Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME	
CENTRE NUMBER	
CANDIDATE NUMBER	

BIOLOGY **0610/33**

Paper 3 Extended **October/November 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.

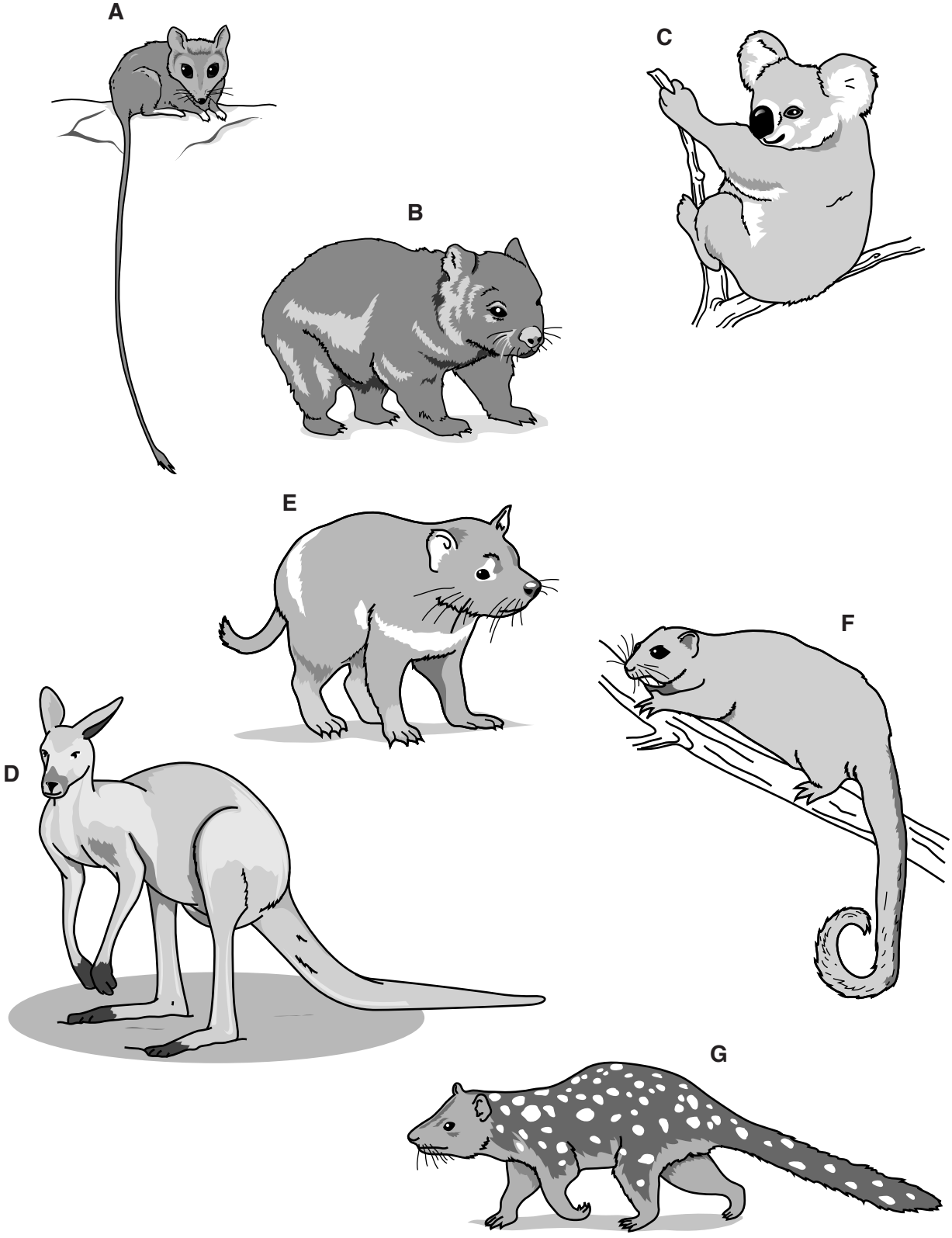
Electronic calculators may be used.
You may lose marks if you do not show your working or if you do not use appropriate units.

