Cambridge Assessment International Education

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3151030415

BIOLOGY **0610/32**

Paper 3 Theory (Core) **February/March 2024**

1 hour 15 minutes

You must answer on the question paper.

No additional materials are needed.

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You may use a calculator.
- You should show all your working and use appropriate units.

INFORMATION

- The total mark for this paper is 80.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **20** pages. Any blank pages are indicated.

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1 (a) (i) The boxes on the left show some of the components of blood.

The boxes on the right show the functions of the components.

Draw lines to link each component with its function or functions.

Draw **four** lines.

component	function
platelets	blood clotting
red blood cells	phagocytosis
white blood cells	produce antibodies
	transport oxygen

[4]

(ii) Plasma is also a component of blood.

Describe the function of plasma.

.....

.....

.....

.....

..... [2]

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(b) Fig. 1.1 is a photomicrograph of one component of blood.

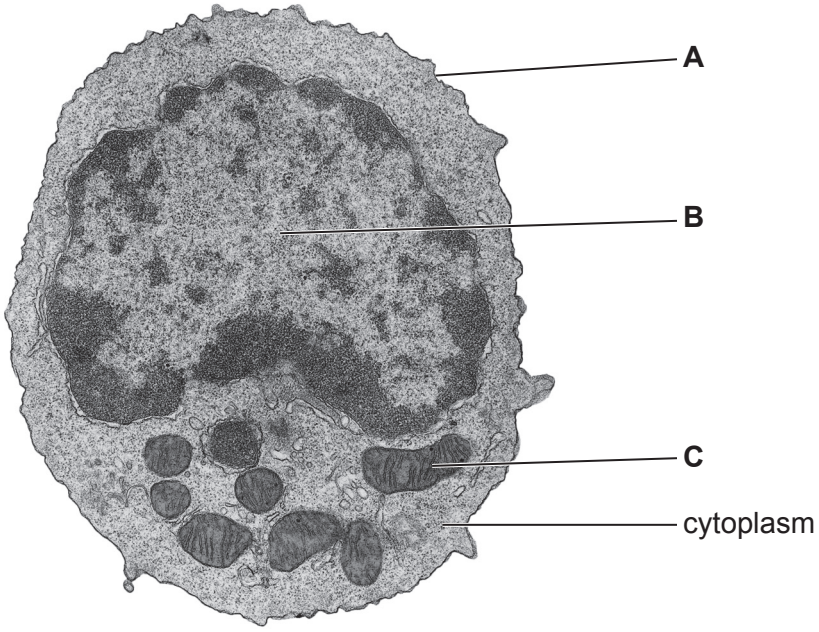


Fig. 1.1

(i) State the name of the component of blood shown in Fig. 1.1.

..... [1]

(ii) Identify structures **A**, **B** and **C** shown in Fig. 1.1.

A .....

B .....

C .....

[3]

(iii) Describe **one** function of the cytoplasm.

.....

..... [1]

[Total: 11]

2 Fig. 2.1 shows part of a strawberry tree.



Fig. 2.1

(a) Complete the sentences, using words from the list, to describe how living things are named.

Each word may be used once, more than once or not at all.

binomial	**dichotomous**	**gamete**	**genus**
kingdom	**offspring**	**organism**	**species**

The ..... system is used to give every species a scientific name.

The scientific name for the strawberry tree in Fig. 2.1 is *Arbutus unedo*.

Arbutus is the ..... name and *unedo* is the .....

name.

[3]

(b) Describe what is meant by the term species.

.....

..... [2]

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(c) Plant species can be identified using a dichotomous key.

Fig. 2.2 shows the leaves from six plant species, **A** to **F**.

