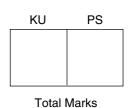
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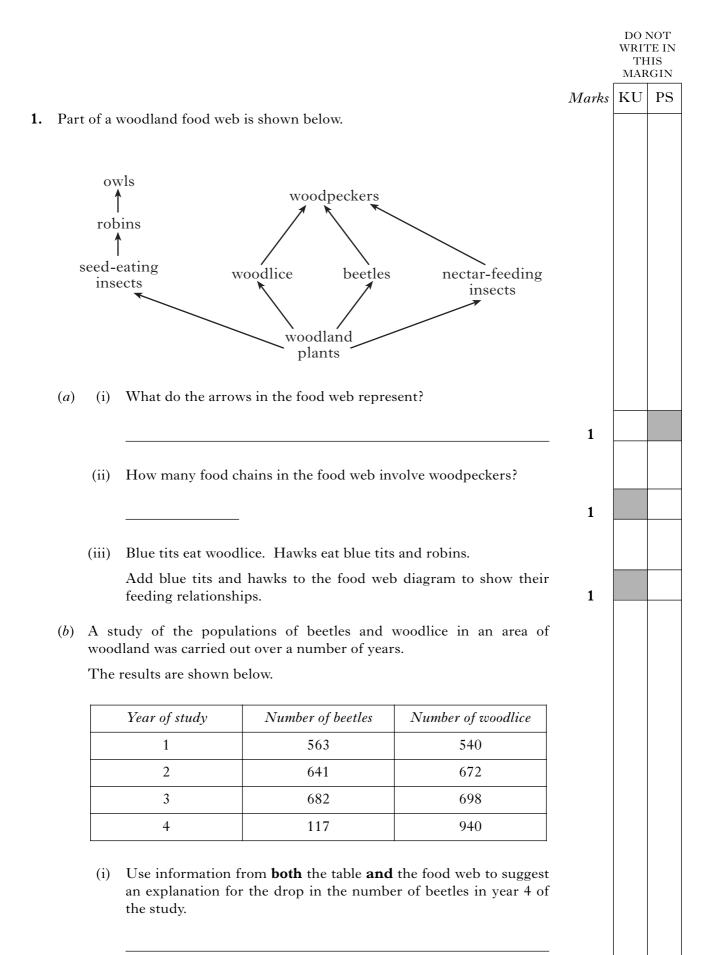
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NATIONAL QUALIFICATIONS 2005 WEDNESDAY, 18 MAY 9.00 AM - 10.30 AM BIOLOGY STANDARD GRADE General Level

Fill in these boxes and read what is printed below.	
Full name of centre	Town
Forename(s)	Surname
Date of birth Day Month Year Scottish candidate number	Number of seat
1 All questions should be attempted.	
2 The questions may be answered in any order but spaces provided in this answer book, and must be w	
3 Rough work, if any should be necessary, as well a book. Additional spaces for answers and for rough book. Rough work should be scored through when t	n work will be found at the end of the
4 Before leaving the examination room you must give not, you may lose all the marks for this paper.	e this book to the invigilator. If you do







							DO N WRIT TH MAR	FE IN HIS
		. 1)				Marks	KU	PS
.(b) (co								
	(ii)				bers of owls increased. heir birth rate and death rate.			
		P		,				
						-		
						_ 1		
	(iii)			he population number of ow	of the robins could have cause ls?	d		
						1		
<i>(c)</i>				dies, decay take box below to	es place. complete the following sentence	es		
	abou	t deca	у.		nan once or not at all.			
	Iou	inay u						
			soil plants	animals protein	nutrients micro-organisms			
			plants	protein	mero-organisms			
	Deca	ıy is ca	rried out by		·			
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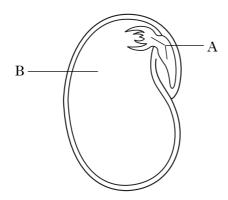
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2. (a) The following table gives the results of an investigation on the factors affecting seed germination.

	Conditions provided						
Test tube	Temperature (°C)	Water present	Oxygen present				
1	20	yes	yes				
2	20	yes	no				
3	20	no	yes				
4	0	yes	yes				
5	0	no	yes				

In which tube(s) would germination occur?

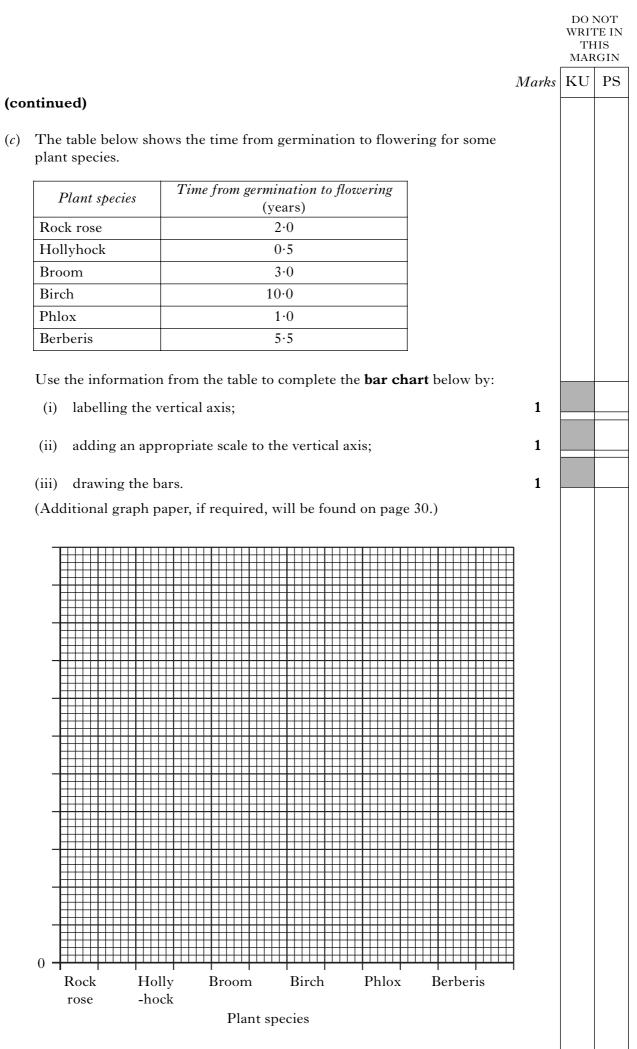
(b) The diagram shows a section through a seed.



