

Cambridge International Examinations

Cambridge International AS & A Level	Cambridge International Examinations Cambridge International Advanced Subsidiary and Advanced Level	
CANDIDATE NAME	O _I	
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CENTRE NUMBER	CANDIDATE NUMBER	J

BIOLOGY 9700/23

Paper 2 Structured Questions AS

October/November 2014 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 in the spaces provided at the top of this page. Write in dark blue or black pen.

You may use an HB pencil for any diagrams, graphs or rough working.

Do not use staples, paper clips, glue or correction fluid.

DO **NOT** WRITE IN ANY BARCODES.

Answer all questions.

Electronic calculators may be used.

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.



WW. Da

Answer all the questions

Fig. 1.1 is a photomicrograph of plant root cells near the growing tip. Some of the ce undergoing mitosis.

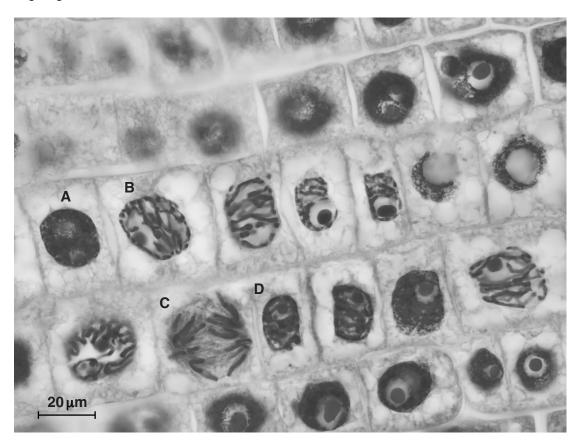


Fig. 1.1

(a)	State one feature, visible in Fig. 1.1, which indicates that the section is taken from plant tissue and not animal tissue.
	[1]
(b)	State the letter, A to D , of the cell in Fig. 1.1 which is in:
	(i) prophase
	(ii) anaphase [2]
(c)	Describe two events occurring in cell B .
	1
	2

(d)	(i)	Describe the role of mitosis in a growing plant root tip.
		Tong
		[2]
	(ii)	Mutations can sometimes occur in cells which are rapidly dividing.
		Outline how a mutation can cause an altered polypeptide to be produced.
		[2]
(e)	Cal	culate the magnification of Fig. 1.1.
	Sho	ow your working and give your answer to the nearest whole number.
		magnification ×[2]

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[Total: 11]

Fig. 2.1 shows a food chain in a freshwater ecosystem. 2

مانمهم	_	water	pond	northern		h a 4 a 10
diatom –	-	flea	skater —	pike	→	heron

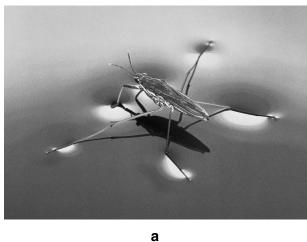
Fig. 2.1

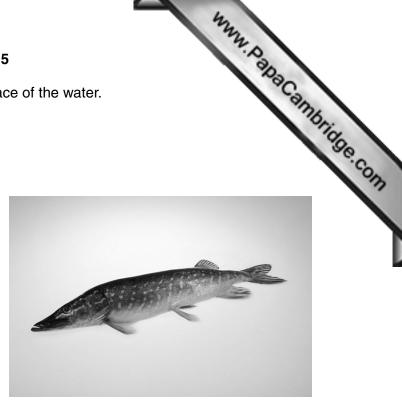
	42
	4
Fig.	2.1 shows a food chain in a freshwater ecosystem.
	2.1 shows a food chain in a freshwater ecosystem. diatom water flea pond skater northern pike heron Fig. 2.1
	Fig. 2.1
(a)	The diatom is an autotroph.
	Explain what is meant by the term autotroph.
(b)	Describe the role of the water flea in the food chain shown in Fig. 2.1.
(c)	
(-)	, , , , , , , , , , , , , , , , , , ,

Fig. 2.2a shows a pond skater walking on the surface of the water.

Fig. 2.2b shows a northern pike.

These are not shown to the same scale.





b

Fig. 2.2

Both animals live in northern countries of the world, where temperatures often drop below 0°C.

(d)	Describe the importance of water as an environment for the pond skater and the northern pike.
	[4]

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(e)	The mud at the bottom of the freshwater ecosystem contains dead organic mate supports the growth of water plants. Outline how nitrogen from the dead organic material is made available to the growing plants.
	Outline how nitrogen from the dead organic material is made available to the growing pla
	[4]
	[Total: 14]

3 Measles is an infectious disease for which vaccines have been developed.

The commonly used vaccine consists of an attenuated (weakened) form of the virus.

The measles vaccine is normally given to children when they are about one year old, followed by a booster dose when they are about four years old.

(a)	Explain how this vaccine can provide long-term immunity against measles.
	re

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Fig. 3.1 shows the number of reported cases of measles and the percentage of the vaccinated worldwide between 1980 and 2002.