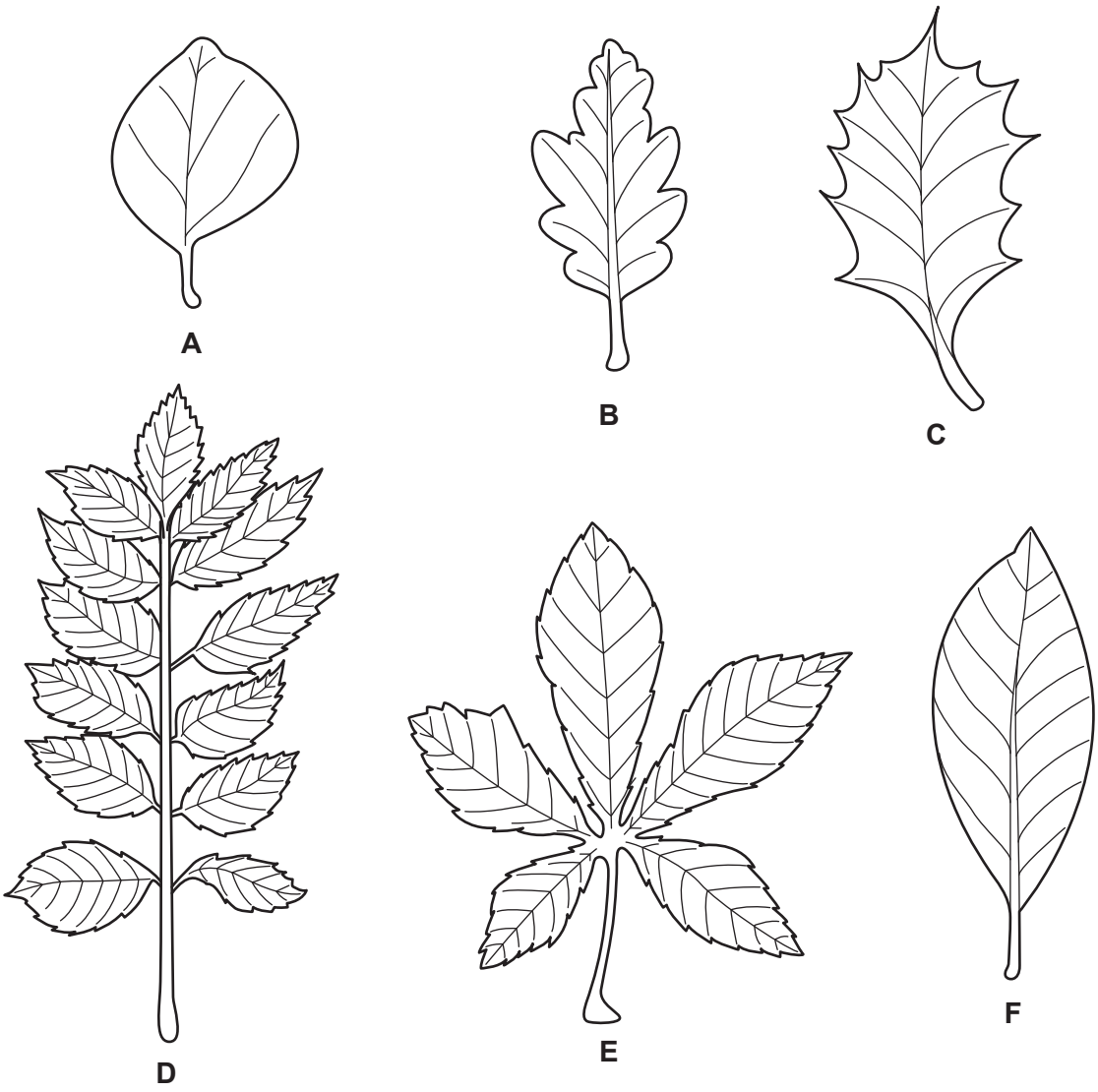


Fig. 2.2 (not to scale)

Use the key to identify the species shown in Fig. 2.2.

Write the letter of each species (**A** to **F**) in the correct box in the key.