(i) Name the parts labelled A and B.



(ii) Name the part of a seed which protects the internal structures.

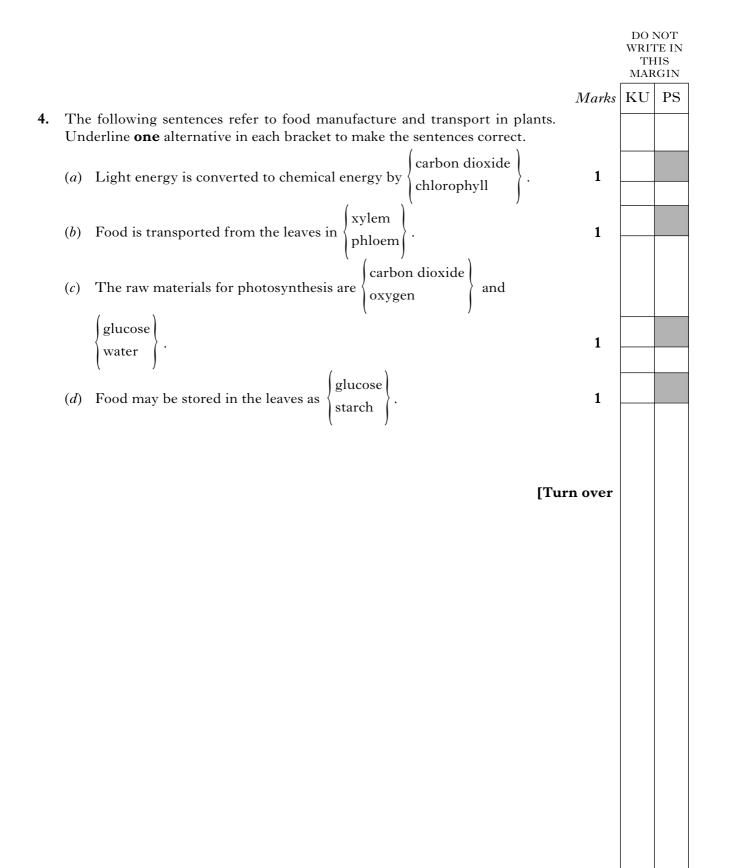


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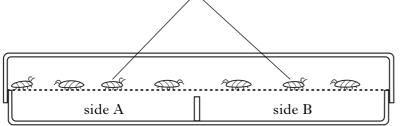
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a 3 year period. Image: Country Timber harvested each year (m ³) Scotland 2292 2496 2883 England 699 881 913 Wales 385 463 663 Total 3840 3840 (a) Complete the table to show the totals harvested in 1999 and in 2001. Space for calculations (b) What was the increase in timber harvested in Wales between 1999 and 2001? Space for calculation m ³ 1 (c) What percentage of the total timber harvested in 2000 was produced in Scotland? Space for calculation % 1	table below gives info	ormation about t	the harvest of so	oftwood timber over	Marks	KU	PS
Country 1999 2000 2001 Scotland 2292 2496 2883 England 699 881 913 Wales 385 463 663 Total 3840 3840 (a) Complete the table to show the totals harvested in 1999 and in 2001. Space for calculations (b) What was the increase in timber harvested in Wales between 1999 and 2001? Space for calculation (c) What percentage of the total timber harvested in 2000 was produced in Scotland? 1 (c) What percentage of the total timber harvested in 2000 was produced in Scotland? 1							
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Space for calculation	What percentage of t	he total timber	harvested in 20	00 was produced in			
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The diagram shows a choice chamber which could be used to investigate the behaviour of woodlice.
 woodlice



- (a) How could the choice chamber be set up to study the effect of light on the behaviour of woodlice?
- (b) (i) Name **one** other abiotic factor which may affect woodlice behaviour that can be investigated using a choice chamber.
 - (ii) How could the choice chamber be set up to investigate this other abiotic factor?

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6. The effect of practice on the reaction times of three volunteers was investigated. A buzzer was sounded and the time taken to stop a clock was measured.

Each volunteer was tested 10 times.

The results are shown in the table.

		Reaction time (milliseconds)									
Attempt Volunteer	1	2	3	4	5	6	7	8	9	10	
А	256	250	210	207	201	192	187	164	162	154	
В	234	227	218	201	200	185	179	161	153	147	
С	218	200	195	192	186	178	160	149	136	131	

- (*a*) Why were three volunteers tested rather than one?
- (b) The average reaction time of the three volunteers' first attempts was 236 milliseconds.

