CCEA GCSE SCIENCE: DOUBLE AWARD (MODULAR)

SCIENCE



EXAM QUESTION PACK

END OF MODULE TEST A HIGHER TIER GDA02 PAPERS

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Rewarding Learning

General Certificate of Secondary Education
2011–2012

Science: Double Award (Modular)

Living Organisms and the Processes of Life
End of Module Test

Higher Tier

[GDA02]

TUESDAY 15 MAY 2012
9.15 am–10.00 am

MARK SCHEME

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				AVAILABLE MARKS
1	**(a)**	Respiration/energy release	[1]	
	(b)	Any **two** from: Insulin released; causes glucose to be converted to glycogen; in the liver; glucose to be converted to fat; **more/increased** respiration of glucose; **more/increased** uptake into cells	[2]	
	(c)	Hepatic portal vein	[1]	4
2	**(a)**	Any **three** from: *Blockage* in artery/clot; Less blood flow through artery; so less glucose/oxygen; less respiration/energy; for heart muscle to contract/heart muscle dies	[3]	
	(b)	Nicotine	[1]	4
3	**(a)**	Keep trachea open/prevent it from collapsing/support	[1]	
	(b)	Any **two** from: These are the *intercostal muscles*; *Contract* during inspiration; so ribs move up or out; Increased volume/decreased pressure/lungs expand	[2]	
	(c)	**(**Blood) capillaries	[1]	4
4	**(a)**	A – Right atrium B – Aorta	[2]	
	(b)	C is deoxygenated/D is oxygenated; C has more CO_2/D has low CO_2	[2]	4

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				AVAILABLE MARKS
5	**(a)**	Any **two** from: Bacteria/microorganisms *caught in the mucus*; germs/dust particles Wafted by ciliated epithelial cells/moved by cilia/hairs; Swallowed; Killed by hydrochloric acid in stomach	[2]	
	(b)	Any **four** from: *Antigens* on surface of microorganism; stimulate the production of antibodies; by lymphocytes (special white blood cells); antibodies join with antigens/or bacteria/virus; forming a clump; This is ingested/digested; by the phagocytes/phagocytosis	[4]	6
6	**(a)**	Pupil gets smaller/constricts/iris gets bigger; *to prevent damage* to the retina/eye	[2]	
	(b)	Reflex action/involuntary/automatic	[1]	3
7	**(a)**	Urethra	[1]	
	(b)	Any **two** from: Breaks down excess *amino acids*/proteins; by deamination/removal of amino group; to produce *urea*	[2]	
	(c)	Downwards arrow ↓	[1]	4
8		Any **two** from: Permanent solution/lifelong; Do not have to make frequent trips to the hospital/less time used up/ discomfort in dialysis; Don't have to be as careful about diet; Does not allow urea/wastes to build up in the body as they are toxic wastes/better general health/more efficient transplant → costs less	[2]	2
9		**Description** (one mark from Description) Dilates bronchioles/deeper breaths/Increases breathing rate; **Explanation** [3] Increases air flow to the lungs/volume increase; So more *oxygen* (enters blood); So more *respiration*/more *energy* released; for increased *muscle* (contraction)/*fight or flight*	[4]	4

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			AVAILABLE MARKS
10	(In the fast-flowing stream:) There is *more oxygen* dissolved in the water; so more *respiration/energy*; for *active uptake*/transport of the minerals; against a concentration gradient/or described low to high	[4]	4
11	**(a)** Respiration and photosynthesis occur; rate equal/CO_2 given out = CO_2 absorbed	[2]	
	(b) Some other factor limits the rate of photosynthesis/temperature/carbon dioxide/chlorophyll limits the rate/*light does not limit rate* water/minerals limit photosynthesis	[1]	
	(c) Any **two** from: Farmyard manure contains minerals/nitrates/or named mineral/**or** is a good fertiliser; tomatoes grow faster; larger leaf area; so increased photosynthesis OR Decomposition of farmyard manure releases carbon dioxide; so more carbon dioxide for photosynthesis	[2]	5
12	**(a)** Any **three** from: In Experiment 1, oxygen used up/CO_2 produced by blowfly is absorbed by NaOH; decrease in pressure/volume; the bead moves to the left; In Experiment 2, carbon dioxide (produced) is not absorbed; Carbon dioxide produced equals oxygen used	[3]	
	(b) 65 mm^3 used in 5 minutes	[1]	
	780 mm^3/2g/hour/65 × 12 = 780 mm^3/2g/hour	[1]	
	= 390 mm^3/g/hour	[1]	6
		Total	**50**

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Rewarding Learning

Centre Number

71	

Candidate Number

General Certificate of Secondary Education
2011–2012

Science: Double Award (Modular)

Living Organisms and the Processes of Life

End of Module Test

Higher Tier

A

[GDA02]

GDA02

MONDAY 27 FEBRUARY 2012
9.30 am–10.15 am

TIME

45 minutes.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
Write your answers in the spaces provided in this question paper.
Answer **all twelve** questions.

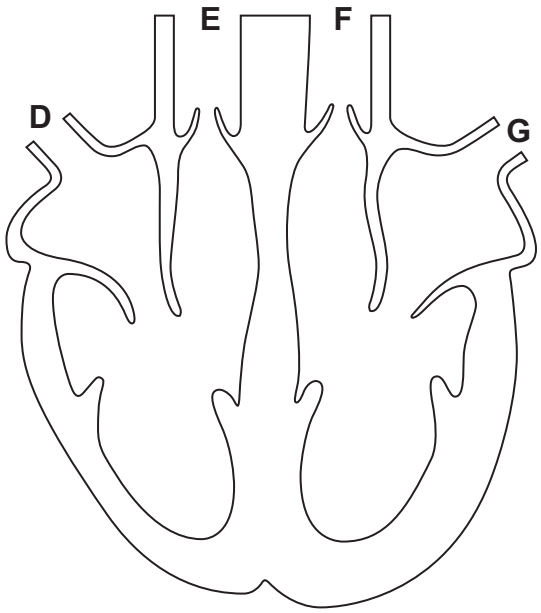
INFORMATION FOR CANDIDATES

The total mark for this paper is 50.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
Total Marks	

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1 The diagram shows a section through the heart.



(a) Which of the blood vessels, **D**, **E**, **F** or **G**:

(i) carries oxygenated blood back to the heart?

[1]

(ii) carries deoxygenated blood to the lungs?

[1]

(b) Draw arrows on the diagram above to show the direction of blood flow through **each side** of the heart. [2]

Examiner Only	
Marks	Remark

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2 Gaseous exchange takes place in the lungs.

(a) State two ways in which inhaled air is different from exhaled air.

1. _____

2. _____ [2]

(b) List two features of the alveoli, in the lungs, that make them efficient gas exchange surfaces.

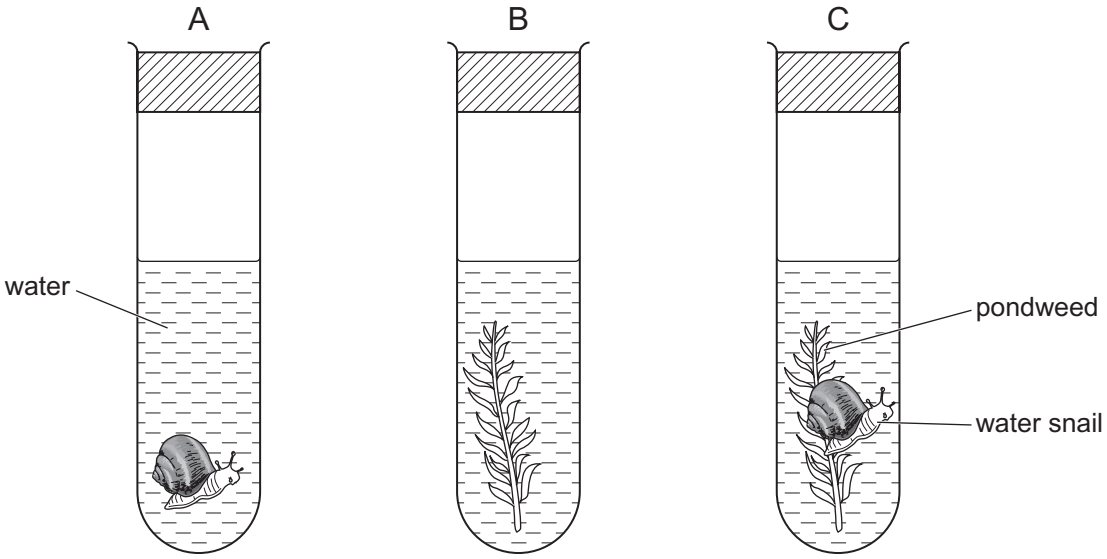
1. _____

2. _____ [2]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

3 A student sets up an experiment as shown in the diagram.



The tubes were left in the light for four hours. They were then tested for carbon dioxide concentration.

Which tube would have had the highest carbon dioxide concentration after four hours? Explain your answer.

Tube _____

Explanation _____

_____

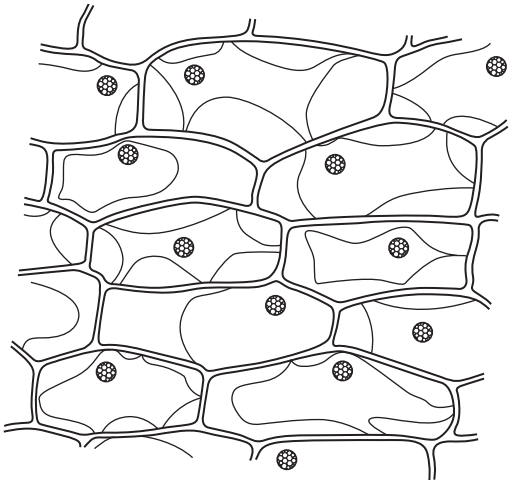
_____

_____

_____

_____ [4]

4 The diagram shows onion epidermal cells that were placed in a strong sugar solution.



Describe and explain what has happened to the cells.

_____

_____

_____

_____

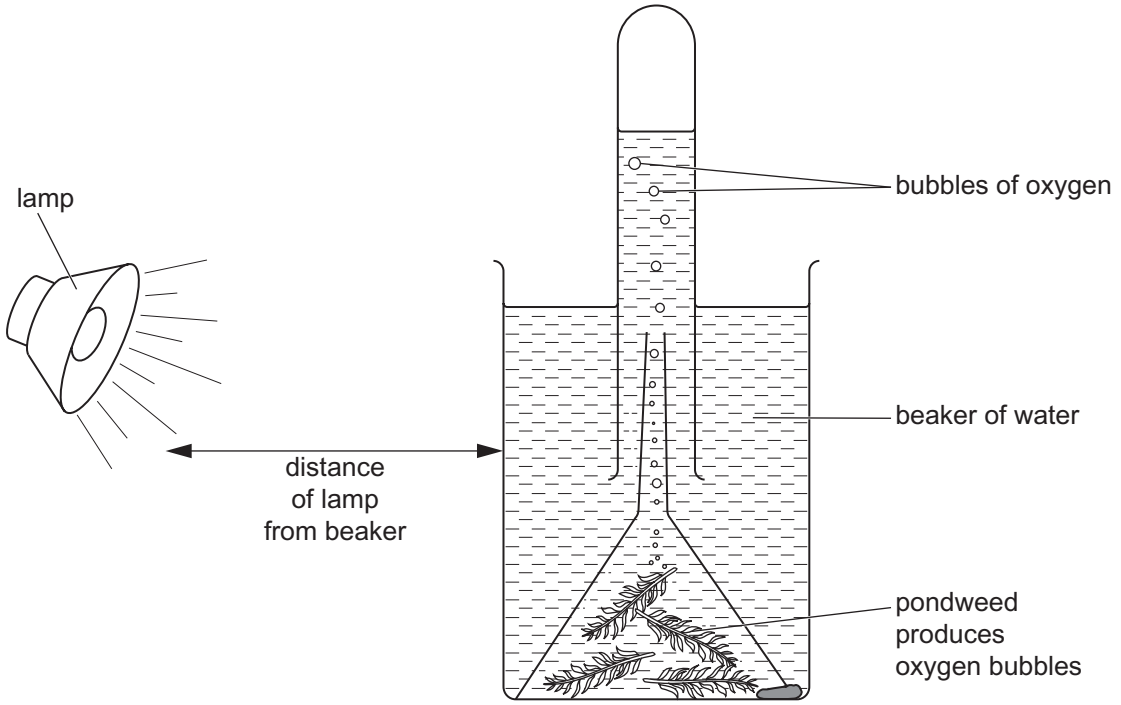
_____

_____ [4]

Examiner Only	
Marks	Remark

5 An experiment was set up to investigate the effect of light intensity on photosynthesis.

Examiner Only	
Marks	Remark



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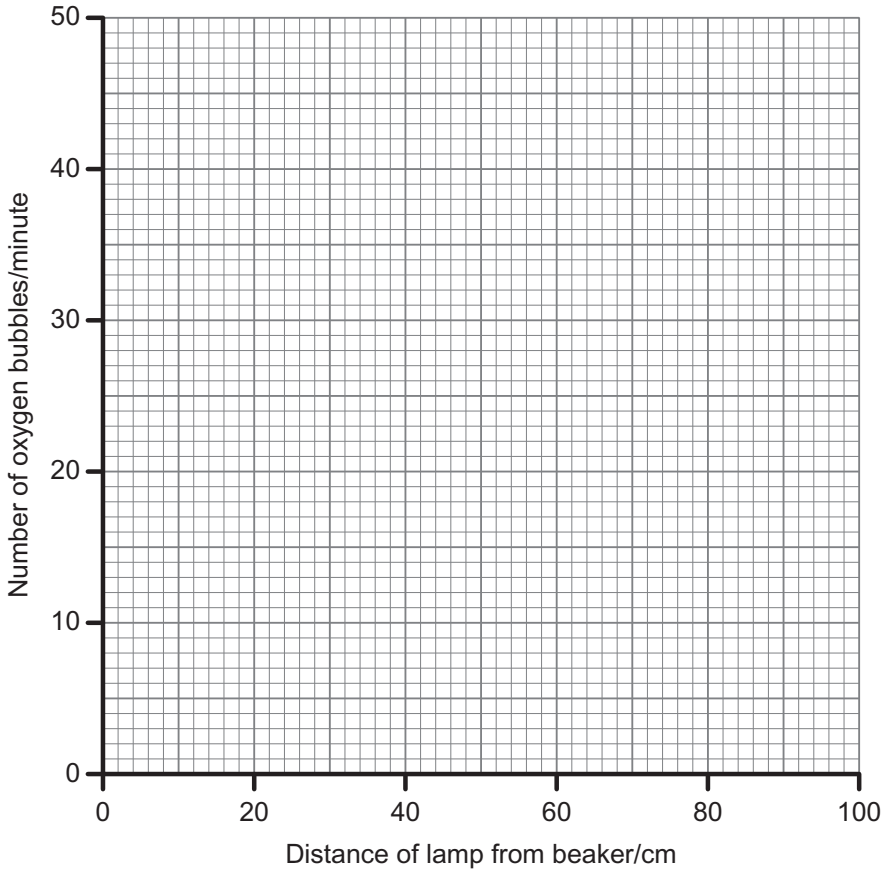
At a certain light intensity, the number of oxygen bubbles released in one minute was counted.

The experiment was repeated with the lamp placed at different distances from the beaker. The results are shown in the table.

Distance between lamp and beaker/cm	Number of oxygen bubbles/ minute
20	48
40	46
60	30
80	10
100	10

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(a) Plot a line graph of these results.



[2]

(b) Use your graph to estimate the number of oxygen bubbles released per minute if the lamp was 50 cm away from the beaker.

_____ bubbles/minute [1]

(c) Describe the trend shown in the graph.

_____

_____ [1]

(d) **(i)** Describe **two** measures you could take to control variables in this experiment.

_____

_____

_____ [2]

(ii) How could you improve the reliability of this experiment?