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 **18** printed pages and **2** blank pages.

1 Fig. 1.1 shows seven marsupial mammals.



not drawn to scale

Fig. 1.1

(a) (i) State **one** visible feature that could be used to identify the marsupials in Fig. 1.1 as mammals.

.....[1]

(ii) 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)	tail visible	go to 2	
	(b)	no tail visible	go to 3	
2	(a)	back feet at least twice as long as front feet	go to 4	
	(b)	back feet and front feet of similar length	go to 5	
3	(a)	large ears relative to the size of the head	*Phascolarctos cinereus*	
	(b)	small ears relative to the size of the head	*Vombatus ursinus*	
4	(a)	tail at least twice as long as body	*Sminthopsis longicaudata*	
	(b)	tail less than twice as long as body	*Macropus rufus*	
5	(a)	uniform body colouring	*Paljara tirarense*	
	(b)	markings on body	go to 6	
6	(a)	white band across back and chest	*Sarcophilus harrisii*	
	(b)	no white band across back and chest	*Dasyurus maculatus*	**G**

[3]

(b) Sexual reproduction occurs in all mammals. A zygote is formed from the fertilisation of a male gamete and a female gamete.

(i) Name the process that results in the formation of haploid gametes.

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(ii) Explain the importance of sexual reproduction in mammals.

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(c) Marsupials differ from other mammals by giving birth to relatively undeveloped offspring. Female humans have a placenta and therefore give birth to more developed offspring.

(i) Describe the role of the placenta in humans.

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(ii) In humans, the placenta is connected to the amniotic sac which contains amniotic fluid.

State **two** functions of the amniotic fluid.

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[Total: 14]

2 Fig. 2.1 shows a diagram of the liver and the blood vessels that enter and exit from it.

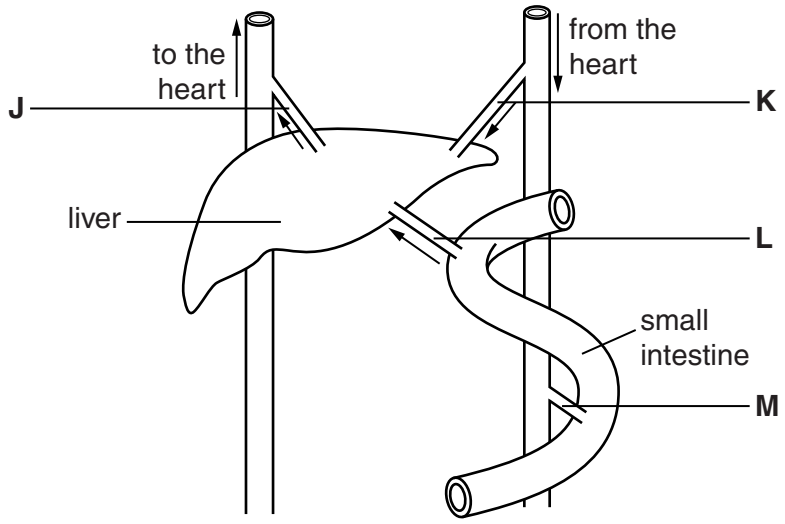

Fig. 2.1

(a) Name blood vessel **L**.

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(b) Blood vessel **J** is a vein.

State **two** structural features of veins and explain how each feature is related to its function of returning blood to the heart.

feature .....

explanation .....

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feature .....

explanation .....

.....[4]

(c) Blood samples were taken from each of the blood vessels **J**, **K**, **L** and **M** two hours after a meal of rice. Table 2.1 shows the concentration of glucose in these blood samples.

Table 2.1

blood vessel	blood glucose concentration / mg per 100 cm^3
J	135
K	128
L	181
M	133

Calculate the percentage increase in blood glucose concentration between blood vessel **J** compared with **L**. Express your answer to the nearest whole number.

Show your working.

..... %
[2]

(d) Control of blood glucose by the liver is an example of homeostasis.

(i) Explain how the liver lowers blood glucose concentration when it is too high.

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(ii) Name **one other** factor in the human body that is also controlled by homeostasis.

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(e) Amino acids are processed by the liver.

Describe this process.

