Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME	

CENTRE NUMBER						CANDIDATE NUMBER					

BIOLOGY **0610/32**

Paper 3 Extended **May/June 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 **20** printed pages.

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CAMBRIDGE International Examinations

1 **(a)** Fig. 1.1 shows seven plant species that are important crops.

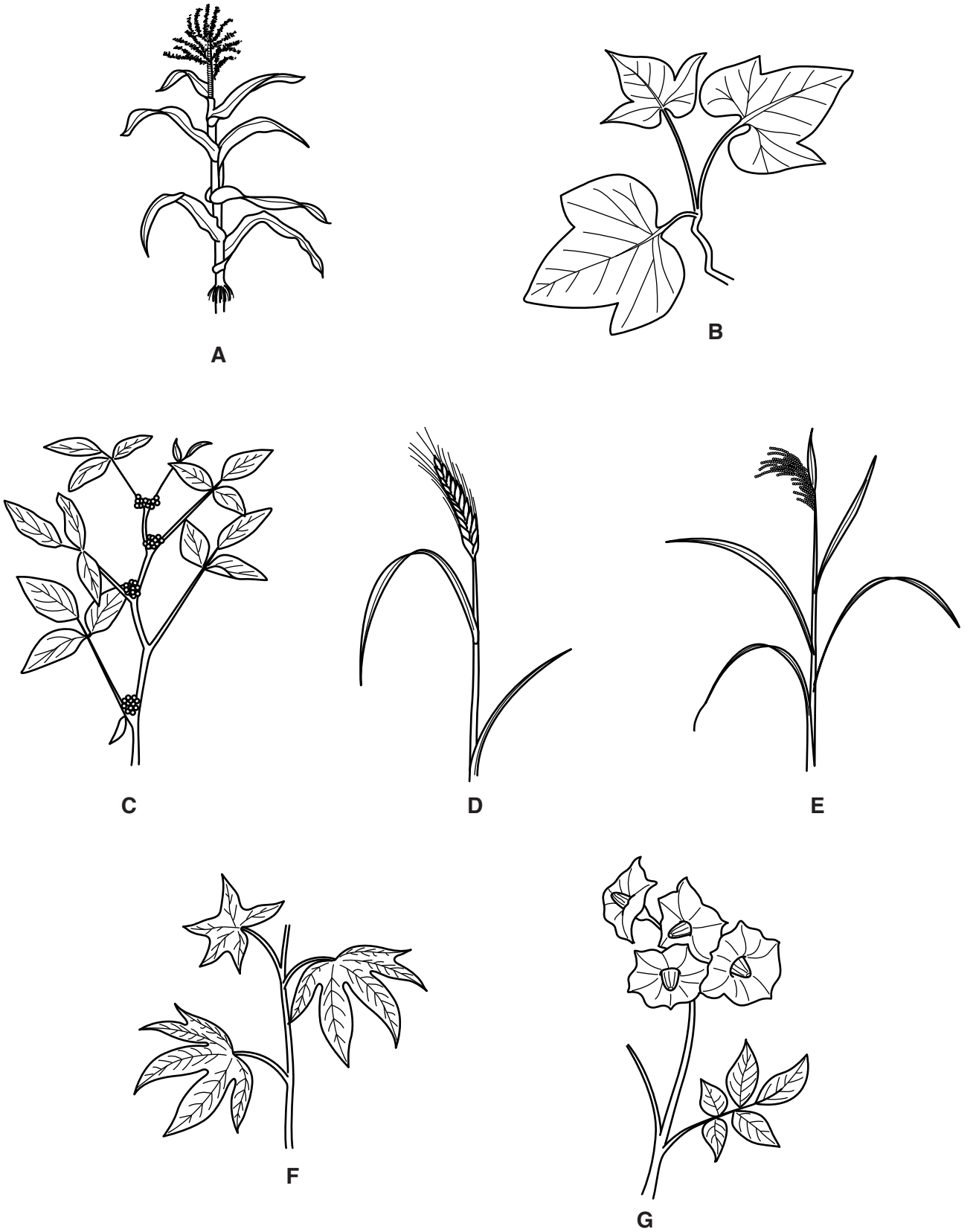

Fig. 1.1

Use the key to identify each species. Write the letter of each species (**A** to **G**) in the correct box beside the key. One has been done for you.

