

GCSE

BIOLOGY B

Biology B Unit 2 Modules B4, B5, B6

Specimen Paper

Candidates answer on the question paper: Additional materials: ruler (cm/mm), calculator



Candidate Name						
Centre Number			Candidate Number			

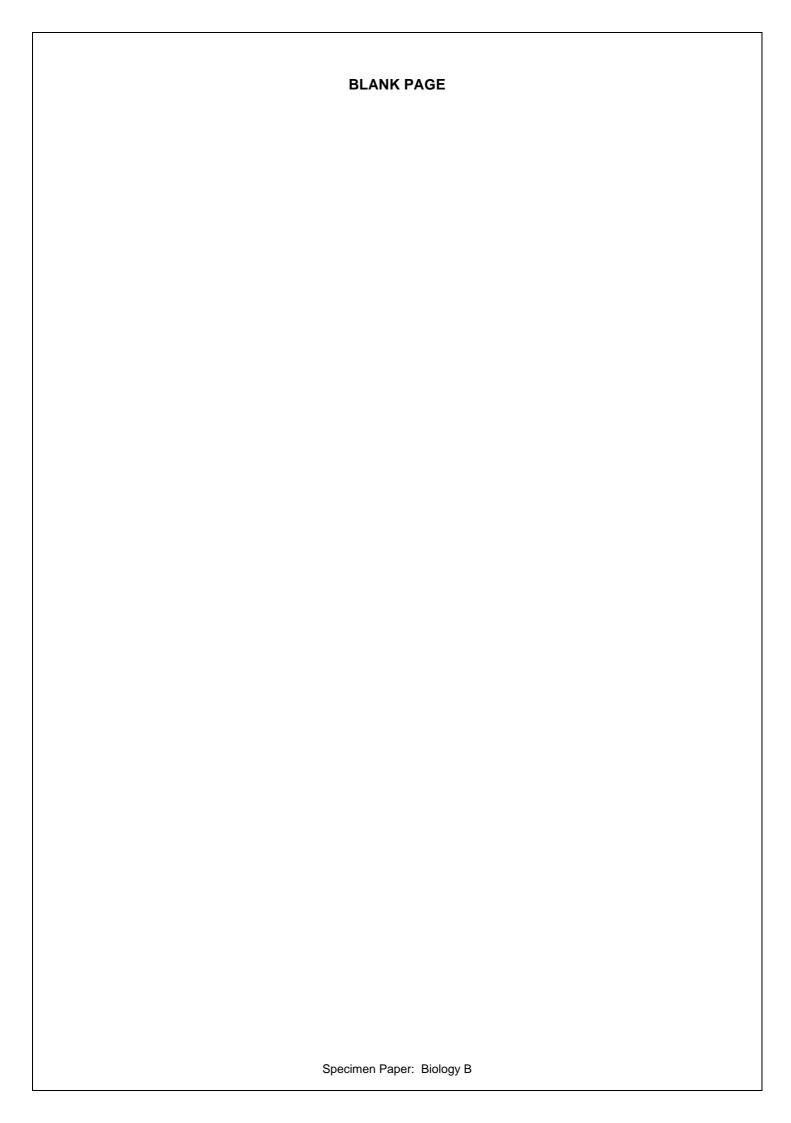
TIME 60 mins

INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the boxes above.
- Answer **all** the questions.
- Write your answers on the dotted lines unless the question says otherwise.
- Use blue or black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure you know what you have to do before starting your answer.
- There is a space after most questions. Use it to do your working. In many questions marks will be given for a correct method even if the answer is incorrect.
- Do not write in the bar code. Do not write in the grey area between the pages.
- DO NOT WRITE IN THE AREA OUTSIDE THE BOX BORDERING EACH PAGE. ANY WRITING IN THIS AREA WILL NOT BE MARKED.

INFORMATION FOR CANDIDATES

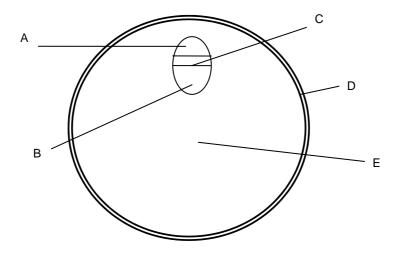
- The number of marks is given in brackets [] at the end of each question or part question.
- The total number of marks for this paper is 60.



Answer all questions.

Section 1

1. The diagram shows a cross section through a plant stem.



(a)	(i)	Which label letter shows the xylem?			
		Choose from A, B, C, D, or E.			
		[1]			
	(::\	Which lab at letter above the while and			
	(ii)	Which label letter shows the phloem?			
		Choose from A, B, C, D, or E.			