Key

1	**(a)**	leaf has a smooth, unlobed outline	**go to 2**	
	(b)	leaf does **not** have a smooth, unlobed outline	**go to 3**	
2	**(a)**	leaf is more than twice as long as it is wide	*Laurus nobilis*	
	(b)	leaf is **not** more than twice as long as it is wide	*Cydonia oblonga*	
3	**(a)**	leaflets are present	**go to 4**	
	(b)	leaflets are **not** present	**go to 5**	
4	**(a)**	only five leaflets are present	*Aesculus hippocastanum*	
	(b)	more than five leaflets are present	*Fraxinus excelsior*	
5	**(a)**	leaf has spikes on its outer edge	*Ilex aquifolium*	
	(b)	leaf does **not** have spikes on its outer edge	*Quercus robur*	

[5]

[Total: 10]

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[Turn over

3 **(a)** Fig. 3.1 shows the apparatus used in an investigation to determine the effect of carbon dioxide on photosynthesis.

Soda lime and potassium hydroxide solution both absorb carbon dioxide from the air.

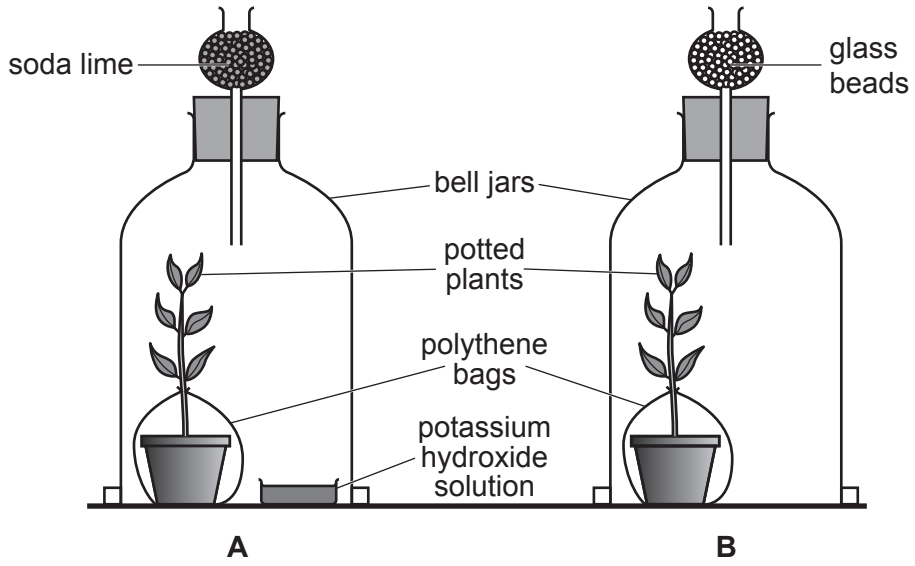


Fig. 3.1

Using the information in Fig. 3.1, predict which plant, **A** or **B**, will have the **lowest** rate of photosynthesis.

Explain your prediction.

prediction .....

explanation .....

..... [1]

(b) Explain why a student used iodine solution to show that photosynthesis had occurred in a leaf.

.....

.....

.....

.....

.....

.....

..... [3]

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(c) Fig. 3.2 shows the effect of light intensity on the rate of photosynthesis.