Calculate the average reaction time of their final attempts. *Space for calculation*

_____ milliseconds

(c) From the results of the investigation, describe the effect of practice on reaction time.

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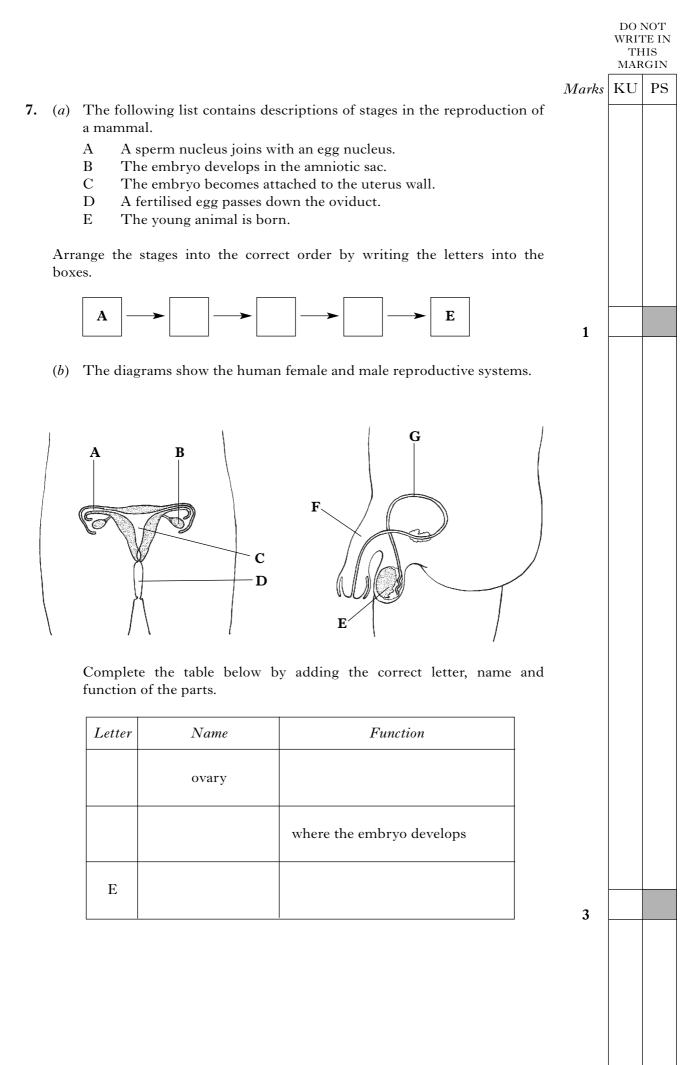
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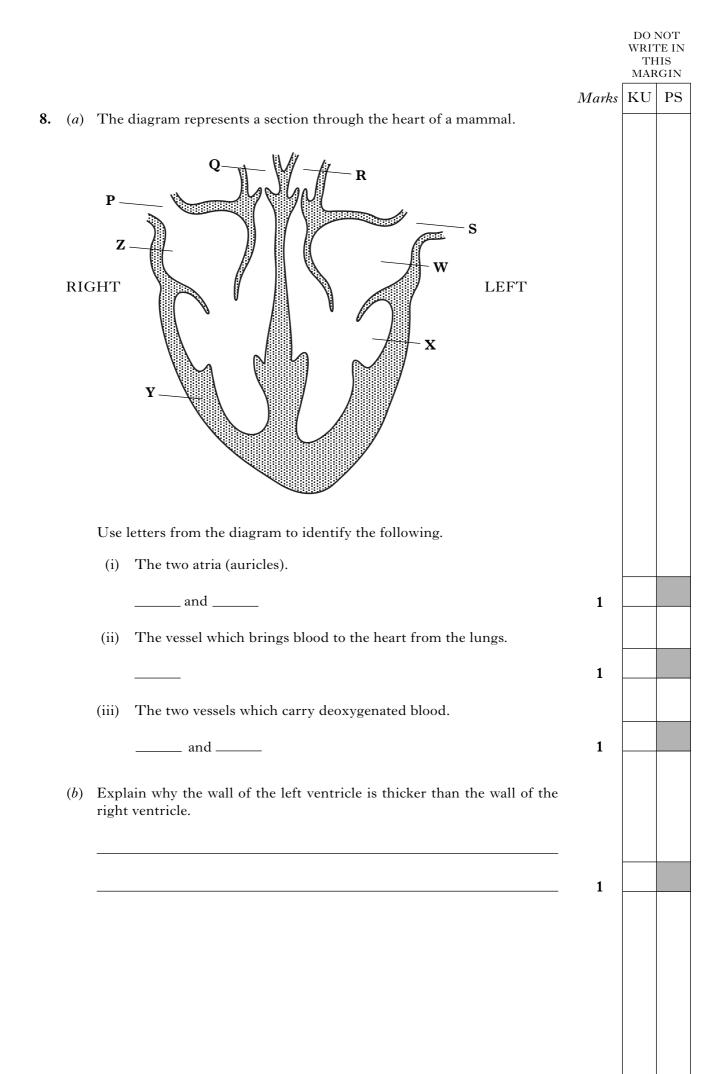
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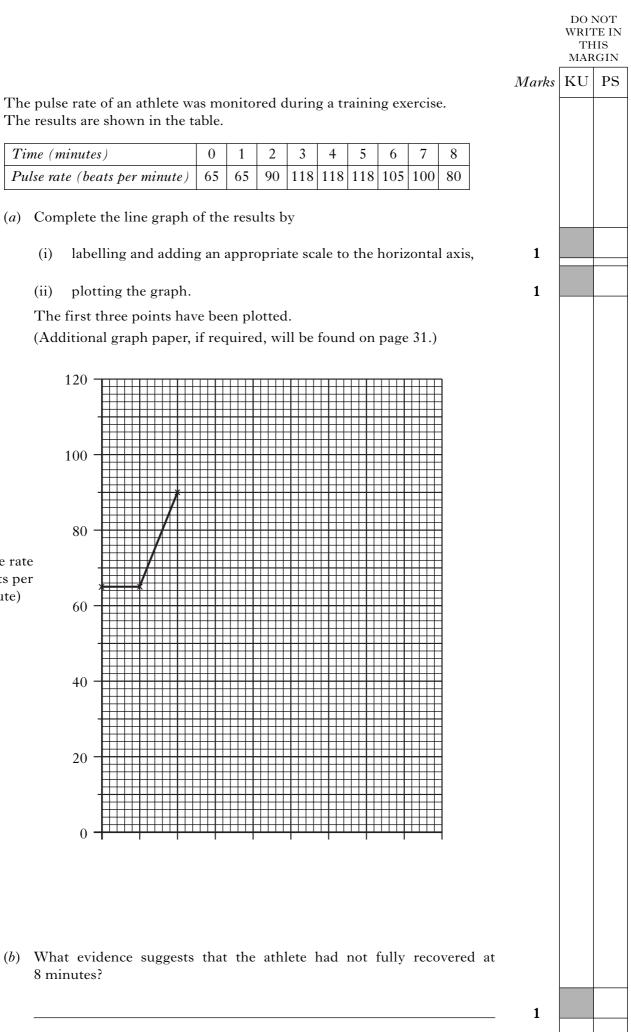
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7.	(cor	ntinu	ed)			
	(c)	(i)	Mammal embryos obtain their food from their mother's blood.			
			Where do the embryos of fish obtain their food?			
				1		
		(ii)	Young fish care for themselves.			
		. ,	How are young mammals cared for?			
				1		
				Ĩ		
			[Tur	n over		
			-			