(b) Water travels through the plant by a process called transpiration.Give two uses of water in a plant.

1		
2	[2	2]

(c) Rob noticed that his tomato plants wilted on a hot and windy day. His friend said this was due to increased transpiration. Explain why transpiration rate is increased on hot and windy days.	
(c) Rob noticed that his tomato plants wilted on a hot and windy day. His friend said this was due to increased transpiration. Explain why transpiration rate is increased on hot and windy days.	
(c) Rob noticed that his tomato plants wilted on a hot and windy day. His friend said this was due to increased transpiration. Explain why transpiration rate is increased on hot and windy days.	
(c) Rob noticed that his tomato plants wilted on a hot and windy day. His friend said this was due to increased transpiration. Explain why transpiration rate is increased on hot and windy days.	
(c) Rob noticed that his tomato plants wilted on a hot and windy day. His friend said this was due to increased transpiration. Explain why transpiration rate is increased on hot and windy days.	
His friend said this was due to increased transpiration. Explain why transpiration rate is increased on hot and windy days.	[2]
His friend said this was due to increased transpiration. Explain why transpiration rate is increased on hot and windy days.	
Explain why transpiration rate is increased on hot and windy days.	
	[3]
(d) The table shows how plants use some elements they obtain from soil mine	als.
Complete the table. One example has been done for you.	

Mineral	One substance made using the mineral
phosphorus	DNA
magnesium	
nitrogen	

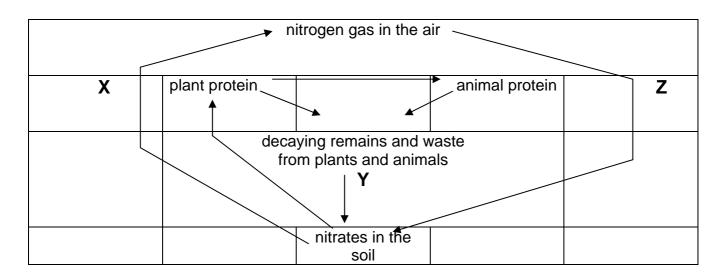
[2]

[Total: 4]

2.

Woolly mammoths were a type of prehistoric elephant.
They used to live in very cold parts of the world.
They became extinct about 10,000 years ago.
The dead bodies of some mammoths have been found preserved in frozen ground.
Some of the mammoths have been taken out of the frozen ground.
The bodies then started to decay.
Explain why they started to decay.
[3]
[Total: 3]

The diagram shows part of the nitrogen cycle.



(a)	What types of microbes cause the changes shown by arrows X , Y and Z ?

Y		
Z	[3]	3]

In tropical rainforests, there is a lot of decaying plant and animal material. (b)

However, the amount of nitrate in the soil is low. Suggest why the amount of nitrate in the soil is low.

[1]	

(c) Nitrates are taken up into root hair cells by active transport.

Explain the term active transport.

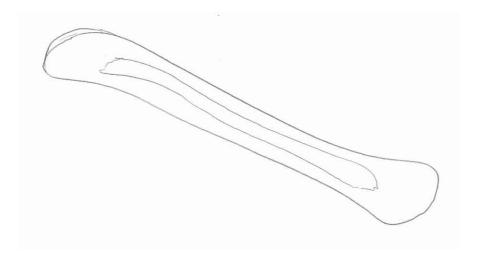


[Total: 6]

Section 2

(a) Label the diagram which shows the structure of a long bone.
 Use words from this list.

Cartlage Bone marrow shaft



[3]

(b) How could you tell, by looking at an X-ray of a bone, whether a person was still growing?

.....[1]

As people live longer, parts of their bodies start to wear out or go wrong.

5.

Thes	e parts can sometimes be replaced.
(a)	Describe two problems in finding a supply of donor organs.
	[2]
(b)	Not all organ donations are successful. Explain why.
	[2]
	[Z] [Total: 4]

6.	(a)	Urea	a is a waste product produced in our body. It is toxic and we have to remove it.						
		(i)	Where in the body is urea produced?						
			[1]						
		(ii)	Explain how the kidneys remove urea from the body.						
			[3]						
	(b)	Write about how the hormone ADH controls the concentration of urine.							
		Include in your answer							
		•	the parts of the kidney affected by ADH						
		•	the changes caused by ADH						
			[4]						
			[Total: 8]						

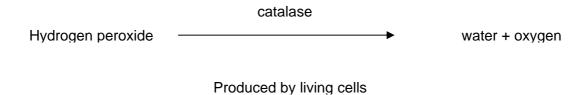
7.	(a)		cribe the following parts of the blood and explain how their structure makes them ble for their function.
		(i)	red blood cells
			[2]
		(ii)	platelets
			[2]
			[Total: 4]