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(f) State **one other** function of the liver, besides homeostasis and processing amino acids.

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[Total: 14]

3 Researchers designed an investigation to find the effect of increasing levels of exercise on two groups of people.

The first group of people were trained cyclists and the second group were untrained cyclists.

The researchers asked all the people to cycle at four levels of effort: 30%, 45%, 60% and 75% of their maximum cycle speed.

They cycled for eight minutes at each level of effort.

(a) The researchers predicted that the pulse rate of all the cyclists would increase during exercise.

Explain this prediction.

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Fig. 3.1 shows the average concentration of lactic acid in the blood of the trained cyclists and untrained cyclists in the investigation.

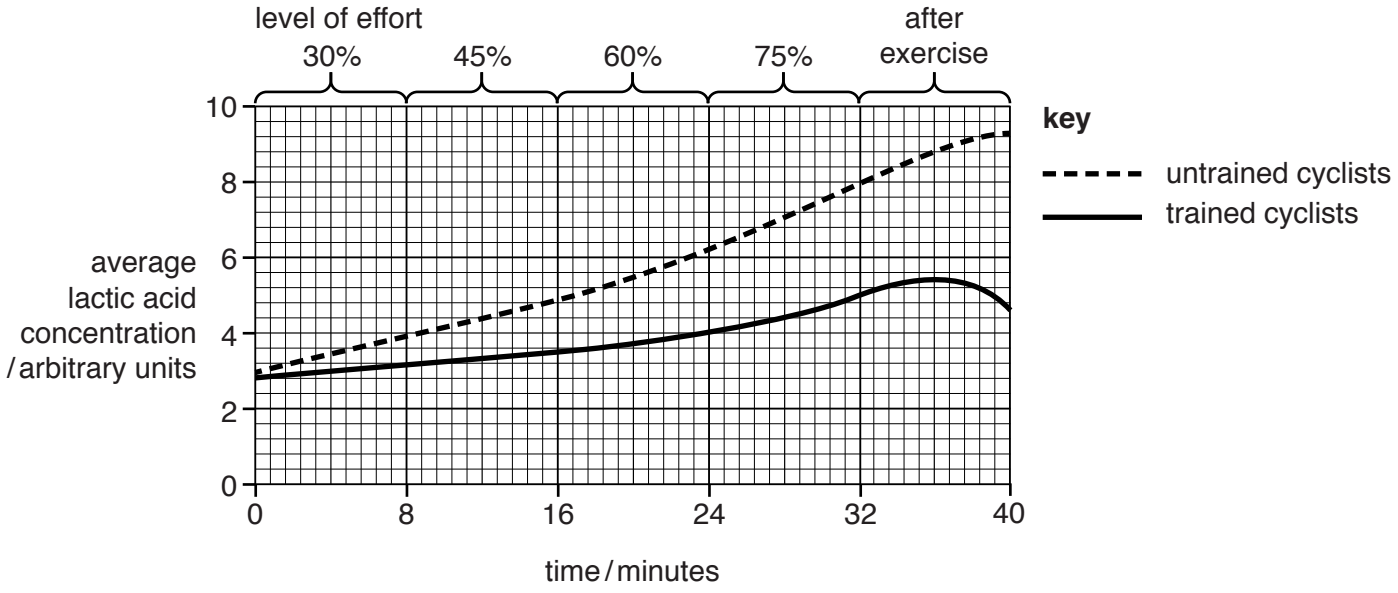

Fig. 3.1

(b) Describe the effect of the increasing levels of effort on the average lactic acid concentration in the blood of the **untrained** cyclists.

You should use data from Fig. 3.1 in your answer.

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(c) Lactic acid is produced in the muscles during anaerobic respiration.

(i) Define the term *anaerobic respiration*.

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(ii) Describe how the lactic acid produced in muscle cells enters the blood.

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(iii) Name the component of the blood that transports lactic acid.

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(d) Explain why the lactic acid concentration in the blood in trained cyclists is different from the untrained cyclists eight minutes **after** the exercise.

You should use data from Fig. 3.1 in your answer.

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[Total: 13]

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4 Water moves into plants from the soil and exits through the leaves.