					DO I WRIT TH MAR	ΓΕ IN HS
0	,			Marks		PS
8.	(con	(i)	ed) Use lines to connect each of the description of blood flow.	e blood vessels to the correct		
			Blood vessel	Description of blood flow		
			arteries	away from the heart		
			veins	through the tissues		
			capillaries	towards the heart 2		
		(ii)	In which type of blood vessel may a	a pulse be felt?		
				1		
				[Turn over		



Time (minutes)	0	1	2	3	4	5	6	7	8
Pulse rate (beats per minute)	65	65	90	118	118	118	105	100	80

- (a) Complete the line graph of the results by
 - (i) labelling and adding an appropriate scale to the horizontal axis,
 - (ii) plotting the graph.

The first three points have been plotted.

(Additional graph paper, if required, will be found on page 31.)

Pulse rate (beats per minute)

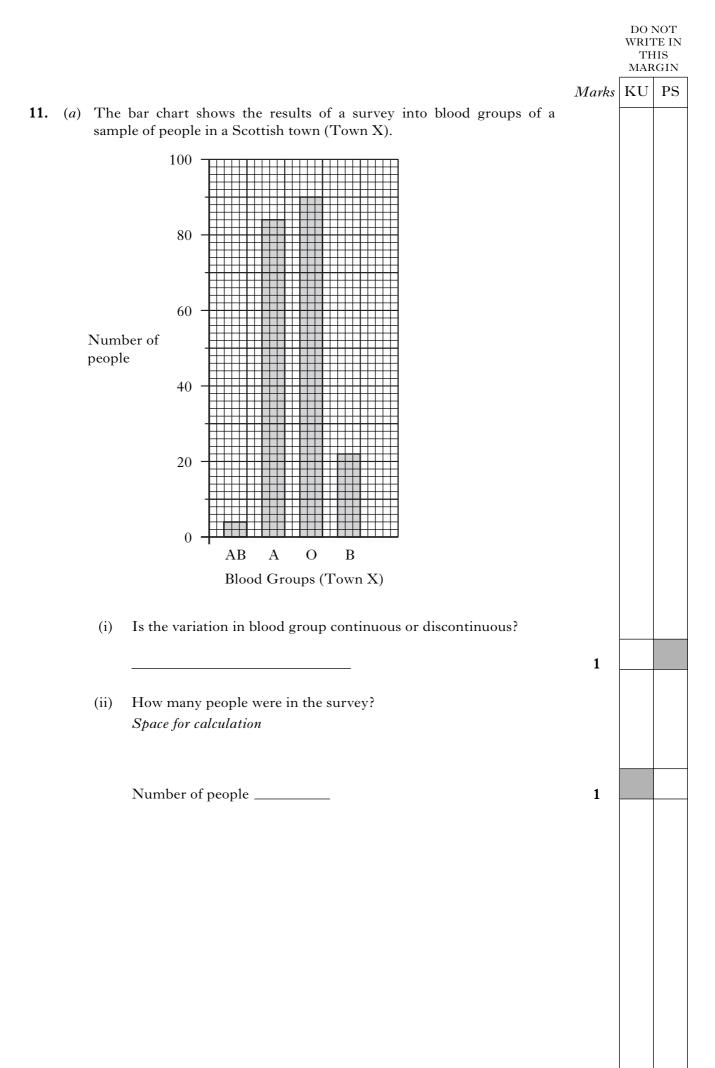
> (b) What evidence suggests that the athlete had not fully recovered at 8 minutes?