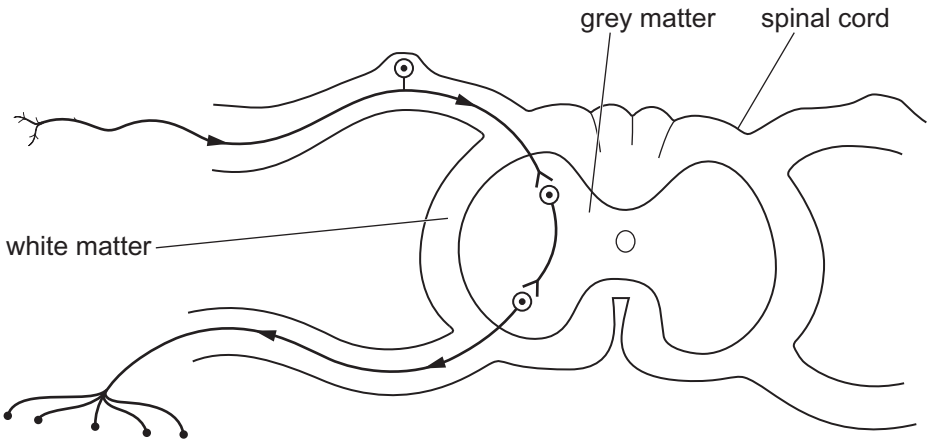
_____ [1]

Examiner Only

Marks	Remark

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6 The diagram shows a reflex arc.



(a) On the diagram, draw in the effector in its correct position. [1]

(b) If you touch a very hot object you pull your hand away rapidly. This is an example of a reflex action.

Explain why the response is so rapid.

_____

_____ [1]

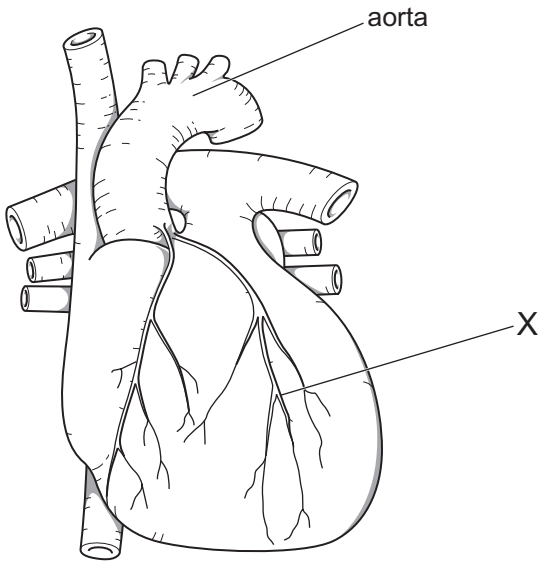
(c) Give **one** other example of a reflex action.

_____ [1]

Examiner Only	
Marks	Remark

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7 The diagram shows the heart and its associated blood vessels.



Explain what would happen if there was a blockage at X.

_____

_____

_____

_____

_____ [4]

Examiner Only	
Marks	Remark

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Examiner Only	
Marks	Remark

8 Children are vaccinated against certain diseases such as polio and tuberculosis. The vaccines contain antigens.

(a) What is the function of an antigen in a vaccine?

_____ [1]

(b) Two children are exposed to the measles virus. Paul had previously received a vaccination against measles but Laura has not been vaccinated.

Describe and explain the difference in the immune response of Paul and Laura.

_____

_____

_____

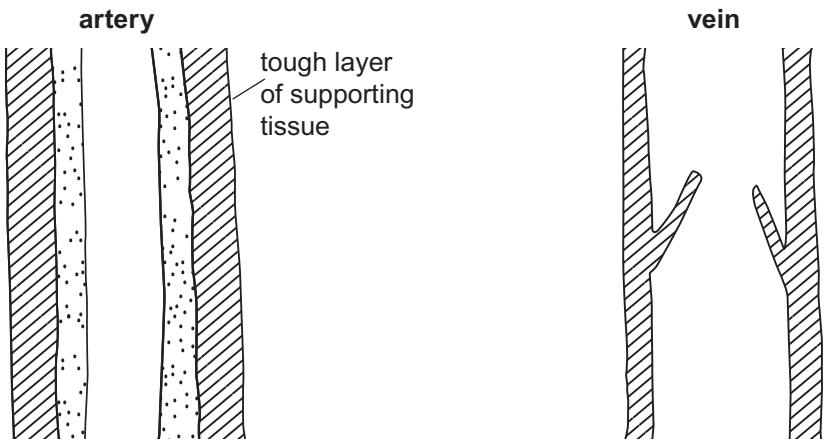
_____

_____

_____ [3]

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9 The diagrams show sections of an artery and a vein. [Not to scale.]



Use the diagram and your understanding to explain how arteries and veins are adapted for their functions.

_____

_____

_____

_____

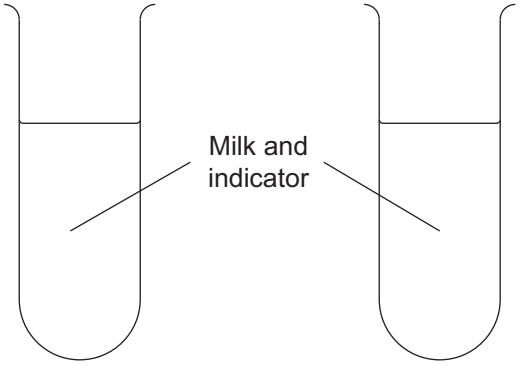
_____

_____ [3]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

10 An experiment was set up to investigate the effect of lipase on the fat in milk. Each tube contained 5 cm^3 of milk, universal indicator and lipase or boiled and cooled lipase as shown in the diagram.



Tube A
1 cm^3 lipase

Tube B
1 cm^3 boiled and cooled lipase

Tubes A and B were kept in a water bath at 35 °C for two hours. Universal indicator changes colour as shown in the box below.

pH4 orange	←	pH7 green	→	pH10 blue

(a) What colour would you expect in Tube A at the end of the experiment?

Explain your answer.

_____

_____

_____

_____

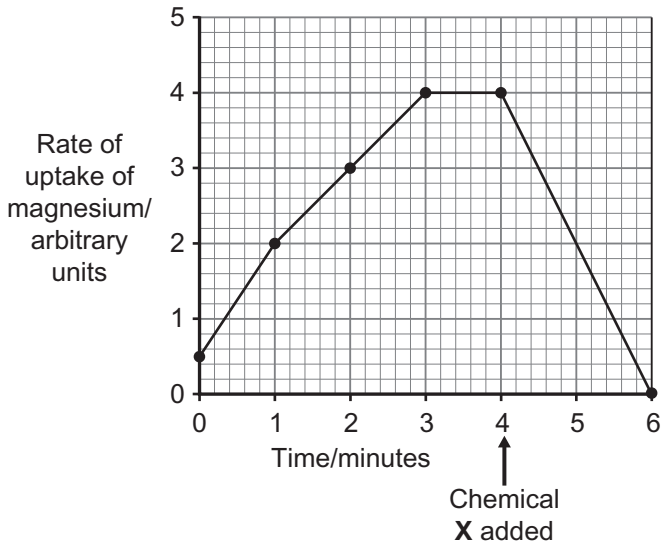
_____ [3]

(b) Explain why there would be no colour change in tube B at the end of the experiment.

_____ [1]

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11 The graph shows the rate at which a plant absorbs magnesium through its roots by active transport. After four minutes a chemical **X** was added to the plant roots.



(a) Suggest why the rate of active transport had levelled off between three and four minutes.

_____ [1]

(b) Suggest which cellular process is stopped by chemical **X** that then caused the rapid decline in active transport.

_____ [1]

(c) State **one** advantage of active transport over diffusion.

_____

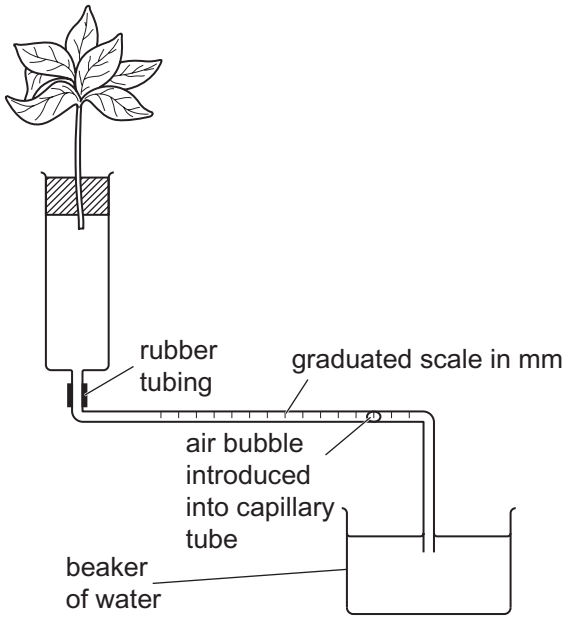
_____ [1]

Examiner Only

Marks	Remark

12 A potometer was set up to measure the rate of water uptake by a leafy shoot.

Examiner Only	
Marks	Remark



To reset the apparatus the air bubble can be expelled from the potometer by squeezing the rubber tubing.

(a) Describe how you would use this potometer to investigate the difference in water loss between upper and lower leaf surfaces.

[4]

(b) Explain the results you would expect.

[2]

THIS IS THE END OF THE QUESTION PAPER

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Rewarding Learning

General Certificate of Secondary Education
2011–2012

Science: Double Award (Modular)

Living Organisms and the Processes of Life

End of Module Test

Higher Tier

A

[GDA02]

MONDAY 27 FEBRUARY 2012
9.30 am–10.15 am

MARK SCHEME

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		AVAILABLE MARKS
1	**(a)** **(i)** G [1]	
	(ii) E [1]	
	(b) Appropriate direction of arrows through each side of the heart: from D through to E; from G through to F in heart [2]	4
2	**(a)** Any **two** from: (assume inhaled) ● inhaled air has more oxygen **or** converse: exhaled has less O_2 ● inhaled air has less carbon dioxide **or** converse: exhaled has more CO_2 ● inhaled air has less water vapour **or** converse ● inhaled air is colder **or** converse. [2]	
	(b) Any **two** from: large surface area/lots of them; good blood supply/capillaries close by; moist; short diffusion distance/thin walls of alveoli or capillaries;/very thin permeable [2]	4
3	tube A; snail respires/produces carbon dioxide; in tubes B/C plant takes in carbon dioxide; by photosynthesis in tube A no pondweed to absorb CO_2; [4]	4
4	description: Cells are plasmolysed/cell membrane has pulled away from cell wall/cells are flaccid/cells shrivel/vacuole shrunk; explanation (any **three** from): ● lower water concentration outside cells/more water inside cells ● water moves out of the cells ● by osmosis ● across a partially/selectively/semi-permeable membrane (not solution passes out) [4]	4

			AVAILABLE MARKS
5	**(a)**	all points correctly plotted; points joined with straight lines; ● vertical lines = 1 mark for points ● not lines of best fit ● –1 if drawn from origin. [2]	
	(b)	37–40 bubbles (consequential marking according to graph) [1]	
	(c)	as the light intensity decreases, there are less oxygen bubbles produced/less photosynthesis **or** closer lamp to beaker → more O_2 bubbles/more photosynthesis **or** converse [1]	
	(d) **(i)**	Any **two** from: ● control temperature (use heat shield or water bath) (not same size beaker) ● same concentration of carbon dioxide in water/same hydrogen carbonate concentration in water. (not measure accurately). ● same pH in water ● allow 5 minutes equilibration at each distance/or settle at ● same piece or amount of pondweed ● same vol. of water ● same bulb/strength of bulb [2]	
	(ii)	reliability – do repeats at each distance/repeat experiment (not repeat at different distance not repeat with different pondweed). [1]	7
6	**(a)**	effector i.e. muscle drawn at end of motor neurone (not hand) (not arm) [1]	
	(b)	does not involve the brain/no thinking time required/shorter nerve pathway/automatic [1]	
	(c)	pupil dilation/constriction/knee jerk/blinking/sneezing/step on a pin/ coughing or other [1]	3
7		blockage in coronary artery; less glucose/less blood/O_2 (to heart muscle) (not body) less respiration/energy; heart muscle cells die/heart does not beat/heart attack (not heart disease) [4]	4

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			AVAILABLE MARKS
8	**(a)**	to cause the production of antibodies (**not** Laura has higher chance of getting measles) [1]	
	(b)	Any **three** from: ● Paul has memory cells in blood/WBC's have a memory. ● Paul shows faster production of antibodies/Laura slower production. ● Paul produces higher level (quantity) of antibodies;/or Laura produces lower levels. ● Paul shows secondary response/Laura only shows primary response. Laura response is slower. ● Paul – antibodies remain in blood. ● Paul's response is quicker (**not** Paul will recover faster) ● Paul doesn't get the disease the 2nd time Paul is immune. [3]	4
9		artery – tough layer to withstand pressure; to carry blood away from the heart; valves in vein prevent blood flowing backwards/large lumen in vein to allow easy blood flow/not more blood in veins. veins carrying blood towards the heart veins – thinner walls because blood under low pressure. veins – large lumen to allow blood to flow easily. (**not** veins have valves) (**not** large lumen – need function) max [3]	3
10	**(a)**	orange; lipase breaks fat down into fatty acids; which make the solution acidic/lowers the pH (not emulsifiy to give fatty acids). [3]	
	(b)	lipase has been denatured/destroyed (not killed). [1]	4
11	**(a)**	magnesium being absorbed as fast as it can be/oxygen limits rate/energy available limits rate/amount of magnesium limits rate/cannot absorb anymore Mg/no Mg left in solution – same as Mg limits rate [1]	
	(b)	respiration [1]	
	(c)	allows higher concentrations of magnesium in the roots than in the soil/against concentration gradient (not faster) [1]	3

12 Any **four** from:

(a)
- grease/cover lower leaf surfaces with vaseline
- record distance moved by air bubble (not mark just for bubble moves along apparatus)
- in a set time
- reset the bubble
- introduce new bubble by lifting end of capillary tube out of beaker of water
- repeat above experiment (i.e. replicates)
- replace with a new shoot of the same size/species/type of plant
- grease only the upper leaf surfaces
  (no additional marks for description of experimental method/ replicates as described above)
- keep all other external conditions (wind, humidity, temperature, light) the same in both experiments/or if specify one.
  (not just compare results) [4]

(b) more water lost when upper surface is greased;/more H_2O lost from lower surface;
because more stomata on lower surface
or converse. [2]

AVAILABLE MARKS
6
50

Total

Rewarding Learning

Centre Number

71	

Candidate Number

General Certificate of Secondary Education
2011–2012

Science: Double Award (Modular)

Living Organisms and the Processes of Life
End of Module Test
Higher Tier

A

[GDA02]

GDA02

TUESDAY 8 NOVEMBER 2011
1.30 pm–2.15 pm

TIME

45 minutes.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
Write your answers in the spaces provided in this question paper.
Answer **all thirteen** questions.