Key

1 (a)	branched veins on leaves	go to 2	
(b)	parallel veins (not branched) on leaves	go to 3	
2 (a)	leaves divided into leaflets (look like small individual leaves)	go to 4	
(b)	leaves not divided into leaflets	go to 5	
3 (a)	flowers grouped tightly together at the top of the stalk	*Triticum aestivum*	
(b)	flowers grouped loosely together at the top of the stalk	go to 6	
4 (a)	large flowers located at top of stem	*Solanum tuberosum*	
(b)	small flowers located along the stem	*Glycine max*	
5 (a)	leaves have five lobes	*Manihot esculenta*	**F**
(b)	leaves have three lobes	*Ipomoea batatas*	
6 (a)	flowers above youngest leaf	*Zea mays*	
(b)	flowers bend down below youngest leaf	*Oryza sativa*	

[3]

(b) The pattern of the veins on the leaves was used in the key to separate the monocotyledonous crop plants and eudicotyledonous (dicotyledonous) crop plants shown in Fig. 1.1.

State **one** other feature that could be used to identify monocotyledonous plants from eudicotyledonous plants.

..... [1]

(c) The leaves of some crop plants are not eaten but are used to make paper. This reduces deforestation because fewer trees are cut down for making paper. Deforestation has negative effects on soil ecosystems.

(i) Describe the negative effects of deforestation on **soil** ecosystems.

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..... [4]

(ii) Paper recycling can reduce deforestation.

Outline how paper can be recycled.

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..... [3]

[Total: 11]

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2 **(a)** Write a balanced chemical equation for photosynthesis.

..... → ..... [3]

A student investigated the effect of light intensity on the rate of photosynthesis of algae.

Fig. 2.1 shows the apparatus set up for the investigation.

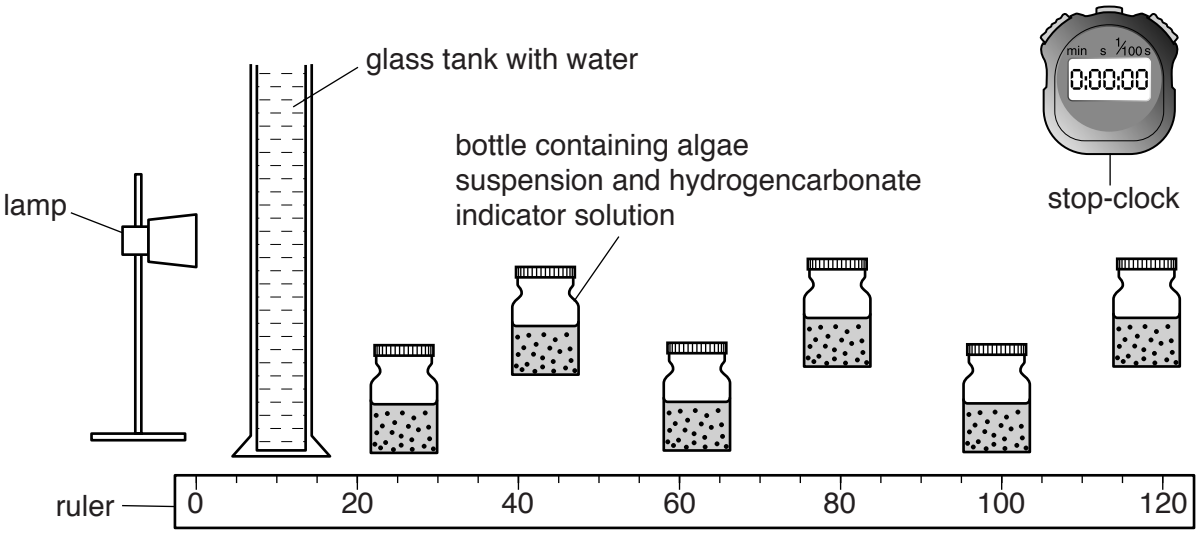

Fig. 2.1

(b) Suggest why a glass tank with water was placed between the lamp and the bottle in the investigation.

.....

.....