Page fourteen

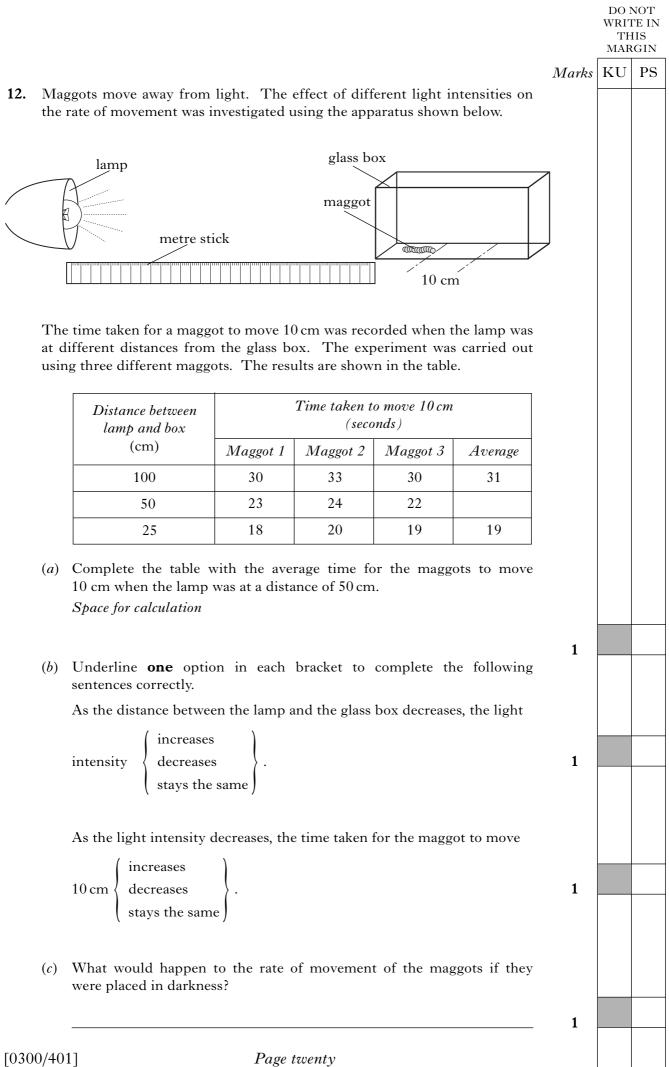
				DO I WRIT TH MAR	FE IN HS
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9.	(co)	ntinued) Suggest an improvement to the procedure to allow the recovery time of the athlete to be measured.			
	(<i>d</i>)	How might the recovery time of the athlete differ from that of an untrained person?	1		
			1		
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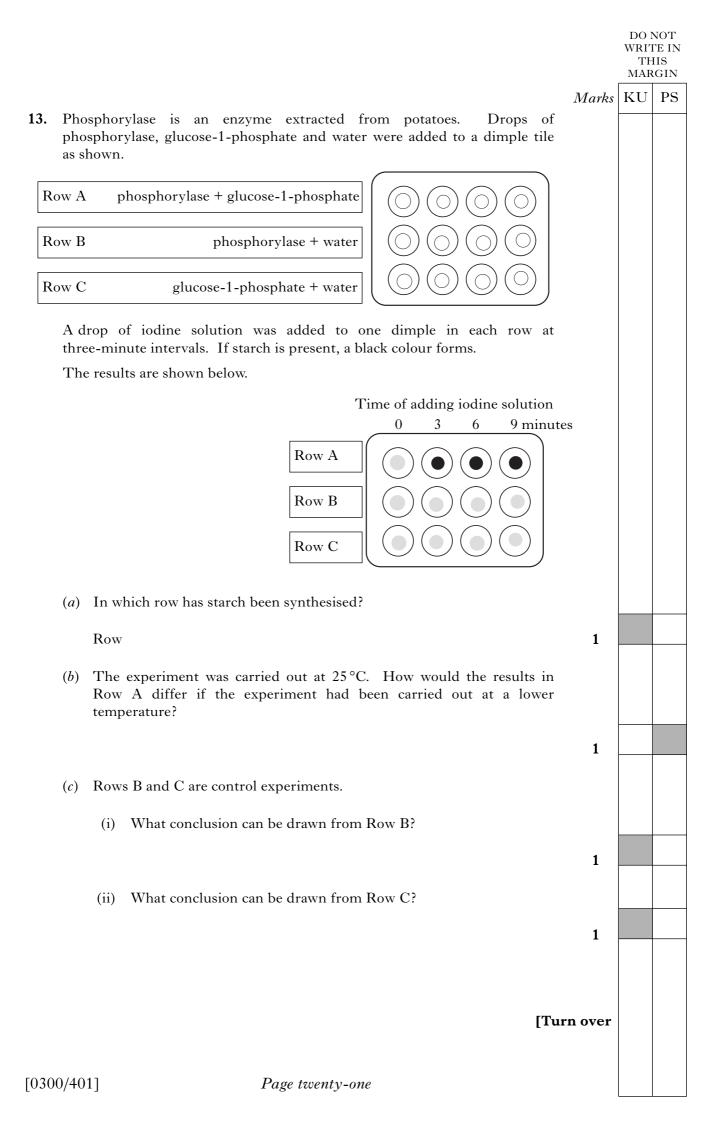
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_		Marks	KU	PS
Re	ad the following passage and answer the questions based on it.			
	Hayfever			
pol by	yfever affects 2 to 3 million people in Britain. It is caused by an allergy to len or sometimes the spores of fungi. The body's immune system reacts releasing excess histamine. This results in an irritation and inflammation the nose and eyes.			
a s wh tirr	the symptoms vary and may involve sneezing, a runny or blocked nose, and ore throat. The eyes may become red, watery or itchy. In addition, a eezy chest may suggest that the sufferer also has asthma. The peak pollen he is early summer when school and university examinations take place. his can make it difficult to revise and perform well.			
	yfever is related to asthma and eczema. It is quite common to find mbers of the same family with one or more of these conditions.			
ant and pre sid dis injo Un	rious treatments are available without prescription. These include chistamine tablets to reduce the allergic response as well as nasal sprays d eye drops to reduce inflammation. For severe cases, doctors may escribe either tablets or injections containing steroids. These can cause e effects so the benefits have to be weighed against the possible advantages. Tablets are more favoured than injections. Other types of ection can desensitise patients to the pollen causing their allergy. fortunately, they may produce serious side effects and, as they can only given under close hospital supervision, are hardly ever used.			
(<i>a</i>)	What effect does pollen have on the body's immune system in hayfever sufferers?	1		
(<i>b</i>)	What evidence is there that hayfever might have a genetic component?	1		
(<i>c</i>)	Which symptom suggests that a hayfever sufferer may also have asthma?			
		1		
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10	(Marks	KU	PS
10.		ntinued) At what time of the year are hayfever sufferers likely to be worst affected?	1		
	(e)	What type of substance is found in treatments prescribed for severe cases of hayfever?			
	(<i>f</i>)	Why are desensitising injections not used very often?	1		
			1		
		[Tur	n over		