INFORMATION FOR CANDIDATES

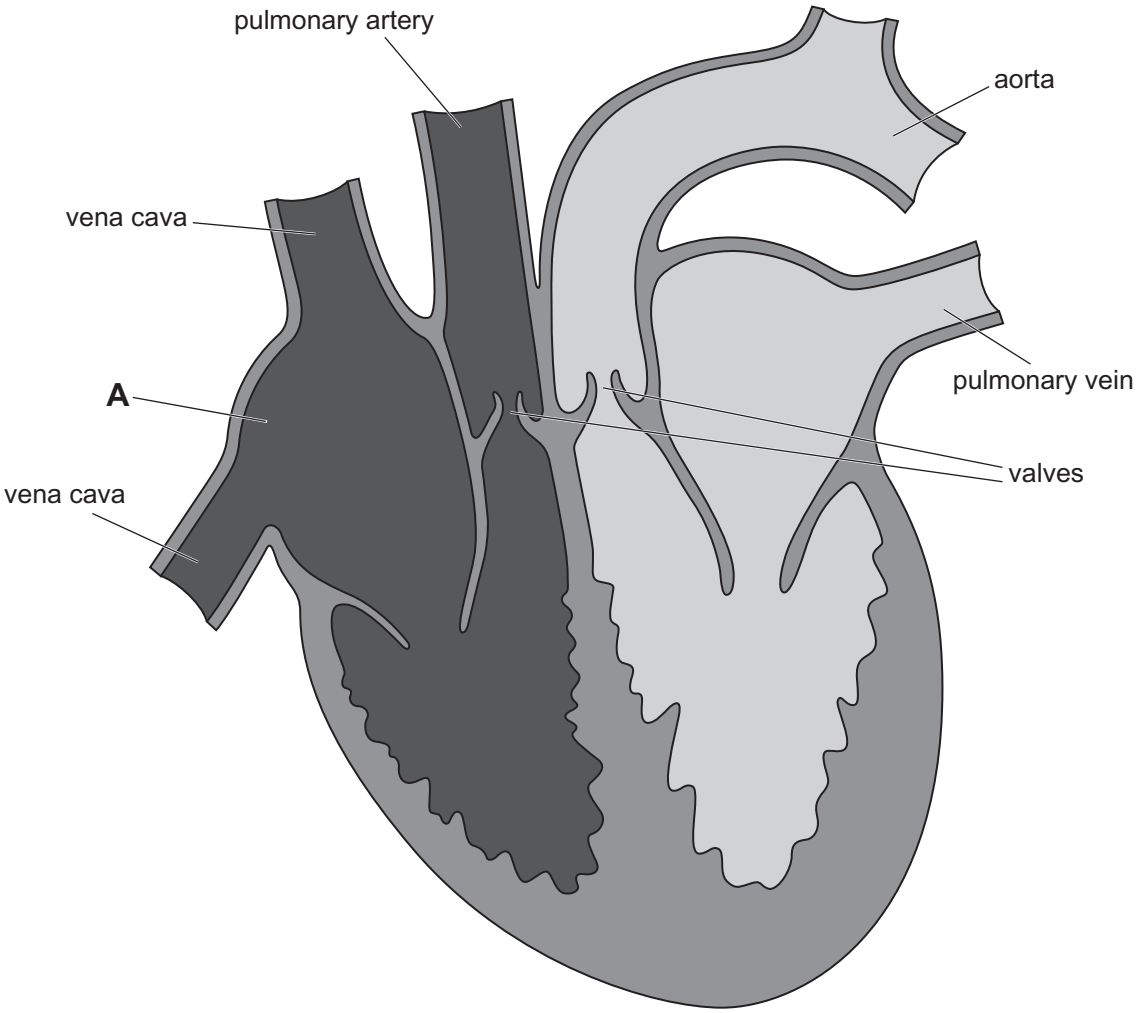
The total mark for this paper is 50.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
Total Marks	

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Examiner Only	
Marks	Remark

1 The diagram shows a section through the human heart.



(a) Name the heart chamber labelled **A**.

_____ [1]

(b) Use the diagram to name the two blood vessels that carry oxygenated blood.

1. _____

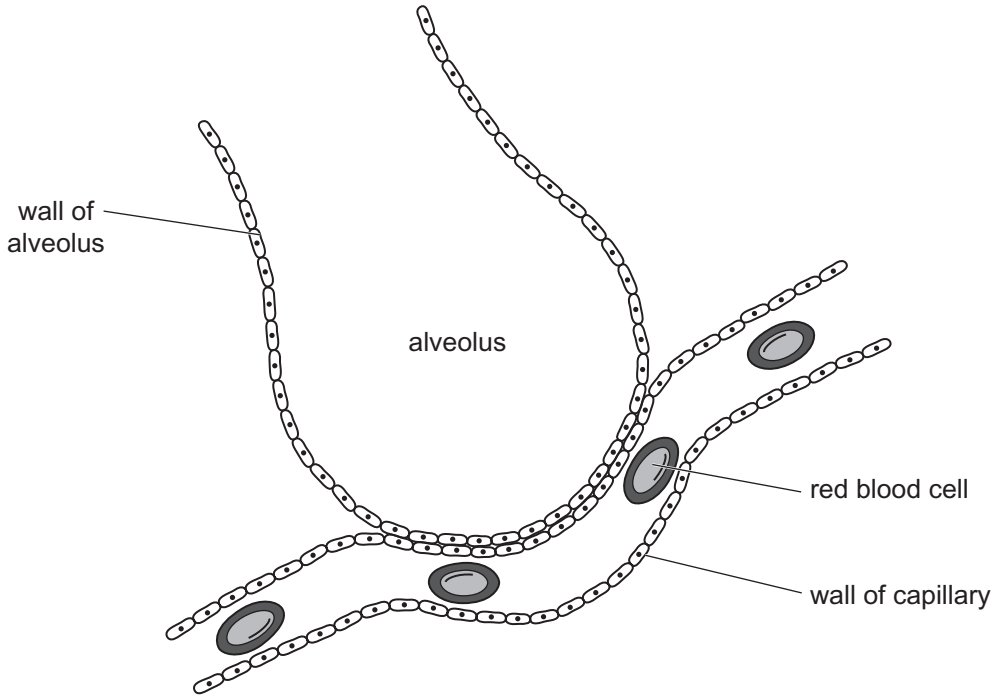
2. _____ [2]

(c) Suggest a function for the presence of the valves in the pulmonary artery and the aorta.

_____ [1]

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2 The diagram shows an alveolus with its associated capillary.



(a) Use the diagram to state one feature about the wall of the alveolus that helps gas exchange.

_____ [1]

(b) Name the gas that diffuses from the alveolus into the red blood cells.

_____ [1]

(c) Explain how having millions of alveoli in the lung facilitates gas exchange.

_____ [1]

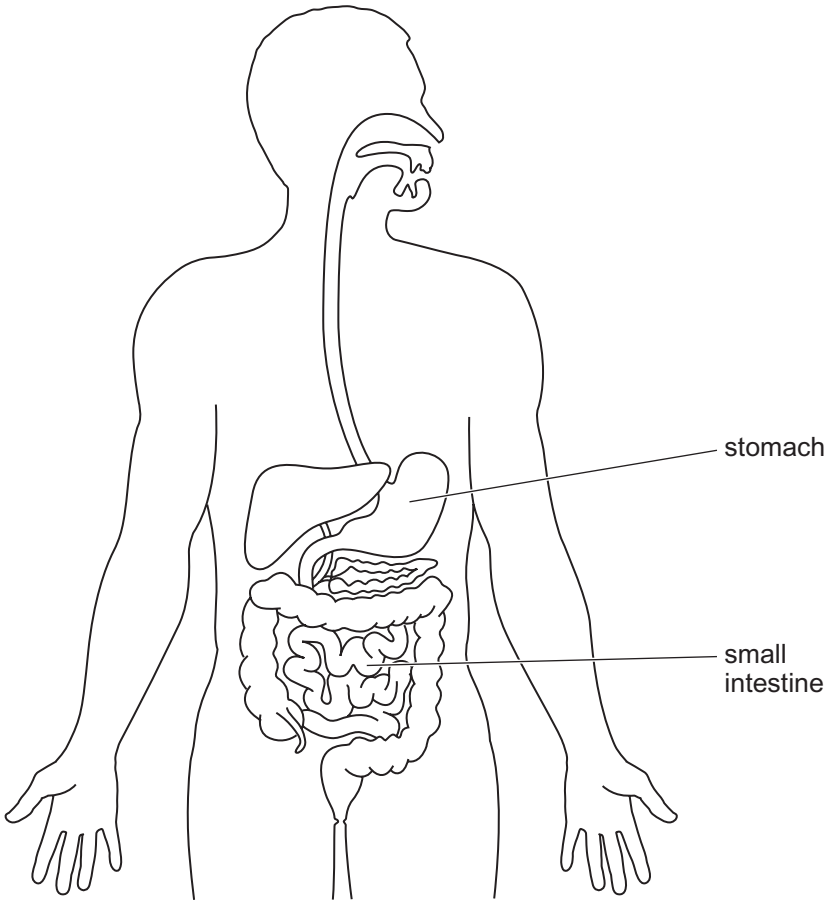
Examiner Only

Marks	Remark

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Examiner Only	
Marks	Remark

3 The diagram shows the digestive system.



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(a) What type of digestive enzyme is present in the stomach?

_____ [1]

(b) Describe one way, **not visible in the diagram**, in which the small intestine is adapted for absorption.

_____ [1]

(c) Name the organ that digested food molecules such as amino acids and glucose are taken to immediately after being absorbed.

_____ [1]

4 **(a)** Give an example of a disease caused by a fungus.

_____ [1]

(b) Complete the table below about active and passive immunity.

Type of immunity	Source of antibodies
Active immunity	
Passive immunity	

[2]

(c) Explain why active immunity is described as long-term, whereas passive immunity is only short-term.

_____ [1]

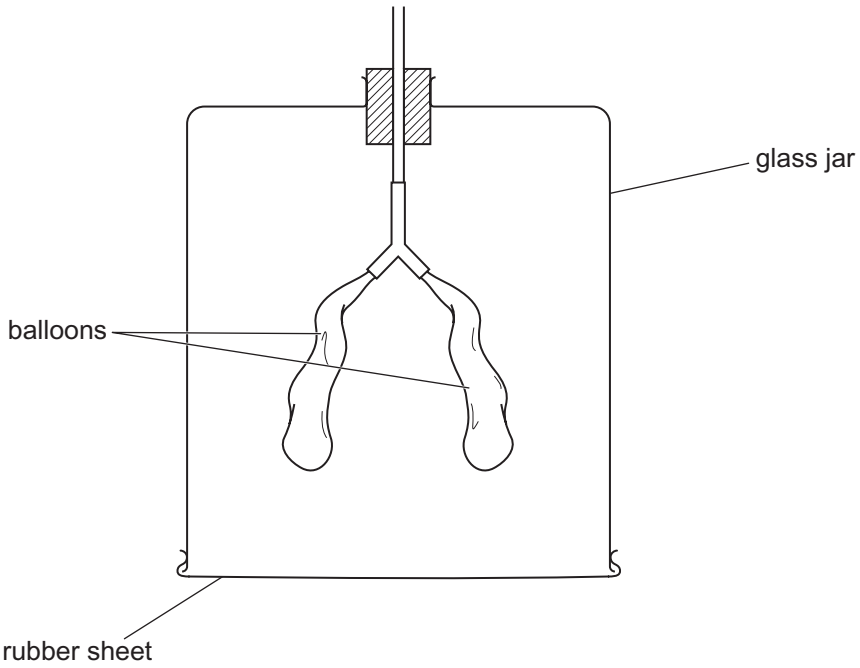
Examiner Only

Marks	Remark

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Examiner Only	
Marks	Remark

5 The diagram shows apparatus that can be used to demonstrate breathing in a human.



(a) What structure does the rubber sheet represent?

_____ [1]

(b) Explain why the balloons inflate when the rubber sheet is pulled down.

_____

_____ [2]

(c) Describe one way in which the balloons, shown in the diagram, do not accurately represent the structure of the lungs.

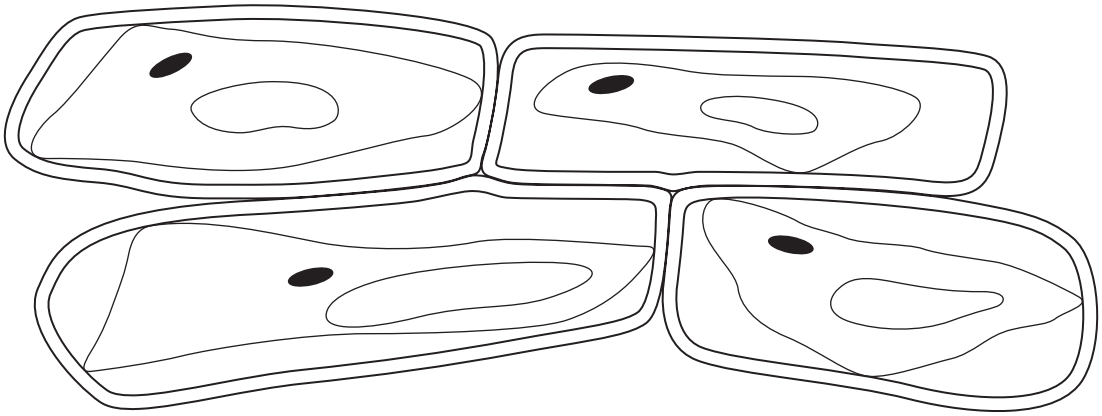
_____ [1]

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Examiner Only	
Marks	Remark

6 Jenny placed onion epidermis cells in a 10% sugar solution and examined a section of them using a microscope.

Some of the cells are shown below.

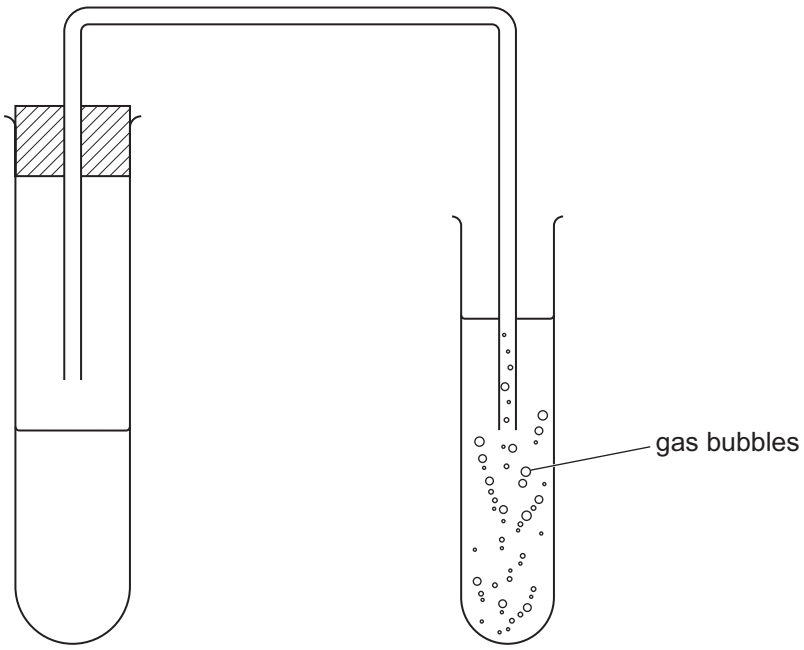


Describe and explain the appearance of these cells.

[4]

Examiner Only	
Marks	Remark

7 The diagram shows the apparatus used to investigate anaerobic respiration in yeast.



(a) In addition to yeast, name two other substances that are added to boiling tube A.

1. _____

2. _____ [2]

(b) Name the gas forming the bubbles in test tube B.

_____ [1]

(c) Apart from the gas, name one other substance produced in anaerobic respiration.

_____ [1]

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Examiner Only	
Marks	Remark

8 Environmental factors may affect the rate of photosynthesis in plants.

(a) Explain what a limiting factor is and suggest what would be the limiting factor in a field of winter wheat in January.

_____

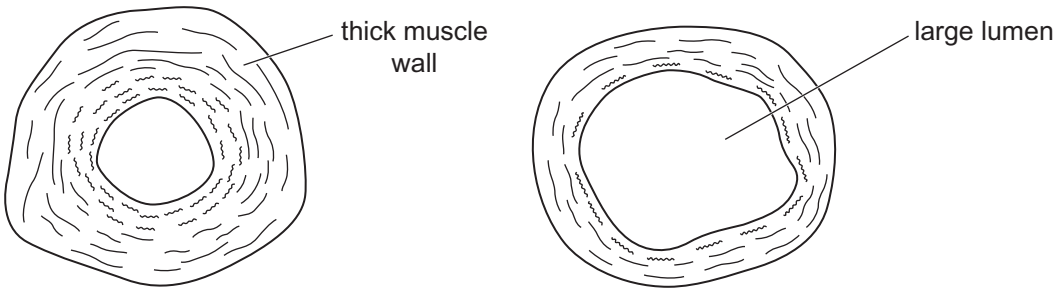
_____

_____ [2]

(b) What factor would you expect to be limiting in a field of potatoes on a sunny day in summer?

_____ [1]

9 The diagram shows a cross-section through an artery and a vein.



artery **vein**

(a) Explain why the artery has a thick muscle wall.

_____ [1]

(b) Suggest why the vein has a large lumen.