Section 3

8. Hydrogen peroxide is poisonous to cells.

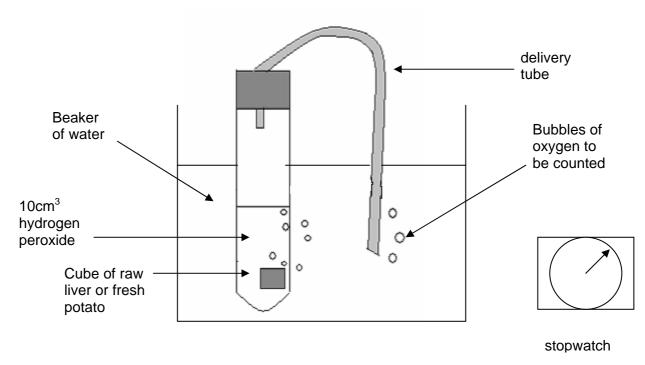
Cells use an enzyme called catalase to break down hydrogen peroxide into water and oxygen.

The word equation shows this reaction.



Small cubes of raw liver or fresh potato were used to investigate this reaction.

The diagram shows the apparatus which was used for the investigation.



Chris cut a small cube of liver.

He dropped it into a test tube containing 10cm³ of hydrogen peroxide.

He placed a bung with a delivery tube in the mouth of the test tube and started the stopwatch.

Chris counted the oxygen bubbles as they came out of the delivery tube.

He recorded the number of bubbles produced each minute for 8 minutes.

Here are Chris's results using a cube of liver.

Time in minutes	1	2	3	4	5	6	7	8
Bubbles per minute	59	46	40	34	28	22	18	16

Kara repeated the experiment using a similar sized cube of potato.

She used 10cm³ of fresh hydrogen peroxide.

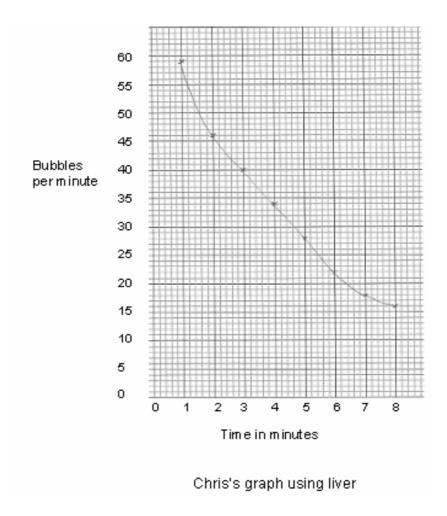
Here are Kara's results using a cube of potato

Time in minutes	1	2	3	4	5	6	7	8
Bubbles per minute	34	30	24	20	18	5	12	10

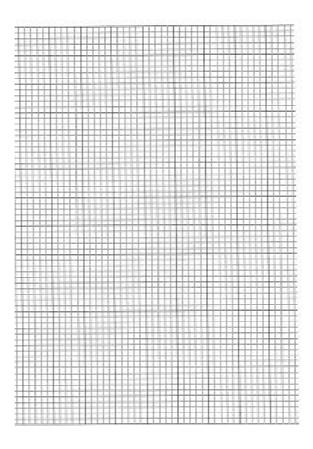
The liver produced a total of 263 bubbles of oxygen in 8 minutes.

(a)	(i)	How many bubbles of oxygen did the potato produce in 8 minutes?
		Bubbles [1]
	(ii)	Suggest a reason why the liver gave off more oxygen than the potato.
	(iii)	It was important to use the same sized cubes of liver and potato for this experiment. Explain why.
		[1]

(b) Chris and Kara used the results of their experiments to make graphs.Chris's graph for the cube of liver is shown below.



Use Kara's results to plot a graph for the cube of potato on the blank grid.



Kara's graph using potato

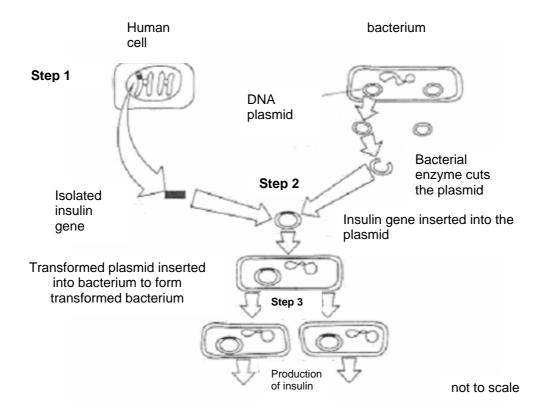
[3]

[Total: 6]

9. Diabetes is a disorder in which the body cannot control its blood glucose level.

Some diabetics need frequent injections of insulin.