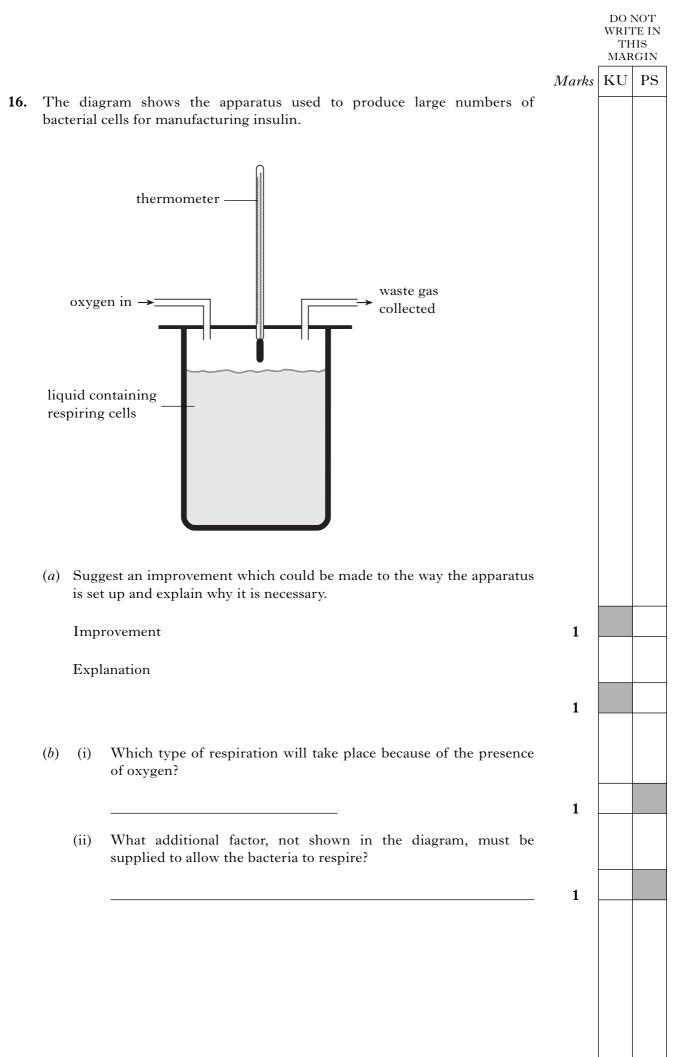
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11.	(co	ntinu	ed)	Marks	KU	PS
	(b)	A si diffe	milar survey was carried out on a sample of 1000 people in a rent town of the same size (Town Y). re were 20 with group AB, 500 with group A, 400 with group O and			
			ith group B.			
		(i)	Complete the pie chart of these results by drawing and labelling the remaining segments. (An additional chart, if required, will be found on page 31.)	2		
		(ii)	What percentage of people in the Town Y sample had blood group O? Space for calculation			
			0%	1		
	(<i>c</i>)	(i)	Select one similarity and one difference between the results of the surveys for Towns X and Y.			
			Similarity	1		
			Difference	1		
		(ii)	Which blood group survey, Town X or Town Y, is the more reliable?			
			Give a reason for your answer.	4		
			Town	1		
			Reason	1		
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14. The	e diagrams show two different types of enzyme-controlled reactions.		
Diagram Synthesis	1 sreaction \downarrow		
Diagram Breakdov	2 wn reaction enzyme molecule and		
<i>(a)</i>	For each of the following word equations state whether it is an example of a synthesis reaction or a breakdown reaction.		
	Word equation Type of reaction		
(i)	maltose enzyme X glucose molecules		
(ii)	amino acid molecules enzyme Y protein molecule		
(iii)	fatty acids and glycerol enzyme Z fat molecule2		
(b)	Of what type of substance are enzymes made?		
	1		
(c)	Respiration provides energy for cells to carry out various functions. Underline two of the following functions which require energy from respiration.		
	Muscle contraction Osmosis Diffusion Cell division 1		
[0300/40]	1] Page tenenty tene		