_____

_____ [1]

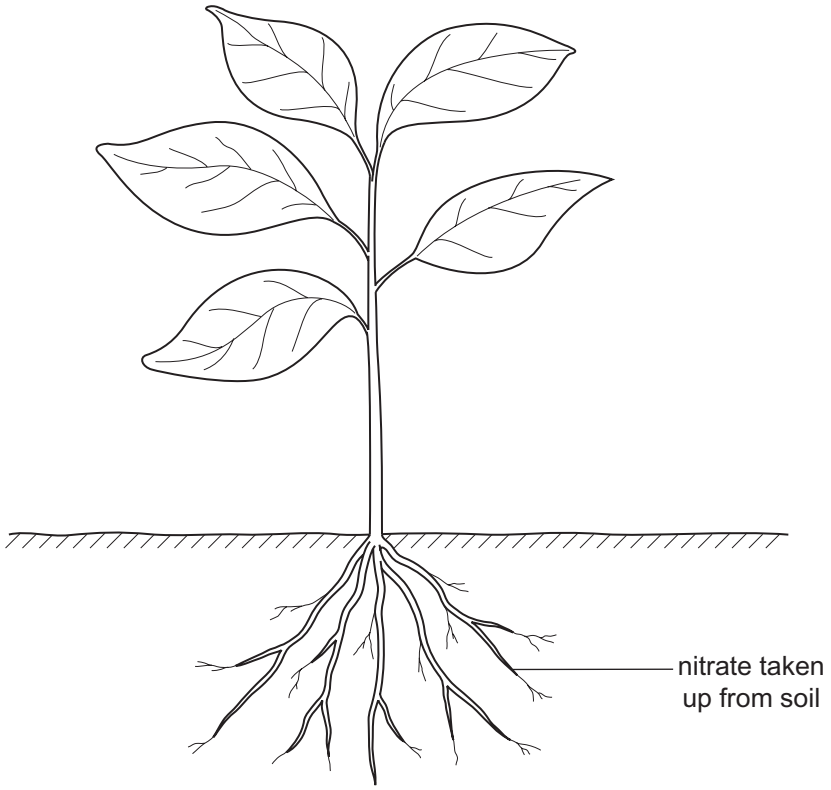
(c) State the way in which the hepatic portal vein differs from other veins.

_____ [1]

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10 The diagram below shows where nitrates enter a plant.

Examiner Only	
Marks	Remark



(a) Describe the role that nitrates play in plant growth.

_____ [1]

(b) Explain how nitrates are taken up from the soil.

_____

_____

_____

_____ [3]

(c) Nitrates move up through a plant in the xylem vessels. The nitrates move through the plant faster on warm days compared to cold days. Explain why.

_____ [1]

11 Urea is a waste product made in our body. It is toxic and needs to be removed.

(a) Where in the body is urea produced?

_____ [1]

(b) Explain how the kidneys remove urea from the body and describe the route urea follows from the kidneys to its elimination from the body in urine.

_____

_____

_____

_____ [3]

Examiner Only	
Marks	Remark

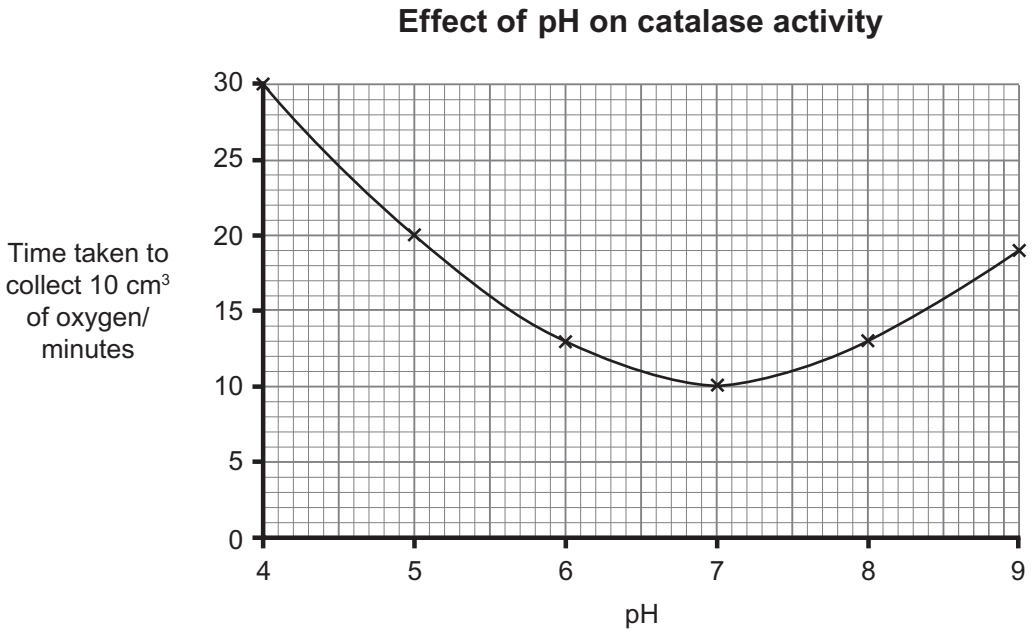
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Examiner Only	
Marks	Remark

12 James is investigating the effect of pH on an enzyme called catalase.

Catalase breaks down hydrogen peroxide into water and oxygen.

James measures the time it takes to collect 10 cm^3 of oxygen at a range of pH values. His results are shown in the graph.



Use the graph and your knowledge to answer parts **(a)(i)–(ii)**.

(a) (i) What is the optimum pH for catalase?

_____ [1]

(ii) Explain the result at pH 4.

_____

_____ [2]

(b) Describe the digestion of fats.

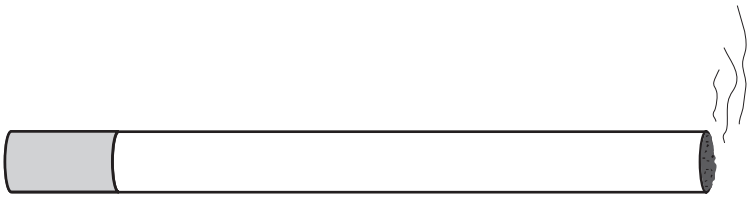
_____

_____

_____ [2]

Examiner Only	
Marks	Remark

13 Smoking cigarettes results in the gas carbon monoxide being absorbed into the bloodstream.



(a) Suggest how the presence of this gas in the mother's blood can result in a smaller than average baby being born.

_____

_____

_____ [2]

(b) Tar from cigarettes clogs up the cilia in the respiratory tract and the cilia stop beating. Explain the effect of this on the body.

_____

_____

_____ [2]

THIS IS THE END OF THE QUESTION PAPER

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111971

Rewarding Learning

General Certificate of Secondary Education
2011–2012

Science: Double Award (Modular)

Living Organisms and the Processes of Life
End of Module Test
Higher Tier

A

[GDA02]

TUESDAY 8 NOVEMBER 2011
1.30 pm–2.15 pm

MARK SCHEME

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				AVAILABLE MARKS
1	**(a)**	A – right atrium	[1]	
	(b)	Aorta; pulmonary vein	[2]	
	(c)	Prevents back flow of blood into the heart/stops blood going in the wrong direction/stop blood flowing back into ventricles	[1]	4
2	**(a)**	One cell thick/thin flattened cells/large surface/short diffusion distance close to blood – (***not*** *moist not permeable*)	[1]	
	(b)	Oxygen/O_2	[1]	
	(c)	Increases surface area/more diffusion occurs/speeds up diffusion	[1]	3
3	**(a)**	Protease/pepsin	[1]	
	(b)	Villi/microvilli/good blood supply/permeable/thin walls (***not*** *long not large surface area not folds on its own*)	[1]	
	(c)	Liver	[1]	3
4	**(a)**	Athletes foot/ringworm/thrush	[1]	
	(b)	Active – Produced by body itself Passive – From outside the body e.g. colostrum/pass across placenta vaccination/injection	[2]	
	(c)	Active-memory cells made/antibodies remain in the blood (***not*** *memory on its own*)	[1]	4
5	**(a)**	Diaphragm	[1]	
	(b)	Increased volume; decrease in pressure more space in jar	[2]	
	(c)	Do not have alveoli/no associated blood capillaries/lots of air sacs No branching/no cells present	[1]	4

		AVAILABLE MARKS
6	**Description:** Cells are plasmolysed/flaccid/cell membrane has pulled away from the cell wall; not turgid not smaller vacuole **Explanation:** Lower water concentration outside the cells (i.e. in the sugar solution); (or more conc. outside) so water moves out of the cells; by osmosis; across a partially permeable membrane/semipermeable. Marking – 1 mark for Description – any **three** for Explanation down conc. gradient but only if } 2 marks water moving out not down conc. gradient on its own	4
7	**(a)** 1. Glucose/sugar solution/water 2. Layer of oil/paraffin oil [2]	
	(b) Carbon dioxide/CO_2 [1]	
	(c) Alcohol/ethanol/not energy [1]	4
8	**(a)** growth or p.s. – not as much as it could be Limiting factor is one that prevents photosynthesis occurring at its maximum rate; temperature/light if you increase the factor the photosynthesis/growth increases [2]	
	(b) Carbon dioxide/CO_2 (*not water*) [1]	3
9	**(a)** Blood is under high pressure in artery/allow blood to be carried from heart [1]	
	(b) Allows blood to flow through easily/freely/more space for blood/allow blood to go back to heart [1]	
	(c) Starts and ends in capillaries carries **high** concentrations of digested food molecules/or named food does not go back to heart [1]	3
10	**(a)** Used for amino acid/protein synthesis [1]	
	(b) Any **three** from: Active transport used; moves nitrates from a low concentration to a high concentration/ against a concentration gradient; needs energy/from respiration; which uses oxygen [3]	
	(c) Higher rate of transpiration on a warm day/more water moves up xylem [1]	5

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		AVAILABLE MARKS
11 **(a)** Liver [1]		
(b) Any **three** from: Ultrafiltration in kidneys/blood is filtered/high pressure in kidneys; urea passes into ureter; then stored in bladder; expelled from body via urethra [3]		4
12 **(a)** **(i)** pH = 7 [1]		
(ii) Catalase is partially/or changes shape catalase/enzyme denatured at pH4;/or changes shape of active site/not too acidic on its own So hydrogen peroxide does not fit readily into active sites accept substrate for hydrogen peroxide [2]		
(b) Lipase is involved; Breaks down fats to fatty acids and glycerol (must be fats digestion) emulsification/or description/or larger surface area/large droplets to small droplets [2]		5
13 **(a)** Any **two** from: There is less oxygen carried in the mother's blood;/CO binds to Hb so less oxygen passes to the foetus; foetus has a lower rate of respiration; and therefore less energy for growth – not less growth on its own [2]		
(b) Any **two** from: Bacteria/dust are trapped in the mucus in the respiratory tract;/clogged respiratory tract normally wafted by cilia upwards to be swallowed; this allows bacteria to enter the lungs; lung cancer [2]		4
Total		**50**

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Rewarding Learning

Centre Number

71	

Candidate Number

General Certificate of Secondary Education
2010–2011

Science: Double Award (Modular)

Living Organisms and the Processes of Life
End of Module Test

Higher Tier

A

[GDA02]

GDA02

THURSDAY 19 MAY 2011, MORNING

TIME

45 minutes.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
Write your answers in the spaces provided in this question paper.
Answer **all thirteen** questions.

INFORMATION FOR CANDIDATES

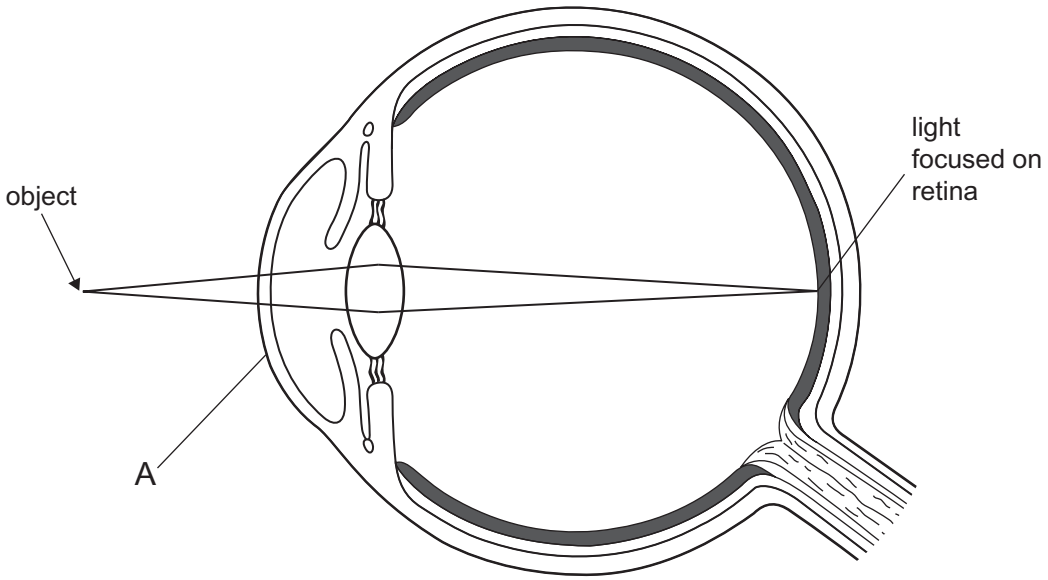
The total mark for this paper is 50.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
Total Marks	

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Examiner Only	
Marks	Remark

1 The diagram shows light from an object being focused by a human eye.



(a) Name part A.

_____ [1]

(b) Describe how the image is focused on the retina and relayed to the brain.

_____

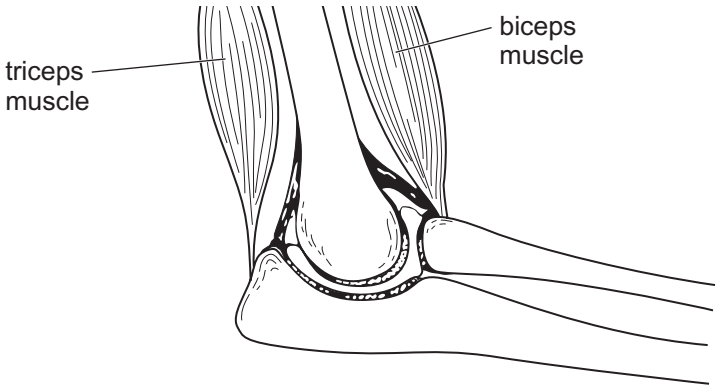
_____

_____

_____ [3]

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2 The diagram shows a section through the elbow joint.



(a) Use the diagram to explain what will happen to the two muscles when the lower arm is raised.

_____

_____ [2]

(b) Explain why the biceps and triceps are described as being an antagonistic pair of muscles.

_____ [1]

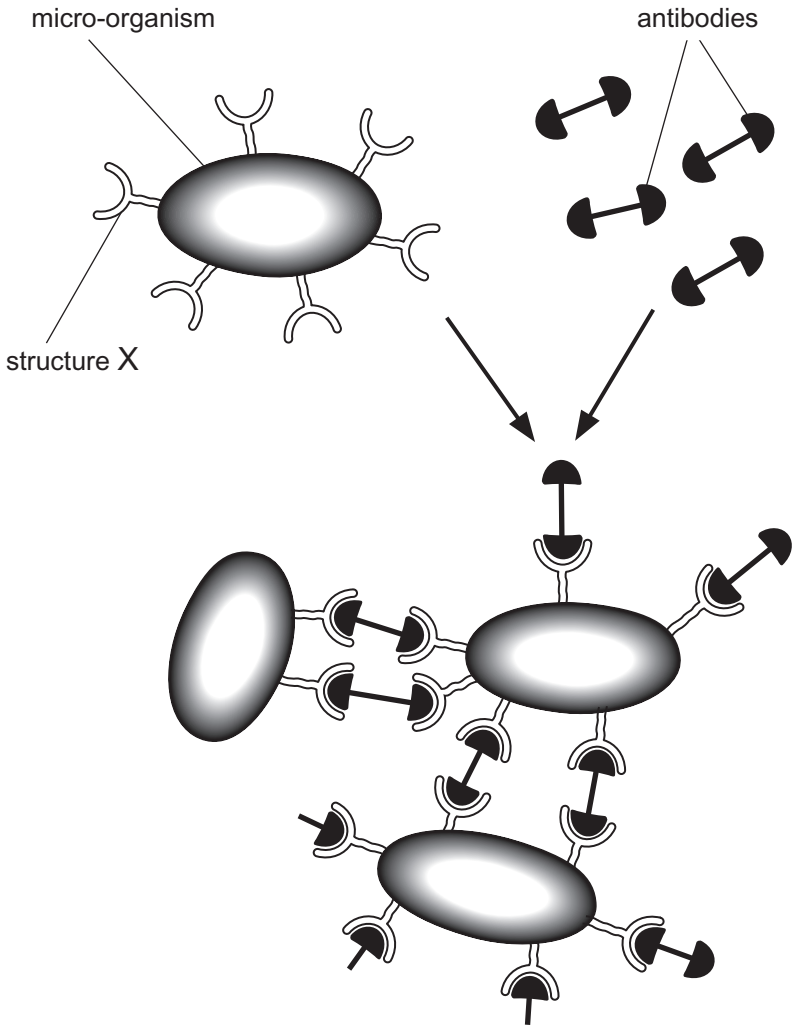
Examiner Only

Marks	Remark

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Examiner Only	
Marks	Remark

3 One way that the body deals with invading micro-organisms is to produce antibodies. The diagram shows the sequence of events following the production of antibodies.



