fruit and vegetables, to improve the energy efficiency of their food supply.

Explain why eating less meat and more fruit and vegetables is more energy efficient.

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..... [3]

(c) As the human population has increased, forests have been cleared for farming.

Outline the effects of deforestation on the environment.

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..... [4]

[Total: 10]

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