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15.	(<i>a</i>)	The	following grid contains some terms used in studying inheritance.	-		
		A	gamete formation B tallness in peas C genotype			
		D	phenotype E true breeding F gene			
		G	fertilisation H dominant I dwarfness in peas			
			letters from the grid to identify the correct term for each of the wing.			
		(i)	Part of a chromosome	1		
		(ii)	Involves a reduction in the number of chromosomes	1		
		(iii)	Two different phenotypes of the same characteristic			
			and	1		
		(iv)	An organism with only one form of a particular gene	1		
		(v)	The genes that an organism contains for a characteristic	1		
	(<i>b</i>)	Pea	plant cells contain 14 chromosomes.			
		(i)	How many complete sets of chromosomes does this represent?	-		
			sets	1		
		(ii)	How many chromosomes are there in the sex cells of pea plants? <i>Space for calculation</i>			
			chromosomes	1		
			[Tu	rn over		



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16.	(b)		ntinued)			
		(iii)	What waste gas will be produced during respiration?			
				1		
		(iv)	What form of energy, other than chemical, may be released by the bacterial cells during respiration?			
				1		
			[Turr	over		

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17.			e works removes organic material before water is discharged into a his is done in two main stages.				
	Sta	ge 1	Organic solids settle out as sludge which is treated separately.				
	Sta	ge 2	The remaining liquid is treated with living organisms.				
	(<i>a</i>)	(i)	Name one useful product which can be made from the treated sludge produced in Stage 1.				
				1			
		(ii)	What type of organisms act on the liquid in Stage 2?				
				1			
		(iii)	Describe one way in which oxygen can be provided for the organisms in Stage 2.				
				1			

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17. (continued)

(b) When water from a sewage works is analysed, several measurements are made. The table shows some of the measurements taken over one year.

Month	Suspended solids (mg/l)	Biochemical oxygen demand (mg/l)
January	35.0	31.0
February	42.0	40.0
March	44.0	35.5
April	30.5	18.0
May	27.0	17.0
June	29.5	19.0
July	21.5	14.5
August	25.5	16.5
September	25.5	16.5
October	29.5	22.0
November	34.5	28.5
December	32.5	35.0

(i) Sewage works should not discharge water with more than 30 mg/l suspended solids **and** a biochemical oxygen demand of more than 20 mg/l.

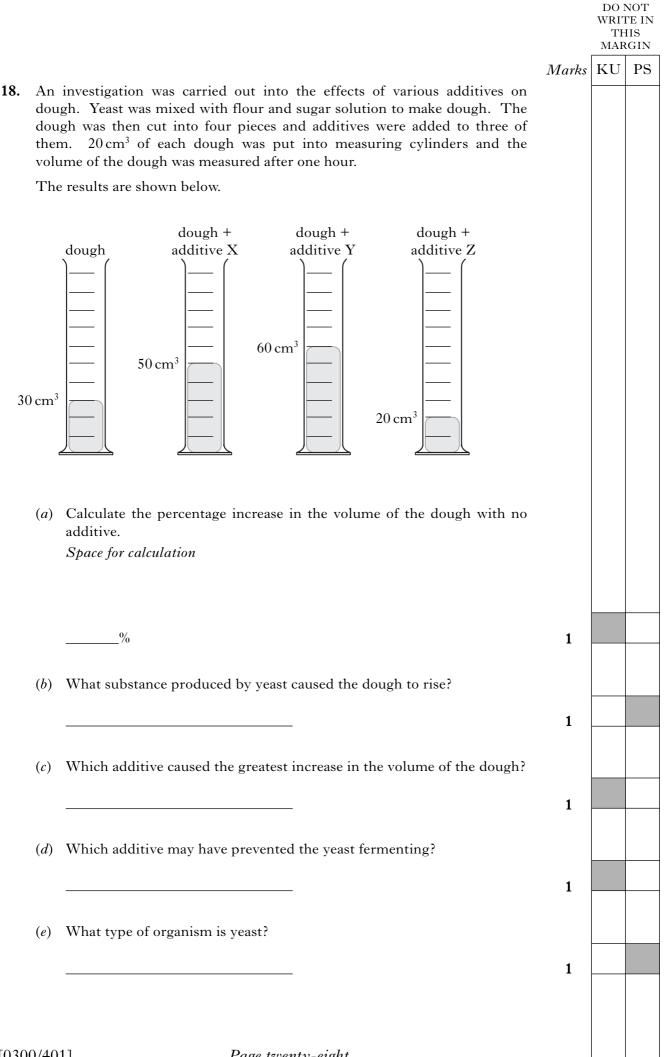
In which months of the year was water from the sewage works not meeting this standard?