(a) Name structure X on the micro-organism that causes the production of antibodies.

_____ [1]

(b) Explain what will happen to the clump shown in the diagram.

_____

_____

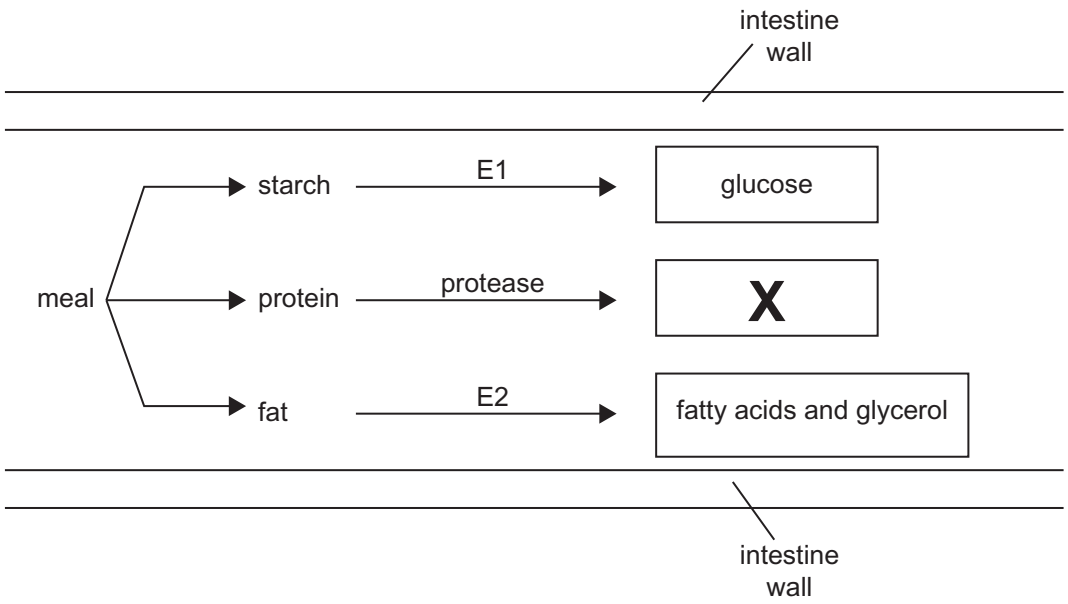
_____ [2]

(c) Suggest why a person is unlikely to get the same disease twice, once antibodies have been produced.

_____ [1]

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4 The diagram shows some of the processes going on in the small intestine after a meal has been eaten.



(a) Use the diagram to name the enzymes, E1 and E2.

E1 _____

E2 _____ [2]

(b) Name substance X.

_____ [1]

(c) Give **one** way (not shown on the diagram) that the intestine wall is adapted for absorption.

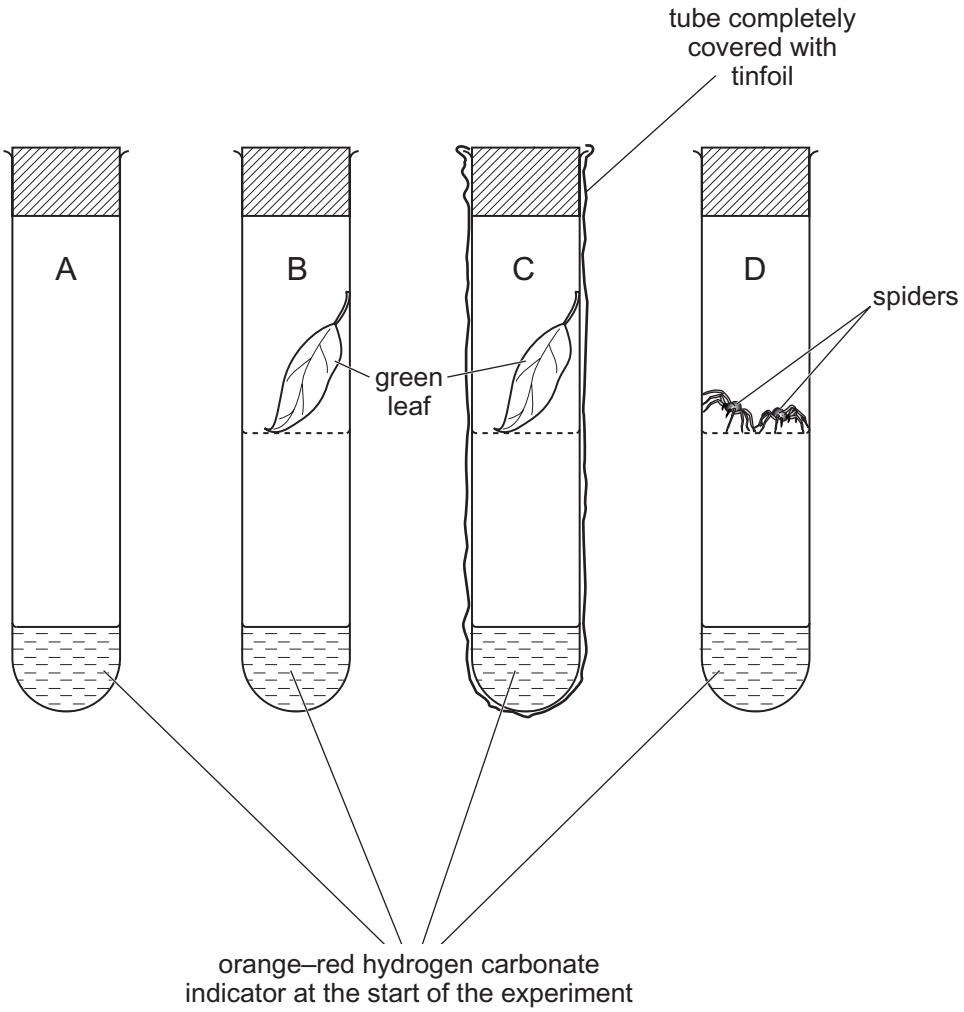
_____ [1]

Examiner Only

Marks	Remark

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5 This experiment was set up to investigate gas exchange.



The colour changes of hydrogen carbonate indicator are shown below.

Purple ← (Less carbon dioxide) — Orange–red — (More carbon dioxide) → Yellow

Examiner Only

Marks	Remark

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The tubes were left in bright light for 10 hours.

Complete the table below to state and explain the results of this experiment.

Tube	Colour of hydrogen carbonate indicator	Explanation of results
A	Orange–red	No living organisms present. No photosynthesis. No respiration.
B		Leaf in light. Uses more carbon dioxide in photosynthesis than it produces in respiration.
C		
D	Yellow	

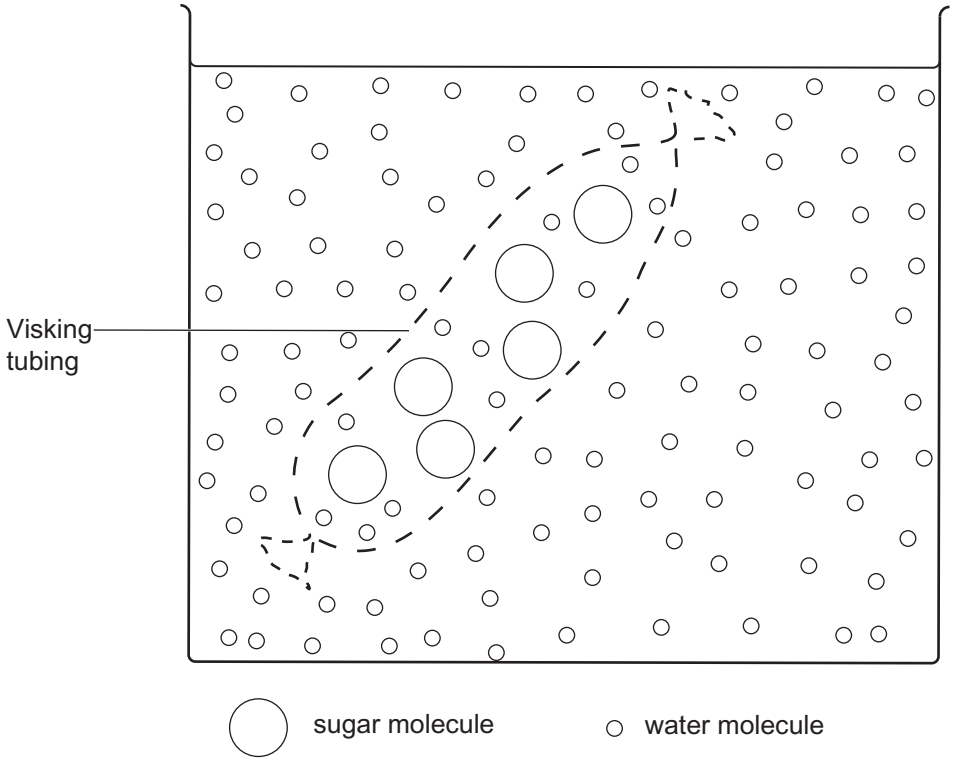
[4]

Examiner Only	
Marks	Remark

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Examiner Only	
Marks	Remark

6 Visking tubing was filled with sugar solution and then placed in a beaker of water.



The Visking tubing is partially permeable.

Use the information in the diagram to describe and explain what would happen if the Visking tubing was left in the water for 24 hours.

_____

_____

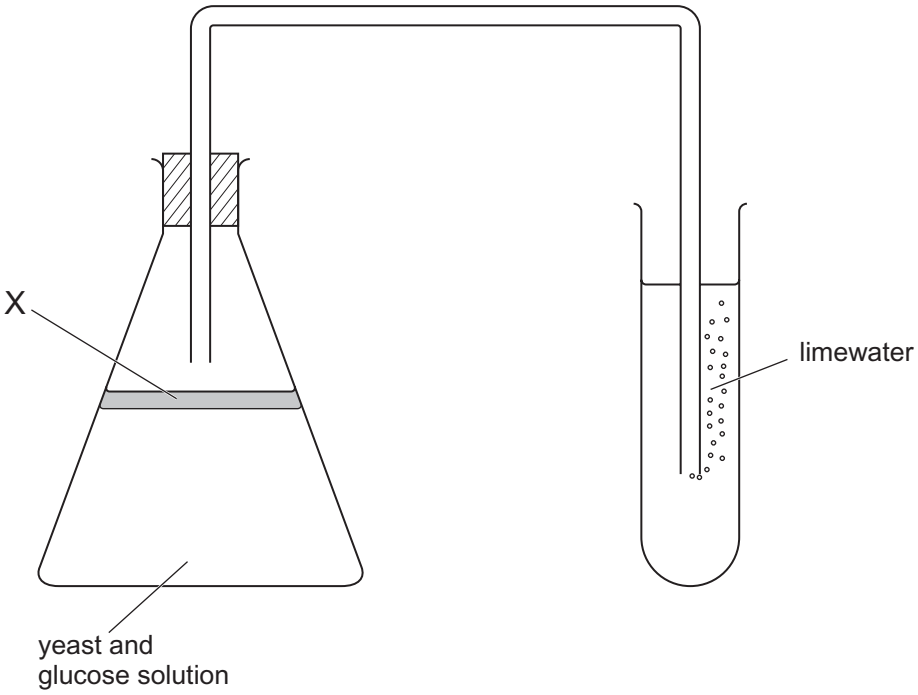
_____

_____

_____ [3]

Examiner Only	
Marks	Remark

7 An experiment was set up to investigate anaerobic respiration in yeast.



(a) Suggest what substance needs to be present at X.

_____ [1]

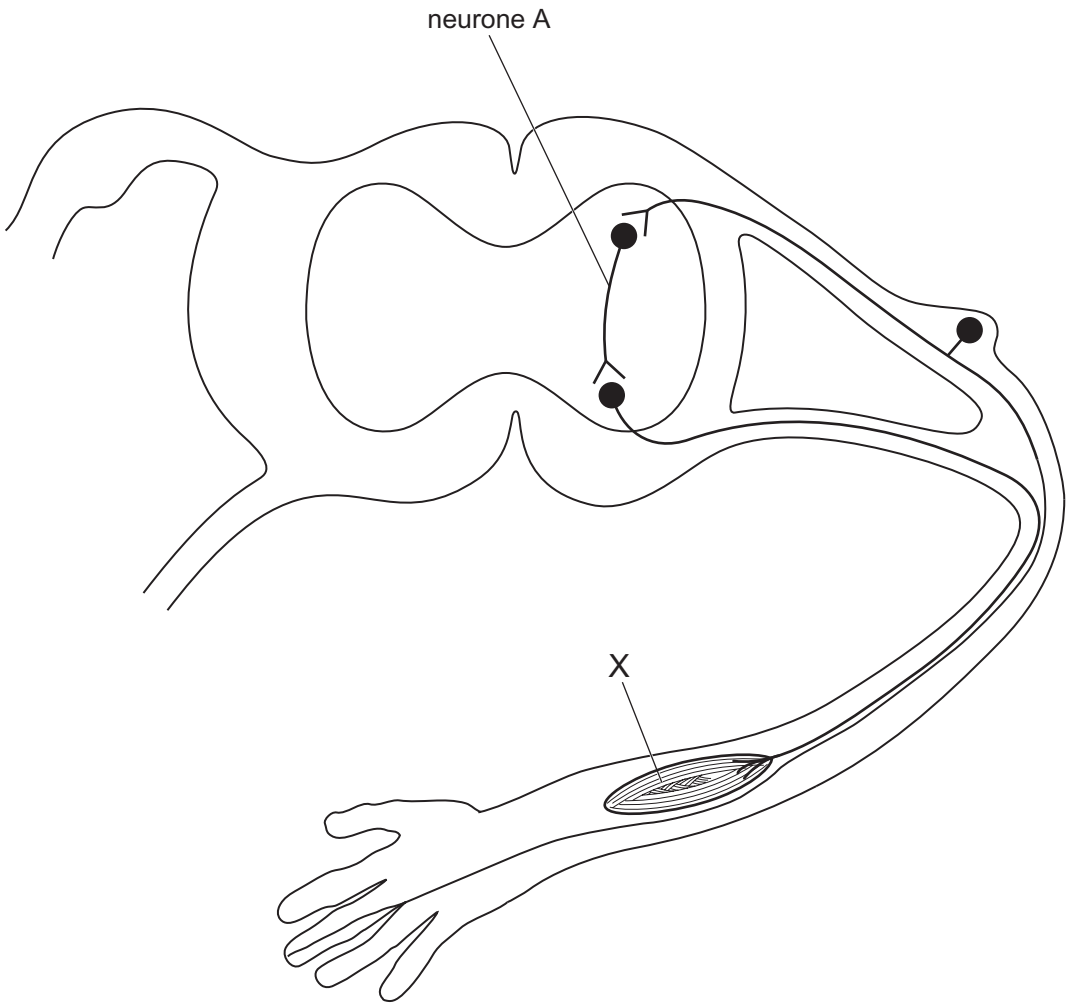
(b) State two ways in which the products of anaerobic respiration in yeast differ from the products of aerobic respiration.

1. _____

2. _____ [2]

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8 The diagram shows the neurones in a reflex arc.



(a) Name neurone A.

_____ [1]

(b) Name structure X.

_____ [1]

(c) Explain the advantage of **not** involving the brain in a reflex action.