(a) Explain how water moves from the soil into the root.

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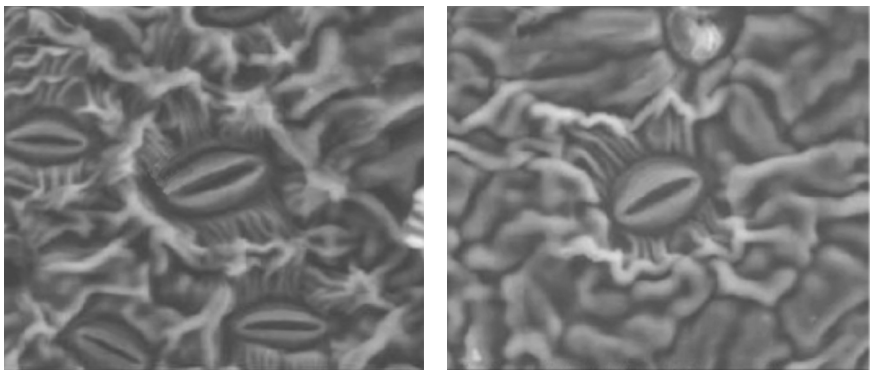
Water reaches the leaves from the roots through the xylem. Fig. 4.1 shows images of stomata on the lower surfaces of leaves of two varieties of olive plant, **A** and **B**. Both are shown at the same magnification.



A **B**

Fig. 4.1

(b) **(i)** Describe the function of stomata.

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(ii) Compare the density of stomata between the two varieties of olive plant, **A** and **B**, shown in Fig. 4.1.

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(iii) Under identical environmental conditions the rate of water uptake in plant **A** is higher than plant **B**.

Explain why.

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(c) The density of stomata is an example of a leaf adaptation to the environmental conditions.

State **two** other adaptations of leaves for survival in a **dry** environment.

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(d) Water lost from the leaves enters the atmosphere.

Describe how water is recycled from the atmosphere back to the roots.

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[Total: 15]

5 Plastic bags cause many problems in the environment.

(a) Plastic bags were banned in Bangladesh in 2002.

Outline the effects of non-biodegradable plastics on the environment.

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Some countries have not banned plastic bags. There have been many studies to analyse possible alternatives to plastic bags.

Table 5.1 shows the results of a study comparing the environmental impact of producing plastic bags and paper bags.

Table 5.1

environmental impact of production	plastic bags	paper bags
waterborne chemical waste/g per bag	1.1	2.7
airborne chemical waste/g per bag	0.025	1.25
energy used/kJ per bag	594	2511
trees used per bag	0	0.0014
oil used/dm^3 per bag	0.022	0

(b) (i) Compare the environmental impact of making plastic bags with the environmental impact of making paper bags.

You should use data from Table 5.1 in your answer.

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(ii) Heavy metals and acids are the most common waterborne chemical wastes from the production of paper bags.

Describe the effects of these waterborne chemical wastes on the environment.

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(c) Table 5.2 shows the results from a study comparing recycling of plastic bags and paper bags.

Table 5.2

	plastic bags	paper bags
bags recycled/%	0.6	19.4
energy used to recycle/kJ per bag	17	14444

(i) Compare the energy used to **make plastic** bags with the energy used to **recycle plastic** bags.

You should use data from Table 5.1 and Table 5.2 in your answer.

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(ii) Pollution by heavy metals and acid is one concern about the making of **paper** bags. There are additional concerns about the making and recycling of **paper** bags.

Discuss these additional concerns.

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[Total: 14]

6 **(a)** Define the term *genetic engineering*.

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(b) Fig. 6.1 is a flow diagram that shows how insulin can be produced using genetic engineering.