1

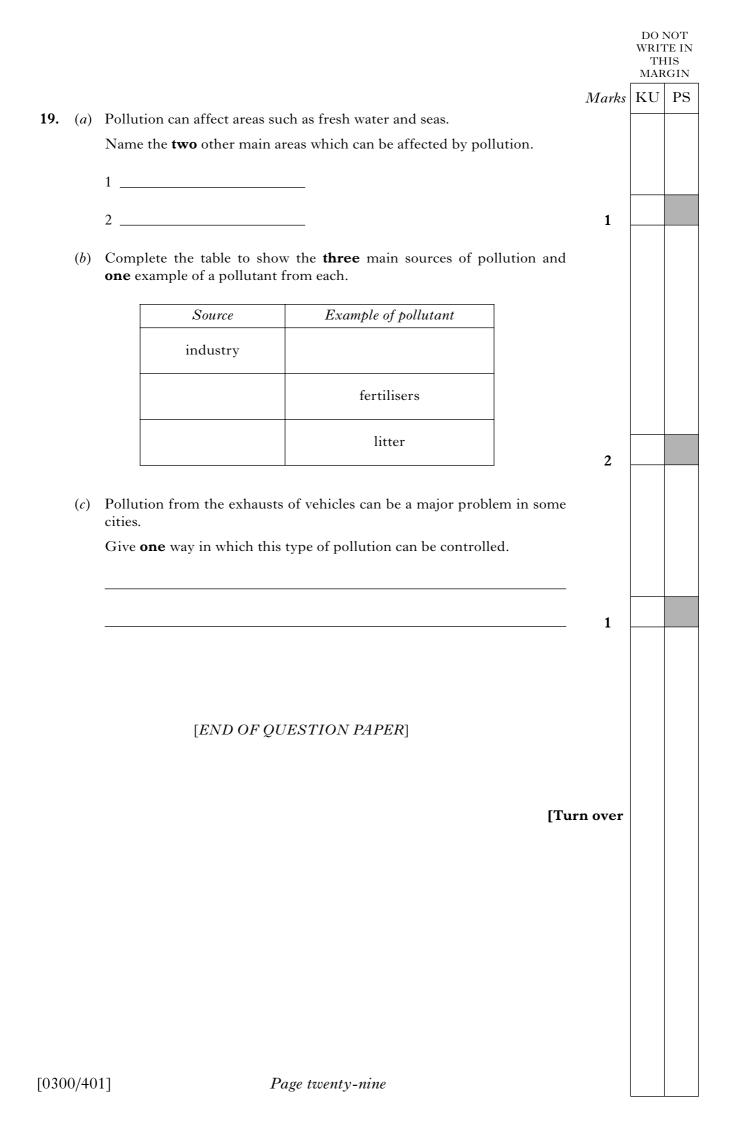
(ii) Suggest **one** abiotic factor which affects how well the living organisms break down the sewage over the course of a year.

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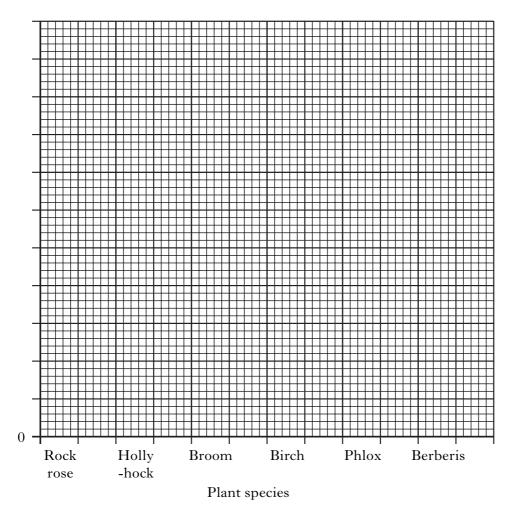


Page twenty-eight



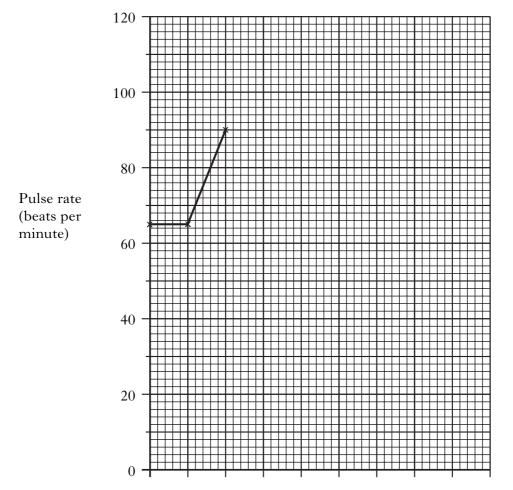
SPACE FOR ANSWERS AND FOR ROUGH WORKING

ADDITIONAL GRID FOR QUESTION 2(c)

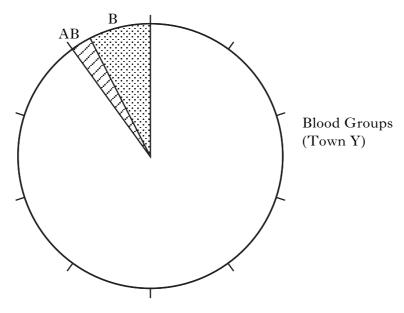


SPACE FOR ANSWERS AND FOR ROUGH WORKING

ADDITIONAL GRID FOR QUESTION 9(a)



ADDITIONAL GRID FOR QUESTION 11(b)(i)



[0300/401]

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SPACE FOR ANSWERS AND FOR ROUGH WORKING