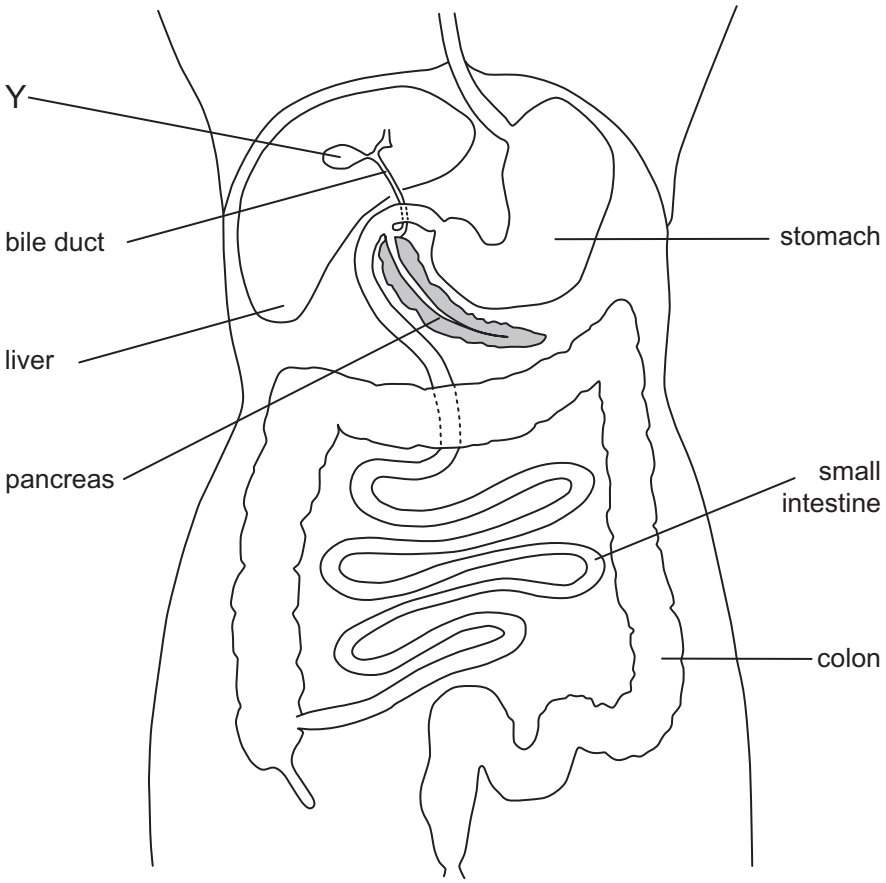
_____ [1]

Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

9 The diagram shows the liver and digestive system.



(a) **(i)** Bile is stored in structure Y after being produced in the liver. Name structure Y.

_____ [1]

(ii) Explain fully the role of bile in digestion.

_____

_____

_____ [2]

(b) If a person has had an operation to remove part of the colon, the colon will be shortened. What process will be affected?

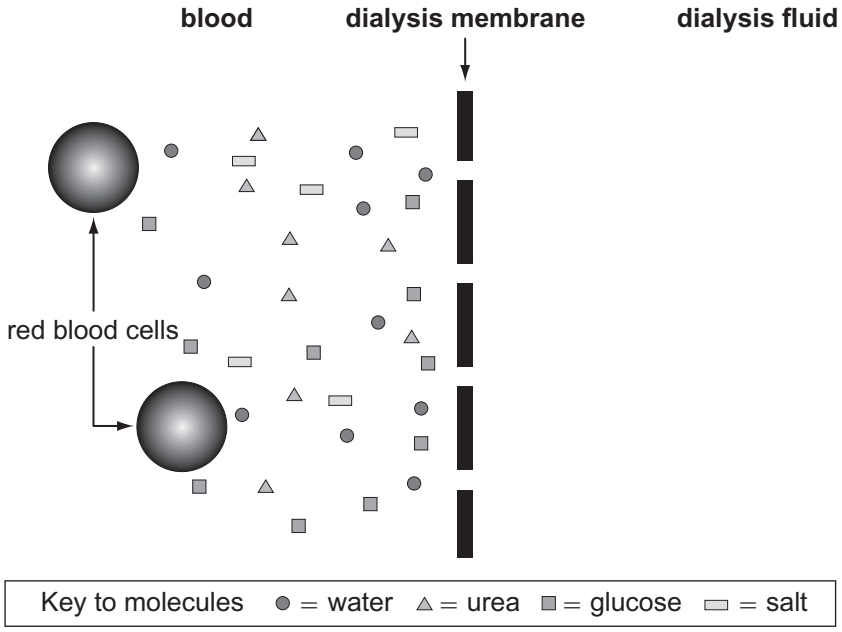
_____ [1]

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Examiner Only	
Marks	Remark

10 James has suffered kidney failure and has to have dialysis.

The diagram shows the composition of James' blood as it enters the dialysis machine. The composition of the dialysis fluid is not shown.



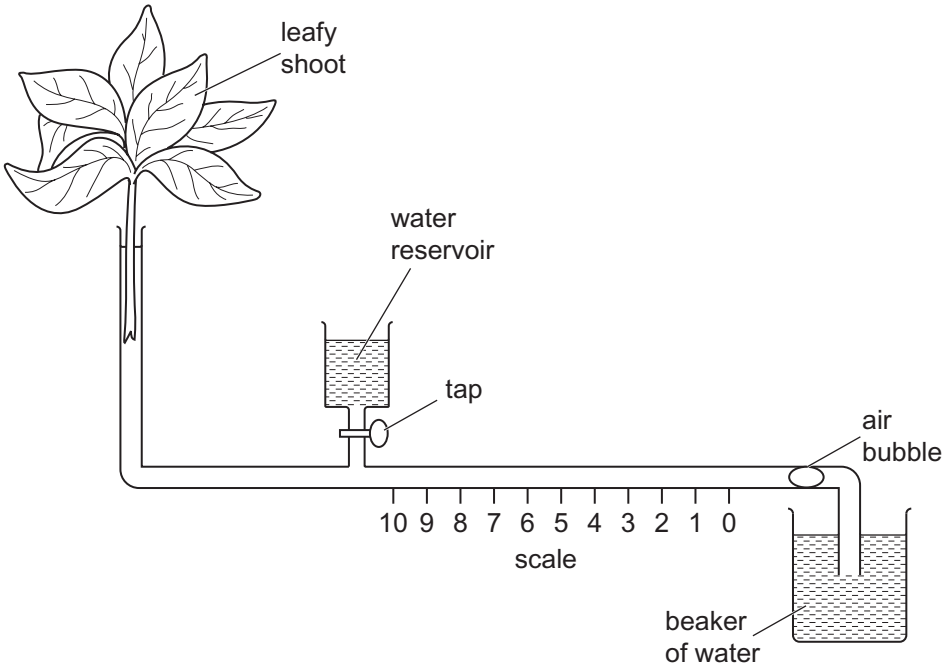
Complete the table to show whether each of the components listed is present in the dialysis fluid at the start of dialysis and at the end of dialysis.

Place a tick (✓) if the component is present or a cross (✗) if it is absent.

Component in James' blood	Component present or absent in the dialysis fluid	
	At start	At end
Water		
Urea		
Glucose		
Salt		
Red blood cells		

[5]

11 A potometer is shown below.



The apparatus is assembled under water to avoid trapping unwanted air bubbles.

(a) Use the diagram to suggest and explain how the air bubble is introduced into the potometer.

_____

_____

_____ [2]

(b) When the upper or lower leaf surfaces are greased with Vaseline, this affects the transpiration rate. The results are shown in the table.

	Distance moved by air bubble (mm/s)
Upper leaf surfaces only greased	1.2
Lower leaf surfaces only greased	0.4

Explain why the rate of transpiration is higher when the upper leaf surfaces only were greased.

_____

_____

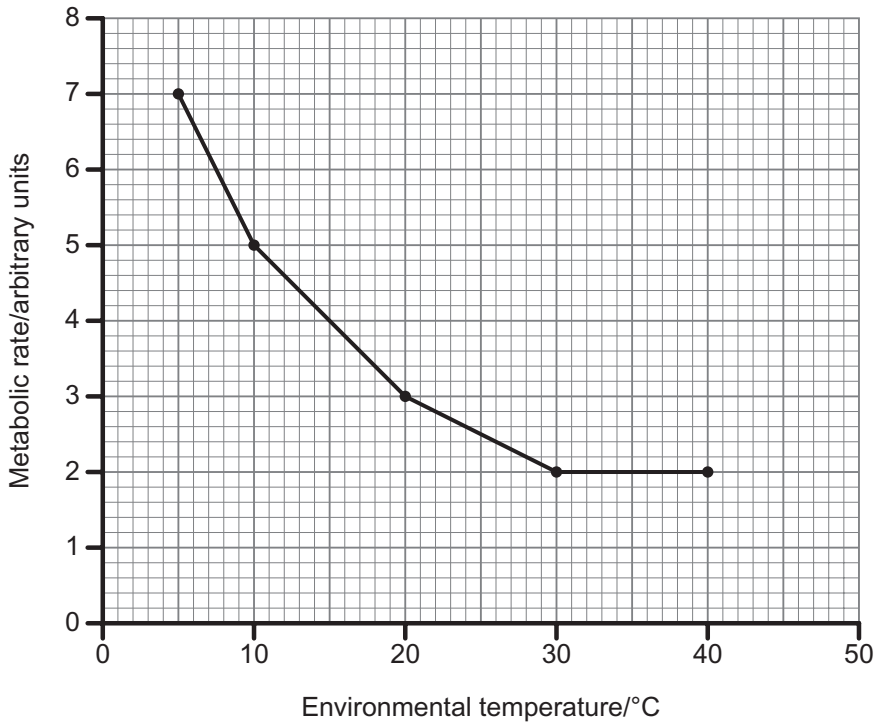
_____ [2]

Examiner Only

Marks	Remark

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12 The metabolic rate (rate of cell reactions) of a mammal is affected by the temperature of the outside environment.



(a) Explain why the metabolic rate increases as the outside environment temperature falls below 30 °C.

_____

_____

_____ [2]

(b) Explain how the mammal will maintain a constant body temperature when the external temperature is 40 °C.

_____

_____

_____

_____

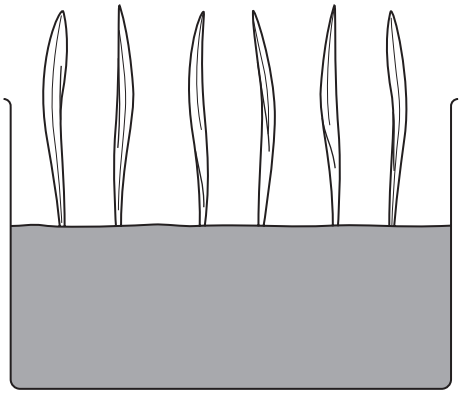
_____ [3]

Examiner Only

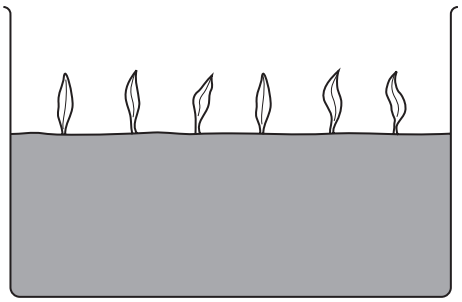
Marks	Remark

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13 Barley seedlings were grown at 20 °C and at 6 °C in good light conditions. All other environmental conditions were kept constant.



barley seedlings grown at 20 °C



barley seedlings grown at 6 °C

Describe and suggest an explanation for the results of this experiment.

_____

_____

_____

_____

_____

_____ [4]

THIS IS THE END OF THE QUESTION PAPER

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Marks	Remark

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Rewarding Learning

General Certificate of Secondary Education
2010–2011

Science: Double Award (Modular)

Living Organisms and the Processes of Life
End of Module Test

Higher Tier

[GDA02]

THURSDAY 19 MAY 2011, MORNING

MARK SCHEME

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				AVAILABLE MARKS
1	**(a)**	Cornea	[1]	
	(b)	Light is bent/refracted; by the cornea/lens; Information passes along *optic* nerve (to brain) not focused onto retina–because told in question	[3]	4
2	**(a)**	Biceps contracts/shortens; Triceps relaxes/extends	[2]	
	(b)	Muscles work against each other/when one contracts, the other relaxes	[1]	3
3	**(a)**	Antigens/proteins	[1]	
	(b)	Clump is ingested/digested; by phagocytes/white blood cells	[2]	
	(c)	Antibodies remain in the blood/memory cells made WBC's retain memory/more antibodies produced quickly	[1]	4
4	**(a)**	E1 – Amylase E2 – Lipase	[2]	
	(b)	Amino acids	[1]	
	(c)	Large surface area/villi/microvilli/thin	[1]	4

5

A		
B	Purple	
C	Yellow	Leaf respires only
D		Spiders respire

[4] 4

			AVAILABLE MARKS
6	Visking tubing bigger/bag bigger/swells/swollen/turgid/expands	[1]	
	Any **two** from four: [1] for description, [1] for rest water molecules pass through but not sugar molecules;/sugar molecules too big to pass through water moves into the tubing; by osmosis; down the concentration gradient/higher water concentration outside the Visking tubing max. [2] if have incorrect statement	[2]	3
7	**(a)** Layer of *oil*/paraffin oil	[1]	
	(b) In anaerobic – assume applies to anaerobic or converse if clear Ethanol produced;/alcohol produced No water made;/produced Less energy released/produced	[2]	3
8	**(a)** Association/relay/intermediate/connector	[1]	
	(b) Muscle/effector	[1]	
	(c) Quicker response/do not waste time thinking/more likely to avoid injury, e.g. a burn/protection against danger/happens automatically.	[1]	3
9	**(a)** **(i)** Gall bladder	[1]	
	(ii) Any **two** from: Bile *emulsifies* fats/breaks large fat globules into smaller fat droplets; so increases the surface area; for lipase to act or enzymes alkaline; neutralise stomach acid	[2]	
	(b) Water absorption/less water absorbed/may suffer dehydration not excretion	[1]	4

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10

	At start	At end
Water	✓	✓
Urea	✗	✓
Glucose	✓	✓
Salt	✓	✓
Red blood cells	✗	✗

must have x's or present and absent

[1] for each substance [5]

AVAILABLE MARKS

5

11 (a) Lift the capillary tubing out of the beaker;
(as water is transpired from the leaves)/air enters end of capillary tube [2]

(b) There are (more) *stomata* on the lower leaf surface;/less stomata on upper surface
stomata/these are not blocked allowing transpiration/and water is lost through stomata
allow pores for stomata [2]

4

12 (a) Any **two** from:
There is an *increase in* the respiration rate;/more respiration
which produces heat;/heat energy
to compensate for heat loss to the outside/to make up for heat loss from body [2]

(b) Any **three** from:
Hair lowered; so no insulating layer; hairs lie flat
Sweat produced; which cools the skin as water evaporates;
Shunt vessel constricts; so more blood passes through the surface capillaries/vasodilation; so heat is lost by radiation [3]

5

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			AVAILABLE MARKS
13	Any **four** from: less growth/stunted at the 6 °C temperature;/better growth at 20 ºC there is reduced enzyme activity; so less respiration/less energy produced; so less active uptake; mineral salts; from a low to a high concentration/against the concentration gradient OR less growth/stunted at the 6 °C temperature; there is reduced enzyme activity; so less photosynthesis; less starch/so less glucose made; so less energy (for growth) [1] description – less growth at 6 ºC or converse 6 ºC – less photosynthesis and respiration = [1]	[4]	4
	Total		**50**

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Rewarding Learning

Centre Number

71	

Candidate Number

General Certificate of Secondary Education
2010–2011

Science: Double Award (Modular)

Living Organisms and the Processes of Life

End of Module Test

Higher Tier

A

[GDA02]

GDA02

THURSDAY 24 FEBRUARY 2011, MORNING

TIME

45 minutes.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
Write your answers in the spaces provided in this question paper.
Answer **all twelve** questions.