Genetic engineering is now used to make human insulin. The diagram outlines the process.



Use your knowledge and the diagram to answer the following questions.

a)	Describe how the required gene is obtained (step 1).
	[2]
(b)	How is the isolated gene inserted into the bacterial DNA (step 2)?
	[2]

(c)	What name is given to this new DNA?
	[1]
(d)	How are many identical copies of the human gene produced (step 3)?
	[1]
	[Total: 6]

10.	Yoghurt	can be	made	usina	cow's	milk

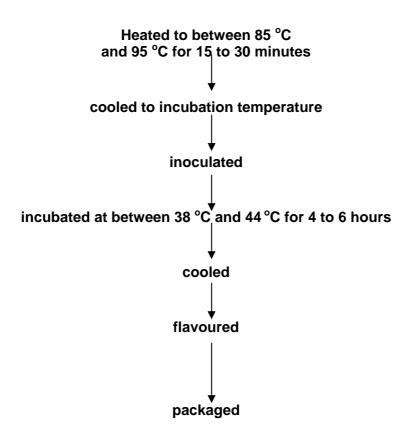
- (a) Before the milk can be contaminated with antibiotics.
 - (i) Suggest how milk can be contaminated with antibiotics.

	•
-	

(ii) How will the antibiotics affect the production of yoghurt?

141
 I I I

(b) The stages in making yoghurt from milk are shown in the flow diagram.

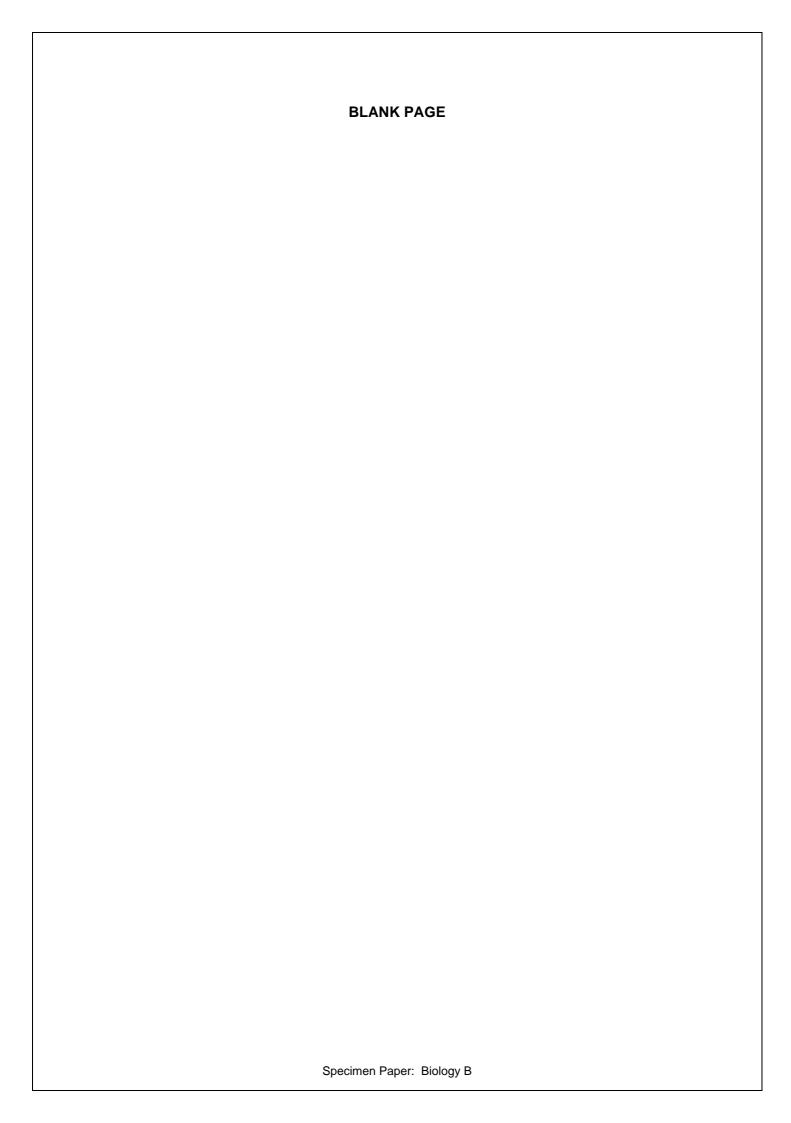


The milk is inoculated with Lactobacillus bulgaricus and Streptococcus thermophilus.