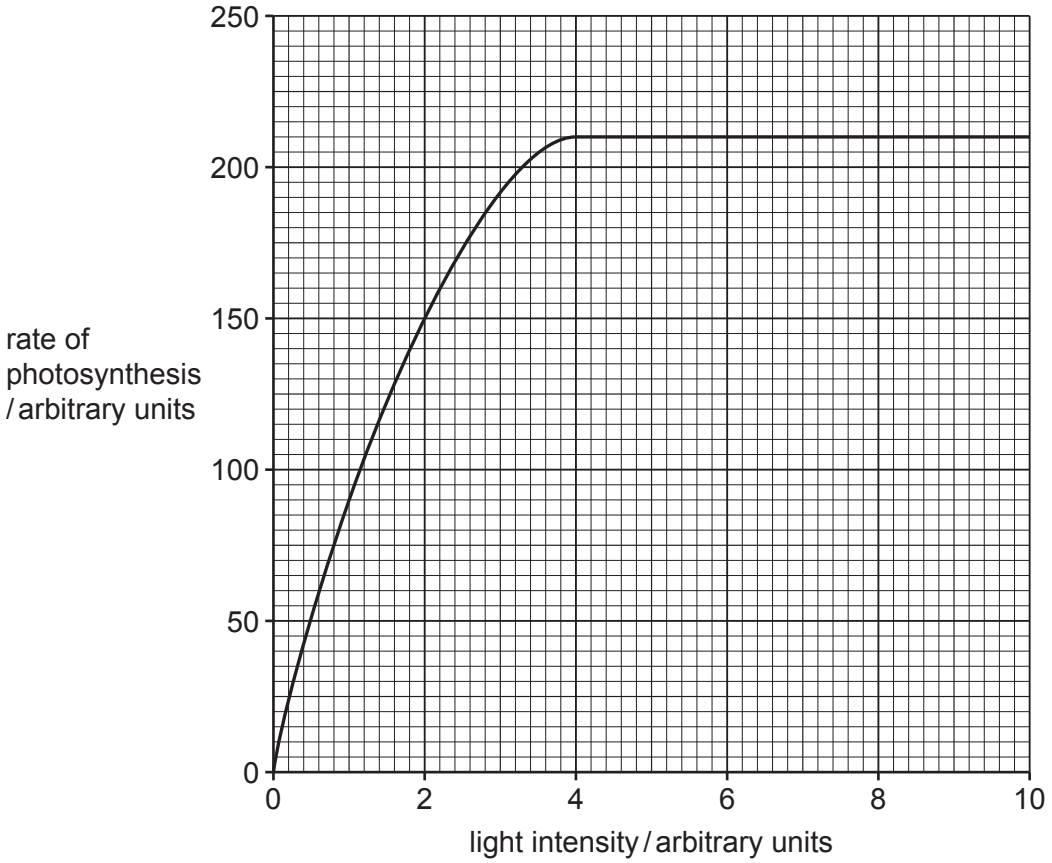


Fig. 3.2

Using the information in Fig. 3.2:

(i) Identify the highest rate of photosynthesis.

..... arbitrary units [1]

(ii) Calculate the difference in the rate of photosynthesis between 1 and 2 arbitrary units of light intensity.

..... arbitrary units [1]

(iii) Identify the lowest light intensity that gives the maximum rate of photosynthesis.

..... arbitrary units [1]

(iv) Explain why the graph rises as light intensity increases from 0 to 2 arbitrary units.

.....

.....

..... [2]

(d) Carbon dioxide is one of the raw materials needed for photosynthesis.

State the other raw material.

..... [1]

(e) State the name of the cell structure where photosynthesis occurs.

..... [1]

(f) In another investigation a student investigated the rate of photosynthesis at two temperatures in three different species of plant. The results are shown in Table 3.1.

Table 3.1

species	rate of photosynthesis at 20 °C / arbitrary units	rate of photosynthesis at 30 °C / arbitrary units
1	20.3	32.8
2	15.9	12.6
3	32.3	35.7

(i) Calculate the percentage increase in the rate of photosynthesis for species 1 between 20 °C and 30 °C.

Give your answer to **three** significant figures.

Space for working.

..... %
[3]

(ii) Tick (✓) **one** conclusion that can be made from the data in Table 3.1.

Species 1 has the greatest rate of photosynthesis at 40 °C.	
The enzymes in species 2 denatured at 30 °C.	
Species 3 has the highest rate of photosynthesis at both 20 °C and 30 °C.	
Species 3 has the smallest change in rate of photosynthesis between 20 °C and 30 °C.	