..... [1]

(c) The hydrogencarbonate indicator solution changes colour when the pH changes. At pH 8.4 it is red, at pH 7.6 it is yellow and at pH 9 it is purple.

Predict the colour of the hydrogencarbonate indicator solution in the bottle nearest the lamp at the end of the investigation. Explain your answer.

colour prediction .....

explanation .....

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[3]

(d) The student's results are shown in Fig. 2.2.

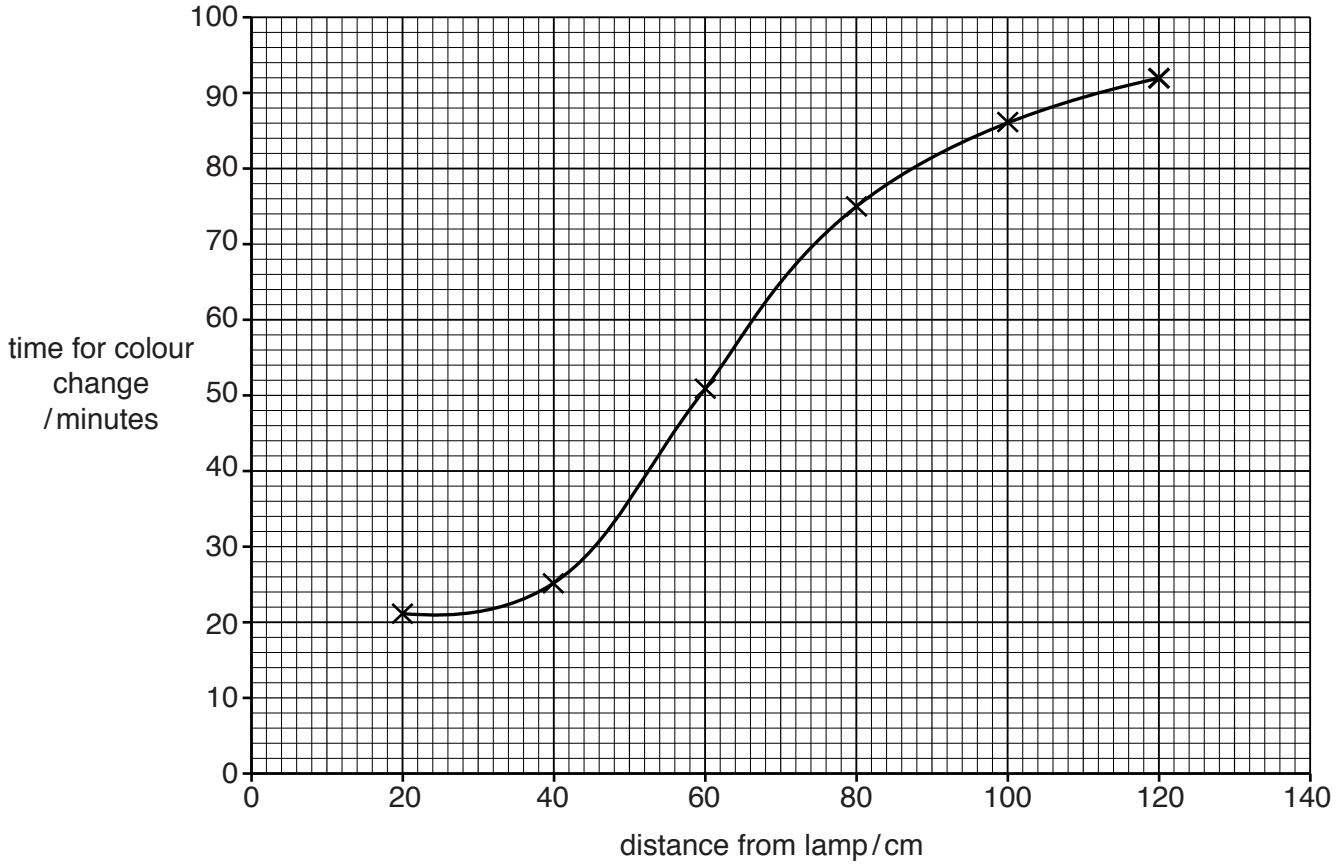

Fig. 2.2

Describe and explain how the rate of photosynthesis is affected by light intensity.