(i) What type of micro-organism are these?



	(ii)	Each micro-organism has two names.	
		What is the system of naming organisms called?	
			[1]
	(iii)	Why is the milk heated to between 85 °C and 95 °C at the beginning?	
			[1]
	(iv)	Why is the milk cooled before inoculation?	
			[1]
(c)		equipment for making yoghurt is sterilised before being used.	
	Sug	gest why.	
	(ii)	Suggest how the equipment can be sterilised.	
		Т]	otal: 8]





GCSE

BIOLOGY B

Biology B Unit 2 Modules B4, B5, B6

Specimen Mark Scheme

Maximum mark for this paper is 60



Question Number	Answer	Max Mark
Section 1		
1(a)i	B;	[1]
1(a)ii	A;	[1]
1(b)i	Cooling; photosynthesis; support; movement of minerals (any two)	[2]
1(b)ii	Diffusion; through stomata;	[2]
1(c)	Windy blows molecules/water molecules away; water molecules evaporate from left; higher temperature gives water molecules greater energy/kinetic energy; water molecules evaporate more quickly WTTF (any three)	[2]
1(d)	Magnesium-chlorophyll;	[3]
1(d)	Nitrogen- protein/amino acid/nucleic acid; Total marks	[2] [4]
2	Micro organisms cause decay; Micro organisms become more active/reproduce faster due to higher temperature;	[2]
	Ice melts to make water available to micro organisms; Total marks	[3] [3]
3(a) 3(b) 3(c)	 X = denitrifying bacteria; Y = nitrifying bacteria; Z = nitrogen fixing bacteria; Small amounts of nitrifying bacteria in the soil; Against, concentration gradient; 	[3] [1] [2]
	Total marks	[6]

Section 2 4(a) 4(b)	Cartilage; bone marrow; shaft; correctly labelled on diagram Amount of cartilage present;	Total marks	[3] [1] [4]
5(a)	Any two from Shortage of donor; Tissue match; Size of organ; Age of donor organ;		[2]
5(b)	Any two from Rejection; by immune system; Failure of immuno-suppressive drug treatment; Wtte;	Total marks	[2] [4]
6(a)i 6(a)ii	Liver; Any three from Blood filtered; High pressure; Urea removed from blood; Urine produced;		[1]
6(b)	Correct use of ureter/ urethra; Urine stored in bladder; Any four of ADH produced in pituitary gland; More ADH; more water is re-absorbed/more concentrated urine; Water re-absorbed in convoluted (tubules); Negative feedback mechanism;	Total marks	[3] [4] [8]
7(a)i 7(a)ii	Description of red blood cell; relate to function; Eg rigid semi-lunar; to carry haemoglobin; Platelets description; related to function;		[2]
	Eg small fragments; stick together to form clots	Total marks	[2] [4]

8(a)i 8(a)ii 8(a)iii 8(b)	163 bubbles; Any one from: Liver contains more enzyme/catalase than potato (or vice versa i.e. potato has less); Surface area of liver larger than potato i.e. cubes not exactly the same size/shape; Kara's equipment has a leak/some gas escapes; Catalase in liver is more efficient than catalase in potato; Optimum temp/pH of potato and liver catalase is different (conditions favour liver); Fair test idea/make a valid comparison/idea of a controlled variable; 1 mark for labelled axes and correct scales 1 mark for plots; 1 mark for line of best fit (smooth curve); Total marks	[1] [1] [1] [1] [1] [6]
9(a) 9(b) 9(c) 9(d)	Any two from: gene cut from (human) chromosomes/DNA; by restriction) enzymes; with sticky ends Any two from :cutting open plasmid (DNA); with (restriction) enzyme; gene's sticky ends match sticky ends of bacterial DNA Recombinant; Asexual reproduction/cloning/DNA replication; Accept 'mitosis'/binary fission' Total marks	[2] [2] [1] [1] [6]
10(a)i 10(a)ii 10(b)ii 10(b)iii 10(b)iv 10(c)i 10(c)ii	Cows given antibiotics/treated for infection/ reject antibodies Antibiotics will prevent (inoculated) bacteria in milk from working (turning into yoghurt); Ignore 'contaminated'/affecting consumer' Bacteria Binominal; accept 'linnaen' Kill/reduces the number of bacteria or microbes/micro organisms; Accept 'sterilises'/pasturises' Otherwise high temperature would kill the (named) bacteria or innoculant added; Accept correct named bacteria can work Prevent contamination/owtte Steam/boiling water (reject antibodies) Total marks Overall marks	[1] [1] [1] [1] [1] [1] [8] [60]