[1]

[Total: 15]

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4 **(a)** Complete the sentences using words from the list.

Each word may be used once, more than once or not at all.

movement	**muscles**	**nerve**	**organisms**
receptor	**reflex**	**sense**	**tissues**

The eye is a ..... organ. The eye is made from a group of ..... .

The ..... cells in the retina detect light.

[3]

(b) Fig. 4.1 is a diagram of the parts of the eye.

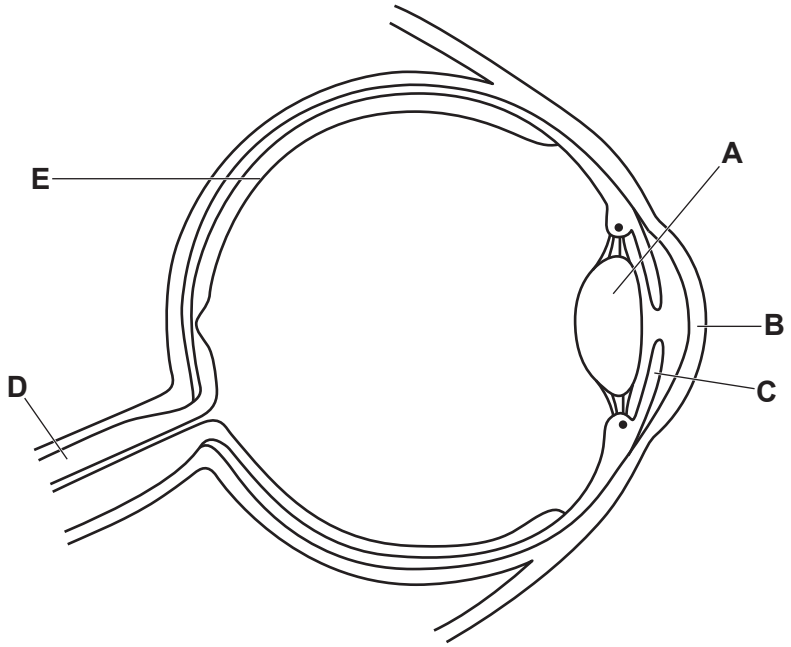


Fig. 4.1

(i) Draw an **X** on Fig. 4.1 to show the position of the blind spot. [1]

(ii) Identify the letters on Fig. 4.1 that represent the:

cornea .....

iris .....

retina .....

optic nerve. .....

[4]

(iii) Complete the table by describing the function of some of the structures of the eye.

structure	function
iris	
lens	

[2]

[Total: 10]