INFORMATION FOR CANDIDATES

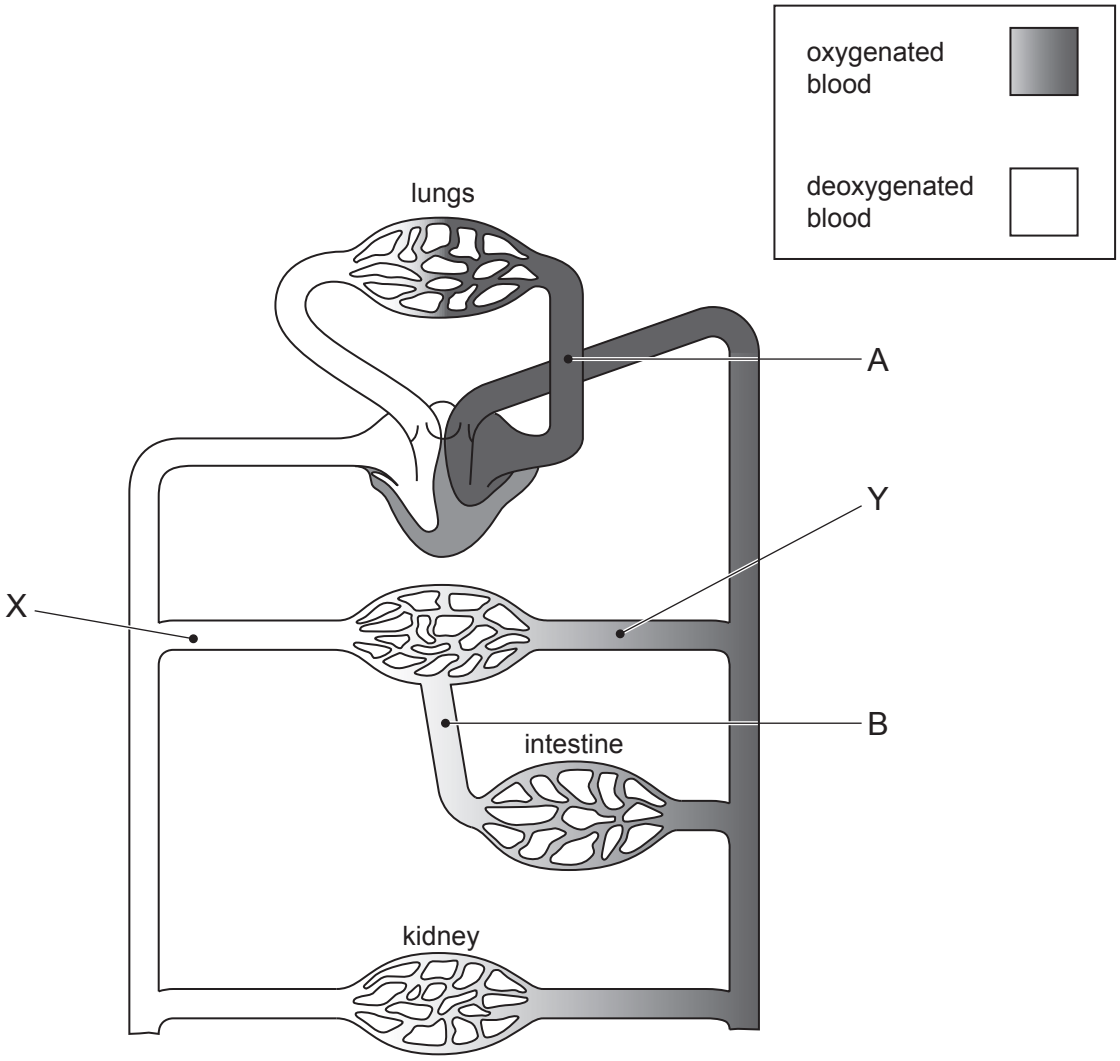
The total mark for this paper is 50.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
Total Marks	

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Examiner Only	
Marks	Remark

1 The diagram shows part of the circulatory system.



© *Human Biology: An Active Approach by P Rowlinson and M Jenkins, published by Cambridge University Press, 1982*

(a) What is meant by **double circulation**?

_____

_____ [1]

(b) Name the blood vessels:

A _____

B _____ [2]

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(c) Explain why the concentration of oxygen is lower in vessel X than in vessel Y.

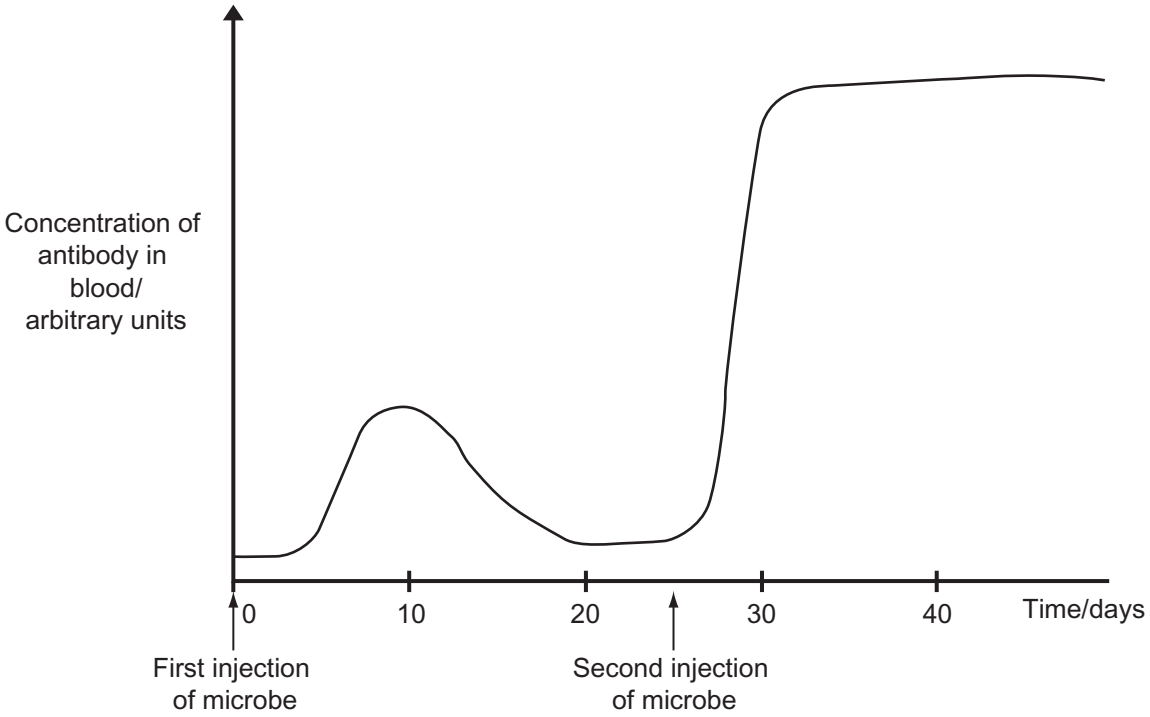
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_____ [2]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

2 The graph shows the body's response to the injection of a microbe.



(a) Name the method of fighting disease where a weakened form of the microbe is injected into the body.

_____ [1]

(b) Use the graph to give two differences between the responses to the first and second injections.

1. _____

2. _____ [2]

(c) The antibodies connect with the microbes to form a clump. Name the process by which the body destroys the clump.

_____ [1]

Examiner Only	
Marks	Remark

3 In blood donation, blood is taken from a vein in a person's arm and used to treat patients who need a blood transfusion



© US Federal Government

The photograph shows a needle inserted into a blood vessel in a donor's arm.

(a) Suggest why the needle is inserted into a vein rather than an artery.

_____ [1]

(b) Use your knowledge of osmosis to explain why the blood cells would be damaged if water was added to the donated blood by mistake.

_____

_____

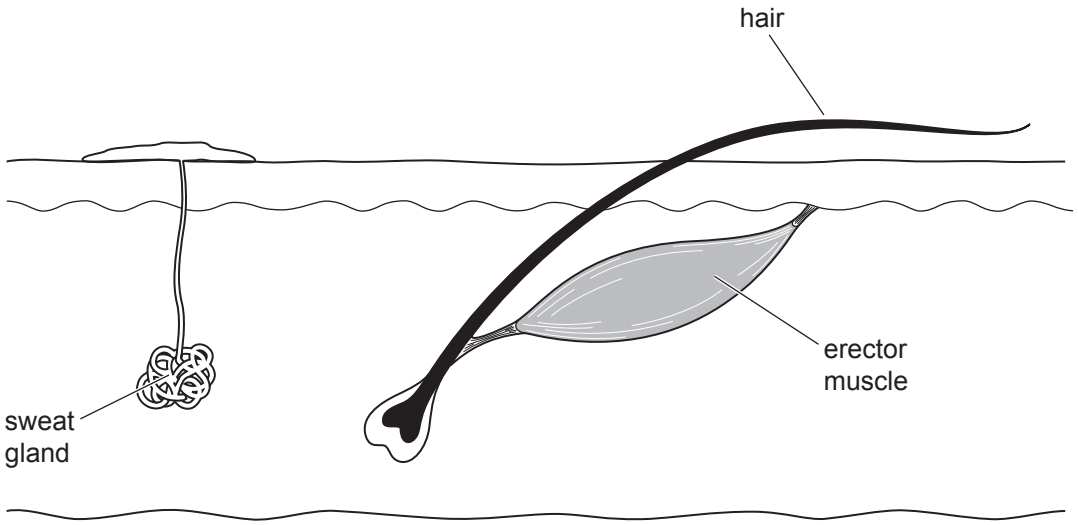
_____

_____

_____ [4]

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4 The skin plays an important role in temperature regulation.



The diagram shows the skin on a hot day. Complete the table to show how the following actions help the body lose heat.

Action	How this helps heat loss
Hair lies flat	
Sweat is produced	

[4]

Examiner Only

Marks	Remark

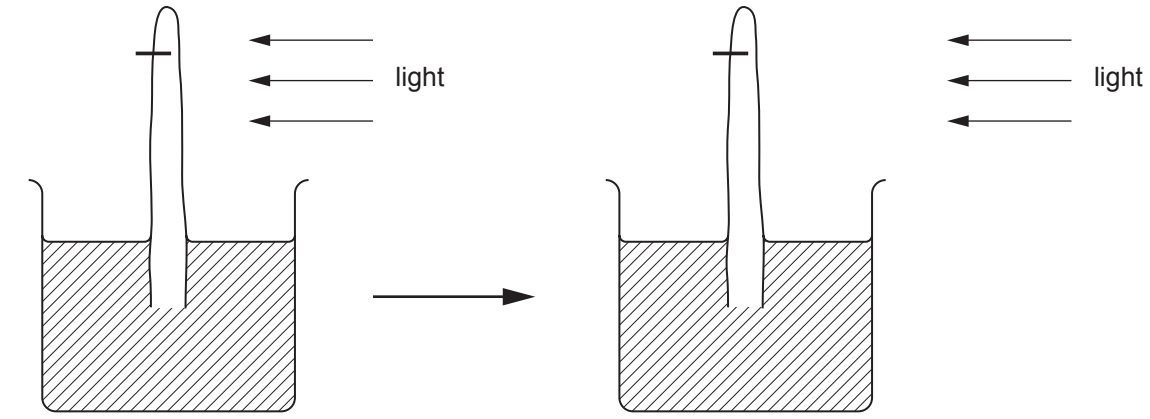
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Examiner Only	
Marks	Remark

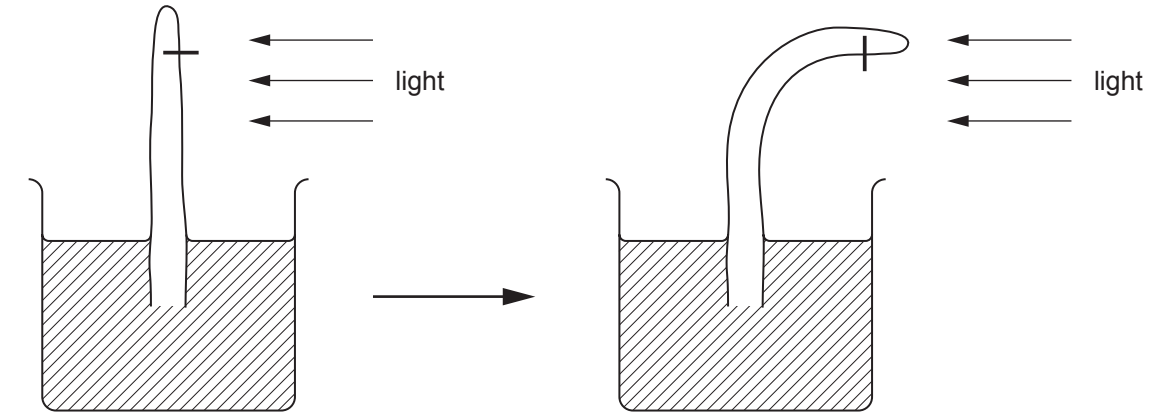
5 An experiment was carried out to investigate the effect of light shining from one side on a plant shoot.



small sheet of impermeable material placed in shaded side of shoot tip

after 5 days

Experiment A



small sheet of impermeable material placed in illuminated side of shoot tip

after 5 days

Experiment B

(a) A plant hormone (auxin) causes the bending response. Auxin is produced in the tip and travels downwards to cause the cells to elongate. Use the results to explain which side of the shoot the auxin travels downwards in.

_____

_____ [2]

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(b) (i) Name the response shown by the shoot in experiment B.

_____ [1]

(ii) Explain how this response will benefit the plant.

_____

_____ [2]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

6 **(a)** The table gives information about digestive enzymes.

Complete the table.

Enzyme	Food broken down	Product(s) of digestion
amylase		maltose (glucose)
lipase	fat	+

[2]

(b) Explain why lipase will not break down protein.

_____

_____

_____ [2]

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Examiner Only	
Marks	Remark

7 **(a)** Add one word to each box to complete the equations for aerobic and anaerobic respiration.

Aerobic:

Glucose + Oxygen → Carbon dioxide + [ ] + Energy

Anaerobic:

Glucose → Carbon dioxide + [ ] + Energy

[2]

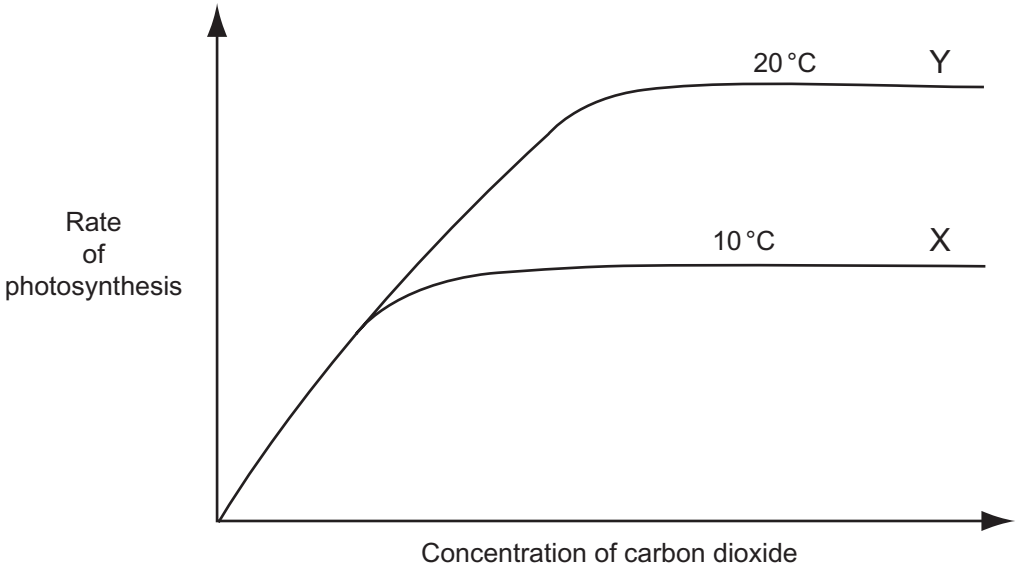
(b) Suggest why more energy is released in the breakdown of one molecule of glucose in aerobic rather than anaerobic respiration.

_____ [1]

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Examiner Only	
Marks	Remark

8 The graph shows the effect of carbon dioxide on the rate of photosynthesis.



(a) Which factor is **not** limiting the rate of photosynthesis at both X and Y?

_____ [1]

(b) Explain why the rate of photosynthesis in plants is higher at 20 ºC than at 10 ºC.

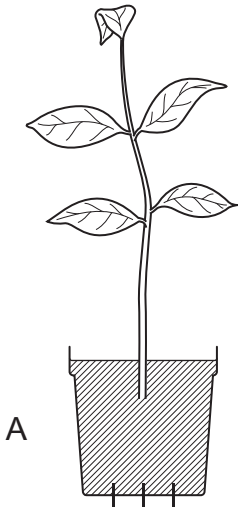
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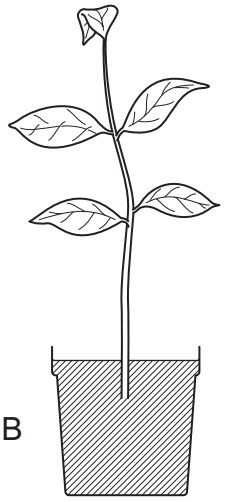
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_____ [2]

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9 Two tree seedlings, A and B, were placed in pots.