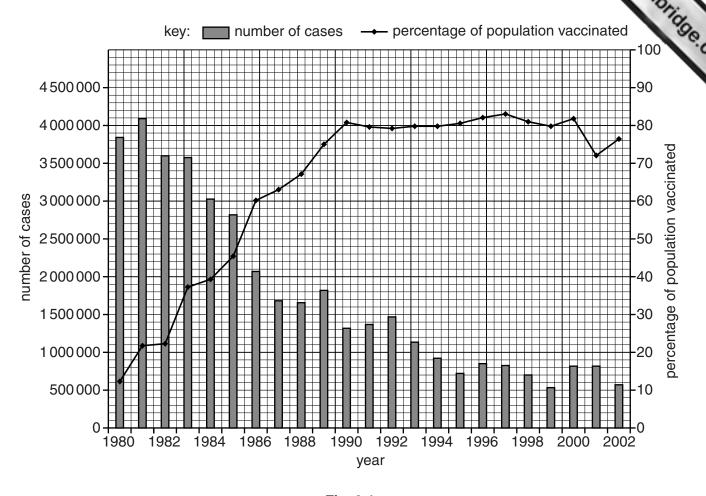


Fig. 3.1

(b)	Describe the trends shown in Fig. 3.1:
	between 1980 and 1990

	between 1990 and 2002.
	[4]
(c)	The measles virus has a unique protein on its surface called MV-H which can bind to a protein called CD-46 on the surface of human cells. This allows the measles virus to infect these cells.
	Suggest how the two proteins, MV-H and CD-46, can bind to each other.
	[2]

[Total: 11]

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www.PapaCambridge.com Fig. 4.1 is a computer-generated image of the enzyme hexokinase binding with N glucose. The product of the enzyme-catalysed reaction is glucose-6-phosphate.

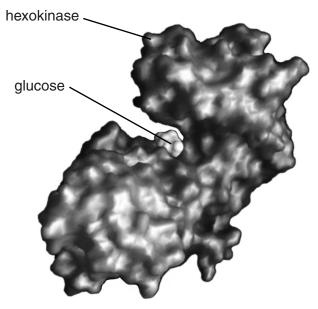


Fig. 4.1

(a)	Hexokinase binds with glucose using the induced fit mechanism. Describe how an enzyme-substrate complex forms by this mechanism.
	[3]
(b)	Suggest how enzymes which use the induced fit mechanism can be less affected by competitive inhibitors than those which use the lock and key mechanism.
	[2]

4

(C)		duct formed decreases by 50% compared to a sample kept between 30°C and	Mbrig
	Ехр	plain this result.	10
			[3]
Glu	cose	can enter cells by active transport or facilitated diffusion.	
Glu	cose-	-6-phosphate is a charged, polar molecule and cannot move out of cells.	
(d)	(i)	State two differences between active transport and facilitated diffusion.	
		1	
		2	
	(ii)	Suggest why glucose-6-phosphate cannot move out of cells.	[2]
			[2]
			[~]

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[Total: 12]

Fig. 5.1 shows a section of lung tissue from a smoker. The image magnification is ×10

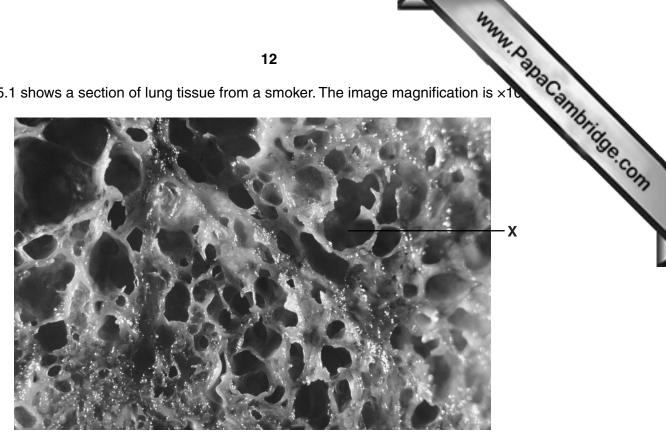


Fig. 5.1

In a smoker, the walls between the gas exchange structures in the lungs can break down, resulting in the damaged features visible in Fig. 5.1. One of these damaged features is labelled ${\bf X}$.

(a)	(i)	Name the gas exchange structures which are damaged in Fig. 5.1.			
		[1]			
	(ii)	Name the smoking-related disease resulting in the damaged feature labelled ${\bf X}$ in Fig. 5.1.			
		[1]			
(b)	Smoking-related diseases may increase the risk of infectious diseases of the gas exchange system.				
	Des	cribe and explain how smoking can increase the risk of these infections.			

5

(c)	From one cigarette, a smoker will inhale between 14 and 20 mg of carbon monox					
	From one cigarette, a smoker will inhale between 14 and 20 mg of carbon monox. Describe the effects of carbon monoxide on haemoglobin.					
	[2]					
	[Total: 7]					

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Table 6.1

Table 6.1 contains some informations plants.	14 tion about xylem vesse Table 6.1	phloem sieve tube
features	xylem vessels	phloem sieve tube elements
living cells		yes
substances transported		dissolved sugars and amino acids
direction of flow of substances	one direction, roots to leaves	
permeability of cell walls to water	not permeable	
cell wall material		

a)	Complete Table 6.1.	[4]
b)	State one use for magnesium ions in plants.	
		[1]
	l'Tota	al: 51

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