5 Fig. 5.1 shows a food web from a desert ecosystem.

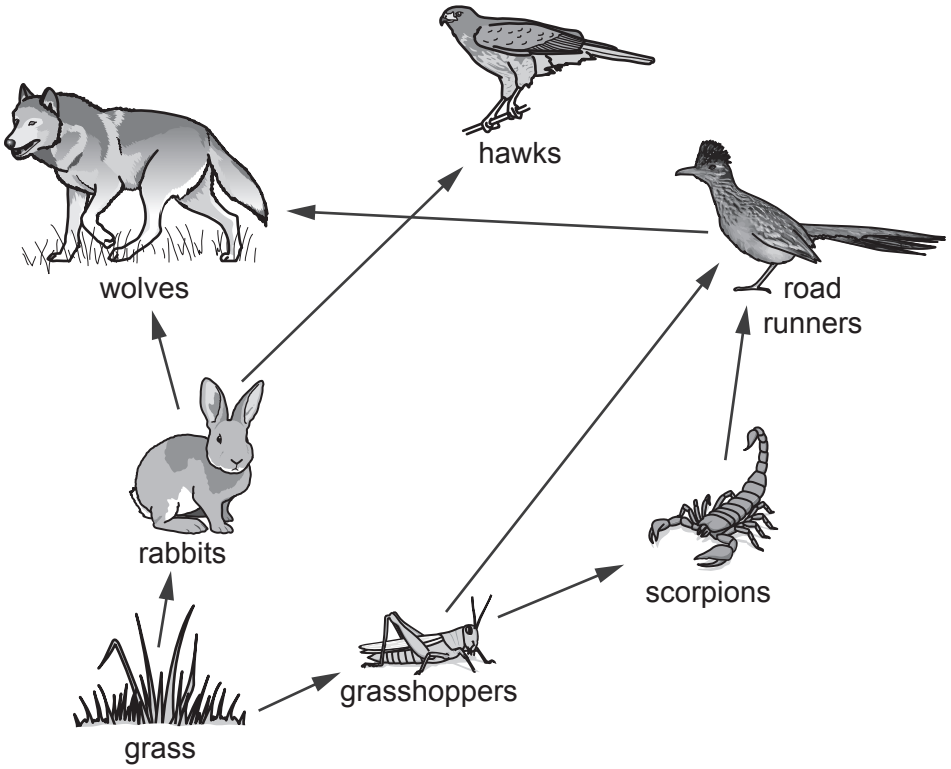


Fig. 5.1 (not to scale)

(a) Identify, on Fig. 5.1:

a quaternary consumer .....

a herbivore .....

an organism that is both a secondary and tertiary consumer .....

an organism that is in trophic level one. .....

[4]

(b) A food chain from the food web is shown:

grass → rabbits → wolves

(i) Sketch the pyramid of biomass for this food chain.

Label the pyramid with the name of each species.

[2]

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(ii) State the principal source of energy for food webs.

..... [1]

(iii) Humans harvest rabbits.

The road runner population could increase or decrease as a result of humans overharvesting rabbits.

Explain how both changes in the road runner population could occur.

.....

.....

.....

.....

.....

.....

..... [3]

(c) The population of hawks has decreased significantly in the past 20 years. One cause of this decrease is insecticides used in farming.

(i) Explain why farmers use insecticides.

.....

.....

..... [2]

(ii) Suggest **three** other ways that humans may cause the population of birds such as hawks to decrease.

1 .....

.....

2 .....

.....

3 .....

.....

[3]

[Total: 15]

6 Fig. 6.1 shows the total mass of plastics waste produced in the world since 2000 and what happens to that plastic. The data from 2020 to 2050 are predictions and are shown as dashed lines on Fig. 6.1.