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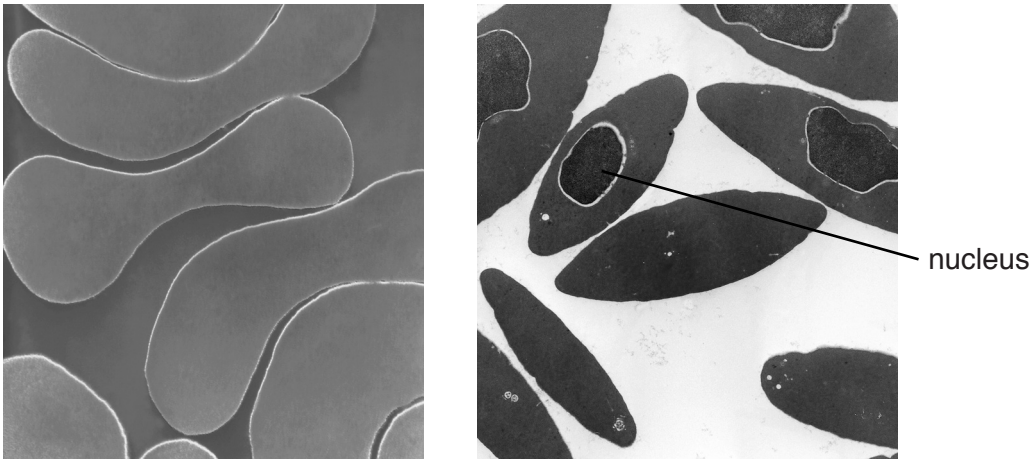
..... [5]

[Total: 12]

3 Fig. 3.1 shows images of red blood cells from a human, **A**, and a bird, **B**.



A **B**

Fig. 3.1

(a) State the function of red blood cells.

.....

.....

..... [1]

(b) There is a nucleus present in each of the red blood cells of the bird, as shown in Fig. 3.1.

(i) State the function of a nucleus.

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.....

..... [1]

(ii) Human red blood cells do not contain a nucleus.

State an advantage of this.

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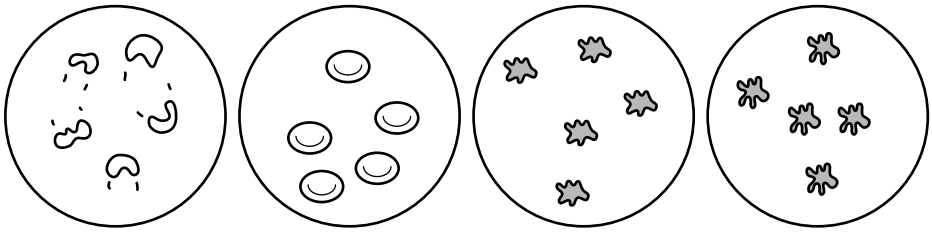
..... [1]

Red blood cells from humans were placed into three test-tubes. Each test-tube contained a salt solution of a different concentration. A sample was taken from each test-tube and viewed using a microscope. The results are shown in Fig. 3.2.



salt concentration / mol dm^{-3}	0.10	0.15	0.20	0.25

Fig. 3.2

(c) **(i)** Describe the appearance of the red blood cells in the 0.15 mol dm^{-3} salt solution and the red blood cells in the 0.20 mol dm^{-3} salt solution.

0.15 mol dm^{-3} .....

.....

0.20 mol dm^{-3} .....

.....
[2]

(ii) The red blood cells in the 0.10 mol dm^{-3} salt solution burst.

Explain why the red blood cells burst.

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..... [3]

(iii) Suggest why a plant cell in 0.10 mol dm^{-3} salt solution would not burst.

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..... [1]

(d) Some people in accidents lose a lot of blood. Doctors give patients fluid to replace lost blood.

(i) Use the information in Fig. 3.2 to predict and explain the concentration of fluid replacement given to patients who have lost blood.

prediction .....

explanation .....

.....

..... [2]

(ii) Describe the process of blood clotting.