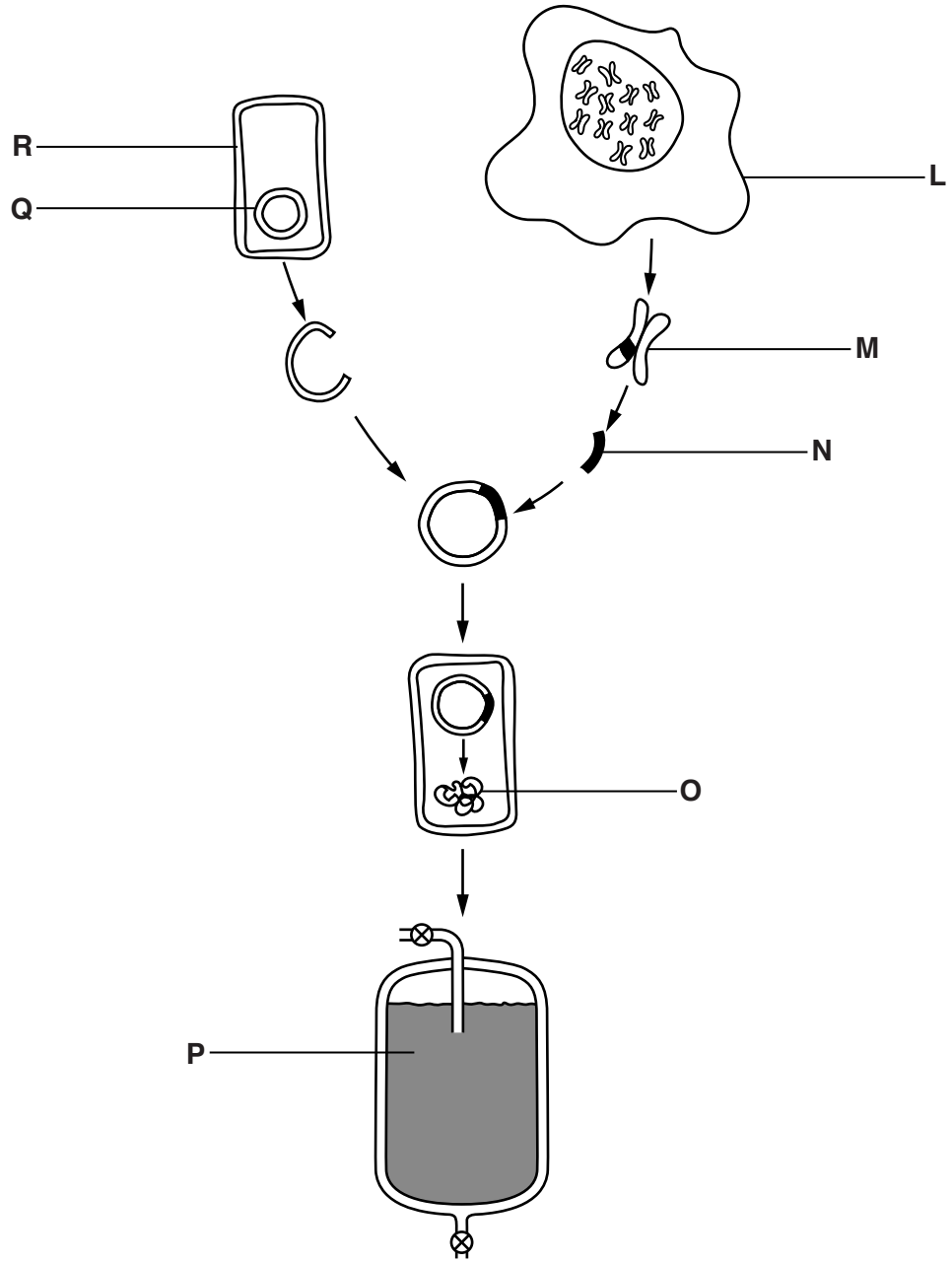

Fig. 6.1

Table 6.1 shows stages in the production of insulin by genetic engineering.

Complete Table 6.1. The first row has been done for you.

Table 6.1

letter from Fig. 6.1	name	description
M	chromosomes	threads of DNA found in the nucleus
		section of DNA removed from human cell
	plasmid	
		type of cell that is genetically engineered
		specific chain of amino acids coded by the section of DNA removed from the human cell
	fermenter	

[5]

(c) The genetically engineered cells in Fig. 6.1 reproduce asexually.

Explain the advantages of asexual reproduction for insulin production by genetic engineering.

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[Total: 10]

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