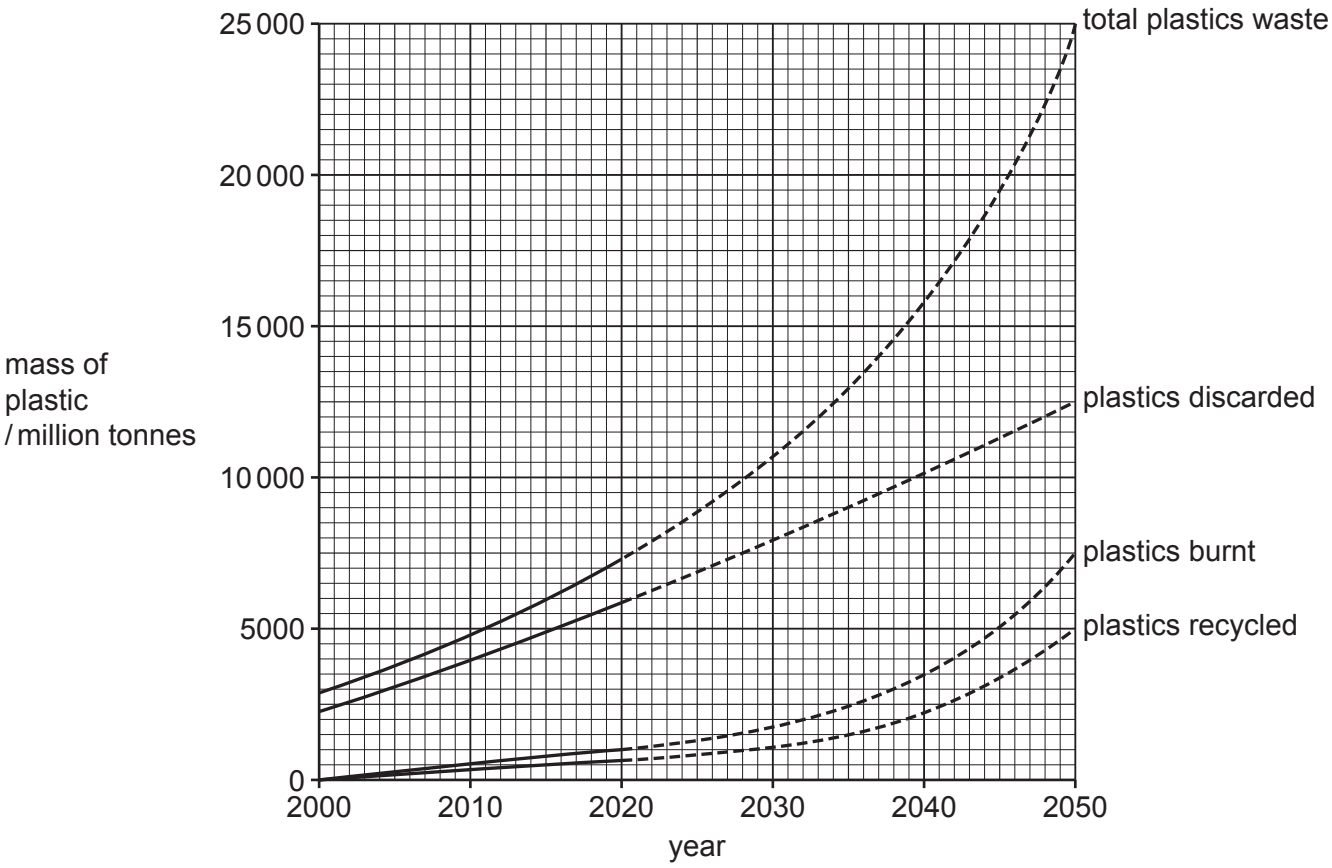


Fig. 6.1

(a) (i) Using the information in Fig. 6.1, describe the data for the total plastics waste production from 2000 to 2050.

.....

.....

.....

.....

..... [2]

(ii) Using the information in Fig. 6.1, estimate the percentage of total plastics waste that will be discarded in 2050.

Circle the correct percentage.

12% **25%** **33%** **50%**

[1]

(iii) Many plastics are made from oil.

Oil is **not** a sustainable resource.

Describe what is meant by the term sustainable resource.

.....

.....

.....

.....

..... [2]

(iv) The combustion of plastics releases carbon dioxide gas into the atmosphere.

Describe the consequences of releasing this carbon dioxide gas into the atmosphere.

.....

.....

.....

.....

.....

.....

..... [3]

(b) Fig. 6.2 shows plastic pollution in an ocean.



Fig. 6.2

Describe the effects of plastic pollution on organisms in the oceans.

.....

.....

.....

.....

.....

.....

..... [3]

[Total: 11]

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7 **(a)** Some bacteria have had human genes inserted into them. The bacteria are said to be genetically modified.

(i) Describe what is meant by the term gene.

.....

.....

.....

.....

..... [2]

(ii) One human protein that is made by genetically modified bacteria is insulin.

State the role of insulin in the human body.

.....

.....

..... [1]

(iii) Describe **one** other use of genetically modified organisms.

.....

.....

..... [1]

(iv) State **two** reasons why bacteria are useful for genetic modification.

1 .....

2 .....

[2]

(b) State **two** ways in which bacterial cells are different from plant cells.

1 .....

2 .....

[2]

[Total: 8]

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