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..... [3]

[Total: 14]

4 Fig. 4.1 shows part of the human gas exchange system.

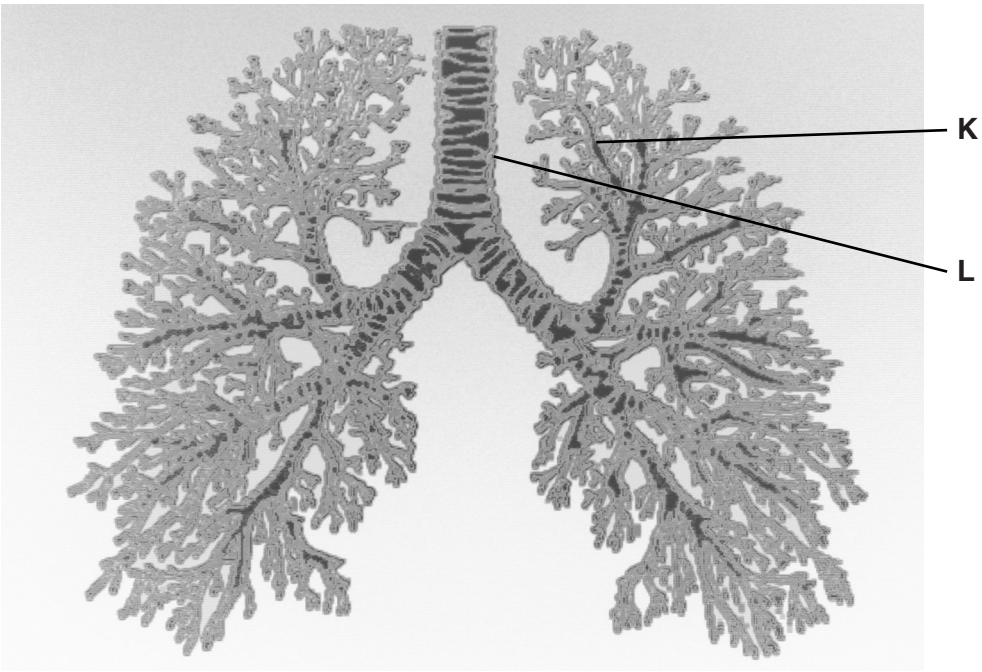

Fig. 4.1

(a) **(i)** Name structure **K**.

..... [1]

(ii) Ciliated cells and goblet cells line structure **L**.

Explain the function of these cells in structure **L**.

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..... [3]

(b) Gas exchange occurs at the alveoli.

(i) Describe how oxygen molecules move from the alveoli into the blood.

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..... [3]

(ii) During inspiration, air moves from the atmosphere into the lungs.

Describe the mechanism of inspiration.

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..... [4]

(iii) Name **one** gas that is found in a higher concentration in expired air than in inspired air.

..... [1]

(c) Tobacco smoke affects the gas exchange system.

Name **two** components of tobacco smoke and describe their effect on the gas exchange system.

component 1 .....

effect .....

.....

.....

component 2 .....

effect .....

.....

.....
[4]

[Total: 16]

Question 5 begins on page 14.

5 The growth and development of an embryo begins immediately after fertilisation.

(a) Fig. 5.1 shows some of the events (**S** to **Y**) between fertilisation and birth.

S	development of the heart
T	placenta forms
U	hormones are released by mother to start contractions
V	implantation of the embryo in the lining of the uterus
W	embryo forms into a ball of eight cells
X	development of sex organs
Y	fertilised ovum divides into two cells by mitosis

Fig. 5.1

(i) Put the events into the correct sequence. Two have been done for you.

Y					**X**	

[2]

Fig. 5.2 shows a developing fetus and part of the reproductive system of the mother.

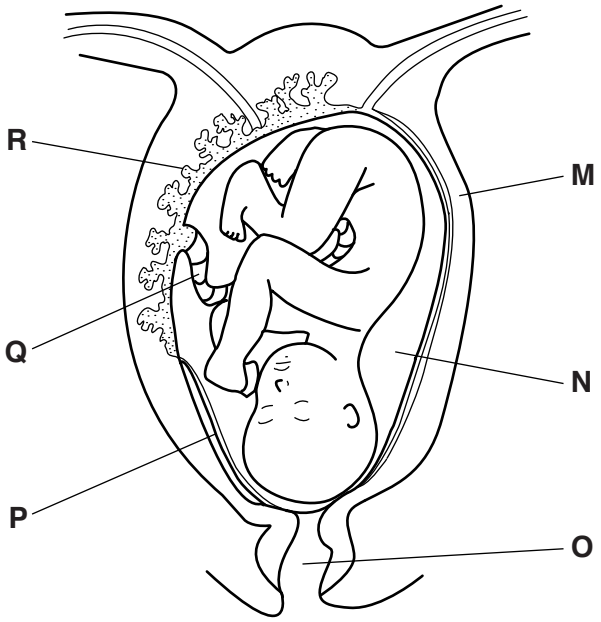

Fig. 5.2

(ii) Table 5.1 shows some functions and names of parts of the developing fetus and pregnant mother.

Complete the table. One row has been done for you.

Table 5.1

letter from Fig. 5.2	name	function during pregnancy
P	amniotic sac	encloses the amniotic fluid
		attaches the placenta to the fetus
	amniotic fluid	
		contracts to push the baby through the birth canal
	placenta	
		widens during labour to allow the head of the baby to pass

[5]

(b) Mothers are often given nutritional advice for their newborn babies. Scientists compared breast-feeding to bottle-feeding with formula milk. Their data is shown in Table 5.2.

Table 5.2

	breast milk	formula milk
lipid / g per dm^3	37	38
lactose / g per dm^3	73	72
protein / g per dm^3	8.7	12.9
energy / kJ per dm^3	680	690
volume of milk taken / g per day	448	732

Use the data in Table 5.2 to describe **one** difference and **one** similarity between the nutritional value of breast milk and formula milk.

difference .....

.....

similarity .....

.....
[2]

(c) The scientists measured the growth of the babies fed with breast milk and babies fed with formula milk described in Table 5.2. The mass of the babies from birth until they were 15 months old is shown in Fig. 5.3.

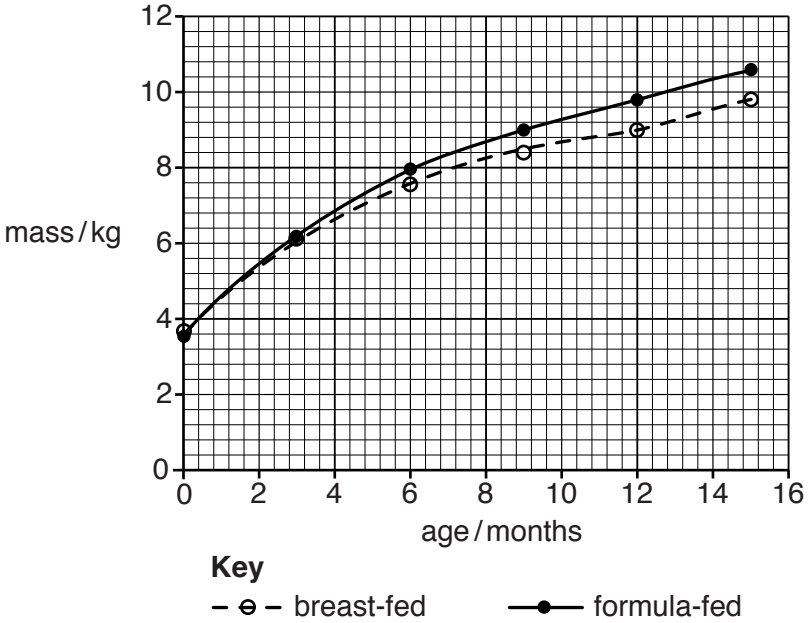

Fig. 5.3

(i) Define the term *growth*.

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..... [2]

(ii) Using the information in Table 5.2 and Fig. 5.3, describe and explain the changes in the mass of the babies that were breast-fed and babies that were bottle-fed with formula milk.

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..... [4]

(iii) The scientists noticed that there were other differences between the breast-fed babies and the babies fed with formula milk.

Describe the advantages and disadvantages of breast-feeding.

advantages .....

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disadvantages .....

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[4]

[Total: 19]

6 The human population is growing rapidly. This is increasing the pressure on the world food supply.

(a) Name the rapid growth phase of any population of organisms.

..... [1]

In Canada farmers are breeding fish in large nets because the wild stocks of fish are decreasing. Fig. 6.1 is a diagram of a salmon fish farm in the ocean. The salmon only eat the food provided by the worker.

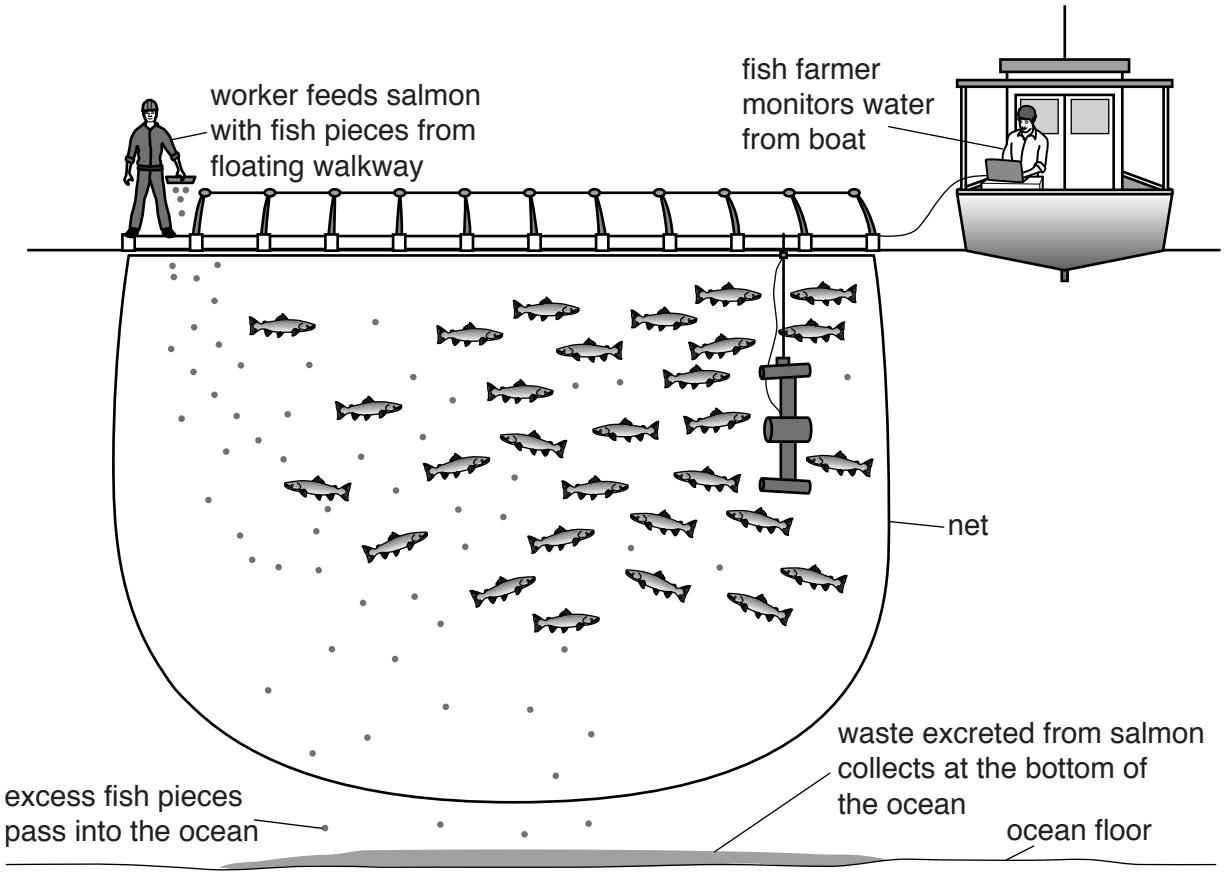

Fig. 6.1

(b) Explain the effects of the excess fish pieces and waste excreted from the salmon on the environment.

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..... [3]

(c) State the lowest possible trophic level of the salmon shown in Fig. 6.1.

..... [1]

(d) Other farmers grow seaweed. Salmon farming is a less energy efficient way of producing food for humans than seaweed farming.

Explain why.

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..... [3]

[Total: 8]

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