The base of pot A was perforated. This allowed any excess water to drain out. Seedling B was in a pot that did not allow drainage. Waterlogged soil contains little oxygen. Explain why seedling B grew poorly and its leaves eventually turned yellow.

_____

_____

_____

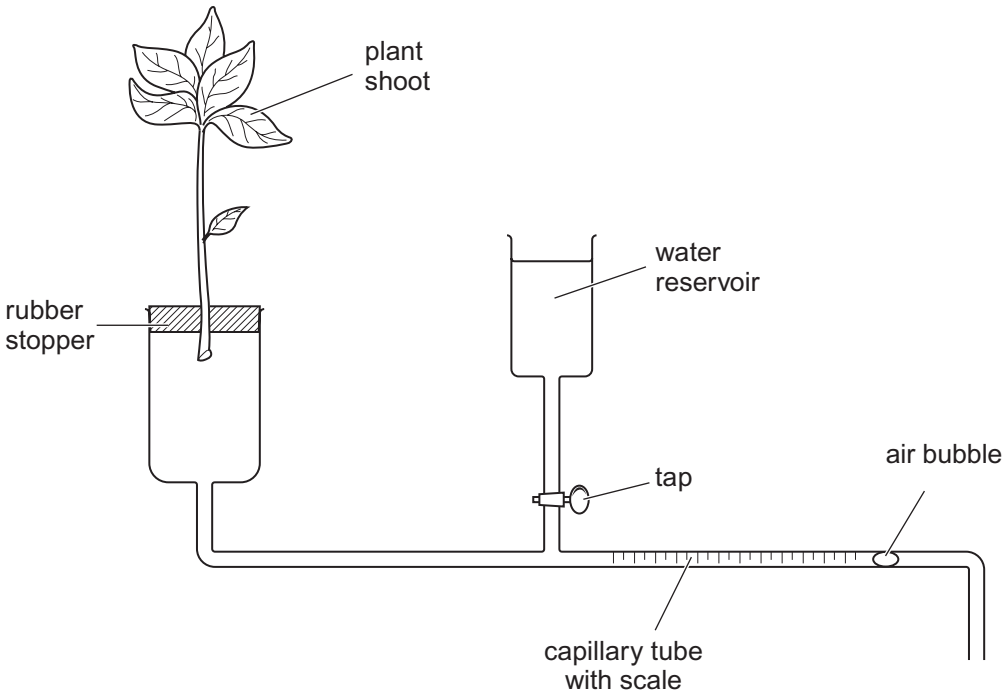
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_____ [4]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

10 The diagram shows a potometer which is used to measure the rate of water uptake by a leafy shoot.



(a) Give **two** precautions you would take when setting up the potometer to ensure that no air bubbles are present apart from the one shown in the diagram.

_____

_____

_____ [2]

(b) If a clear polythene bag was placed over the shoot, describe and explain how this would affect the rate of water uptake.

_____

_____

_____ [2]

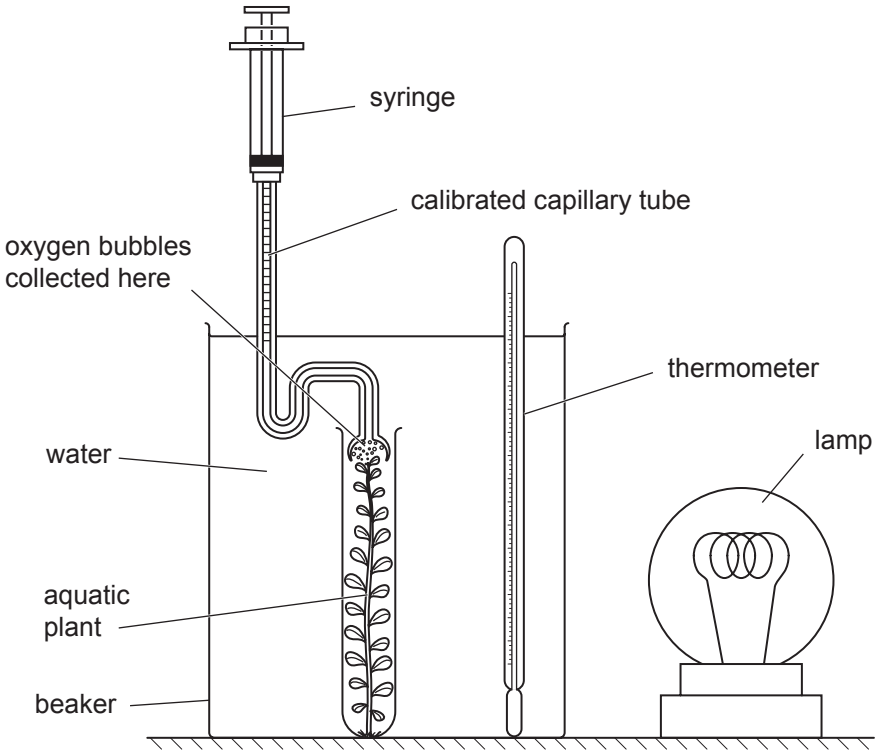
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Marks	Remark

11 The diagram shows apparatus used to investigate the effect of light on the release of oxygen during photosynthesis by an aquatic plant.



(a) Suggest why the boiling tube containing the aquatic plant is placed in a beaker of water.

_____ [1]

(b) Suggest how the apparatus is used to measure the rate of oxygen production at a particular light intensity.

_____

_____

_____

_____ [3]

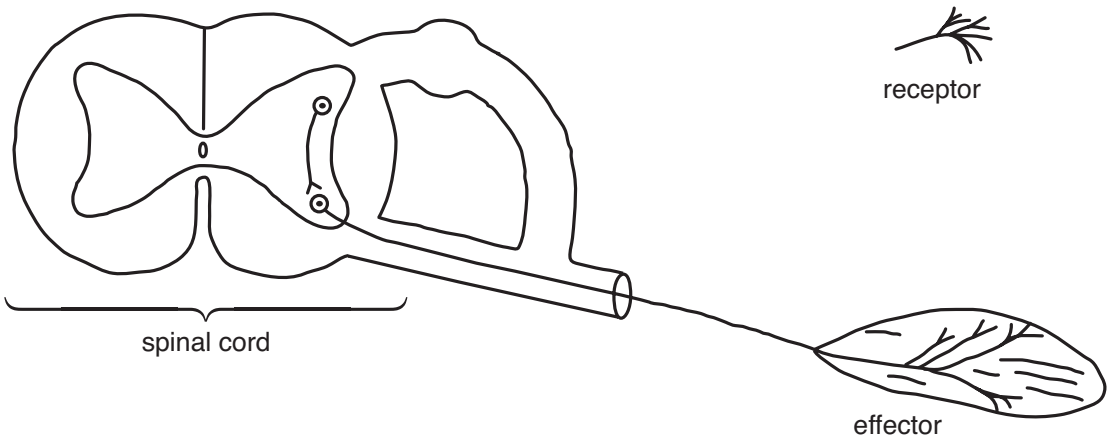
(c) Suggest **one** reason why the oxygen released by the plant is an underestimation of the oxygen produced by photosynthesis.

_____

_____ [1]

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12 The diagram shows a cross section of the spinal cord to illustrate a reflex arc.



(a) Complete the diagram by drawing in the sensory neurone. [1]

(b) Name the effector in a reflex arc.

_____ [1]

(c) What is the advantage of a reflex action?

_____ [1]

(d) Reflex arcs in the spinal cord connect with other neurones (not shown on the diagram) that travel up the spinal cord. Suggest what their function is.

_____ [1]

THIS IS THE END OF THE QUESTION PAPER

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Marks	Remark

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Rewarding Learning

General Certificate of Secondary Education
2010–2011

Science: Double Award (Modular)

Living Organisms and the Processes of Life

End of Module Test

A

Higher Tier

[GDA02]

THURSDAY 24 FEBRUARY 2011, MORNING

MARK SCHEME

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			AVAILABLE MARKS
1	**(a)**	Blood passes through the heart twice **in one circuit of the body**/ blood flows from heart to lungs then back to the heart to be passed around the body [1]	
	(b)	A Pulmonary vein B Hepatic portal vein [2]	
	(c)	Some oxygen is **used in respiration**; by the **liver**. [2]	5
2	**(a)**	Immunisation/vaccination/active immunity [1]	
	(b)	Any **two** from: For the second injection the response is quicker; a higher level of antibody production; the level of antibodies remains higher [2]	
	(c)	Phagocytosis [1]	4
3	**(a)**	Blood is under **too high pressure** in artery [1]	
	(b)	Any **four** from: There is a higher water concentration **outside** the cell/lower water **inside** the cell; more H_2O outside/more dilute solution outside. so water moves into the blood **cells**; across a partially permeable membrane; the cells would burst; as they do not have a cell wall [4]	5
4	Any **two** from each		

Air movements/air is not trapped/allow air to move; Remove warm air/heat is not trapped/air is not an insulator; Heat lost by radiation/or convection.
Evaporation of water; Cooling effect on the skin; Heat lost by radiation.

[4] 4

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	AVAILABLE MARKS

5 **(a)** Auxin is present in the left hand side/shaded side; the impermeable sheet prevents its downward movement [2]

(b) **(i)** Phototropism [1]

(ii) Plant gets **more** light;
so more photosynthesis/more growth or better photosynthesis [2] — 5

6 **(a)** Starch

Fatty acids + glycerol

(both needed) [2]

(b) Any **two** from:
lipases only work on fats/protease will only work on protein;
only fat fits into active site of lipase/protein will not fit/locking/fit/specificity/shape/active site each enzyme is specific for a particular substrate/principle of substrate specificity applies [2] — 4

7 **(a)** Water

Ethanol or Alcohol/ Lactic acid

[2]

(b) Glucose is more fully broken down/metabolised/energy still locked up in the ethanol/alcohol [1] — 3

8 **(a)** Carbon dioxide [1]

(b) Any **two** from:
Photosynthesis is controlled by **enzymes**;
enzymes and substrates have more **kinetic** energy at 20 °C;/or molecules movement;
so more collisions between enzymes and substrates [2] — 3

9 Any **four** from:
Less oxygen in soil of B;
so less respiration/energy;
so less active transport/uptake;
of minerals;
specifically magnesium;
so chlorophyll not made [4] — 4

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			AVAILABLE MARKS
10	**(a)**	Any **two** from: Immerse the potometer (without the plant) completely in water; stem of shoot is cut under water; to stop air entering xylem; while still under water, attach shoot through rubber stopper; smear shoot/rubber stopper connection with Vaseline [2]	
	(b)	Reduced rate of transpiration/slower uptake of water/decreased water uptake/slower movement of air bubble; due to higher humidity (lower conc. gradient for water loss/or described – more H_2O outside leaf) [2]	4
11	**(a)**	Beaker of water acts as a heat shield/to prevent boiling tube warming up/so that temperature remains constant/maintain temperature/stop plant heating. [1]	
	(b)	Any **three** from: Allow apparatus to equilibrate/acclimatise at a set light intensity; leave for a period of time; to draw the O_2 collected into the calibrated capillary tube (use syringe); measure length of air bubble/count the O_2 bubbles/pushes up syringe; rate is volume of oxygen produced/minute/time [3]	
	(c)	Some oxygen is used in respiration/some of the oxygen dissolves in the water/some O_2 could escape from apparatus. [1]	5
12	**(a)**	Sensory nerve starts at sense organ – inside dorsal root to grey matter of spinal cord [1]	
	(b)	Muscle [1]	
	(c)	Speed/protection/does not involve brain/stops damage [1]	
	(d)	Travel to brain/make brain aware/inform the brain [1]	4
		Total	**50**

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Rewarding Learning

Centre Number

71	

Candidate Number

General Certificate of Secondary Education
2010–2011

Science: Double Award (Modular)

Living Organisms and the Processes of Life
End of Module Test

GDA02

A Higher Tier

[GDA02]

WEDNESDAY 10 NOVEMBER 2010, AFTERNOON

TIME

45 minutes.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
Write your answers in the spaces provided in this question paper.
Answer **all twelve** questions.

INFORMATION FOR CANDIDATES

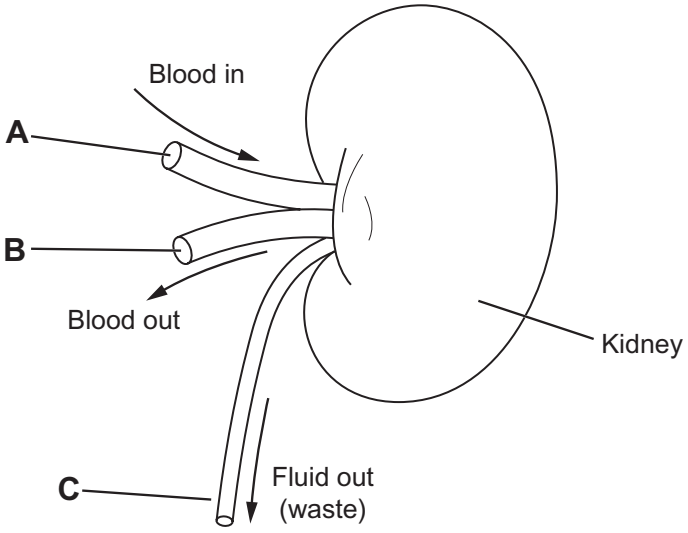
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For Examiner's use only	
Question Number	Marks
1	
2	
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10	
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12	
Total Marks	

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Examiner Only	
Marks	Remark

1 The kidney controls the water content of the body and removes waste from the blood.



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

_____ [1]

(b) Suggest one substance that you would expect to be at a higher concentration in blood vessel **A** compared to blood vessel **B**.

_____ [1]

(c) Where is the fluid in **C** taken to for temporary storage?

_____ [1]

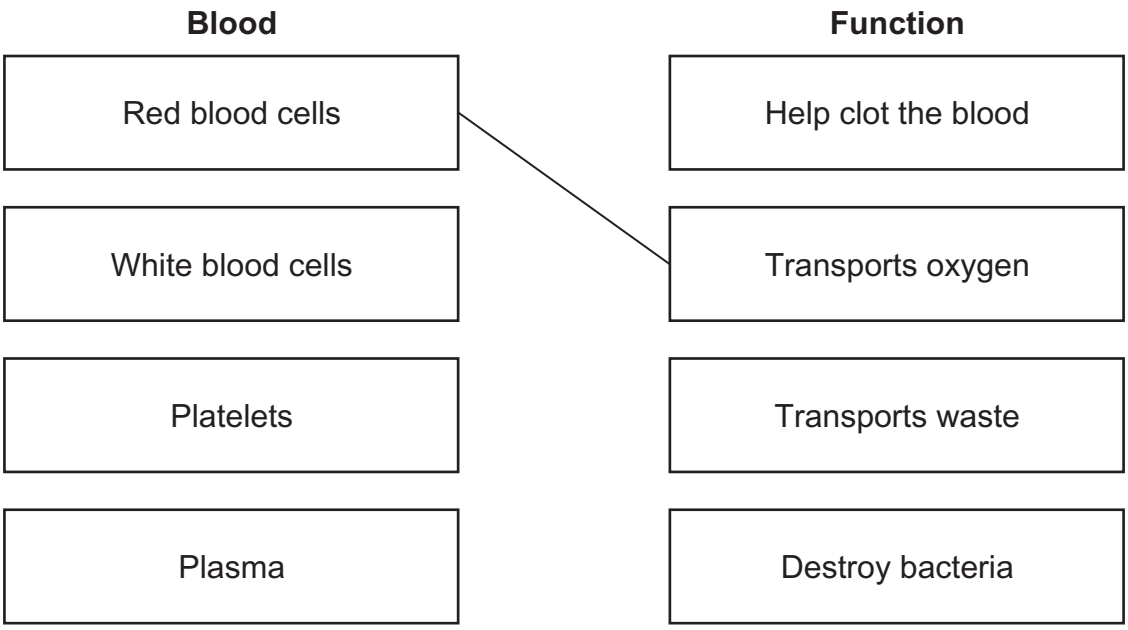
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Examiner Only	
Marks	Remark

2 The blood is made up of cells, plasma and platelets.

(a) Draw one line from each blood component to its function.

One example has been completed for you.



[2]

(b) The heart is supplied with blood by the coronary artery.

Explain why eating too much animal fat can cause a heart attack.

_____

_____

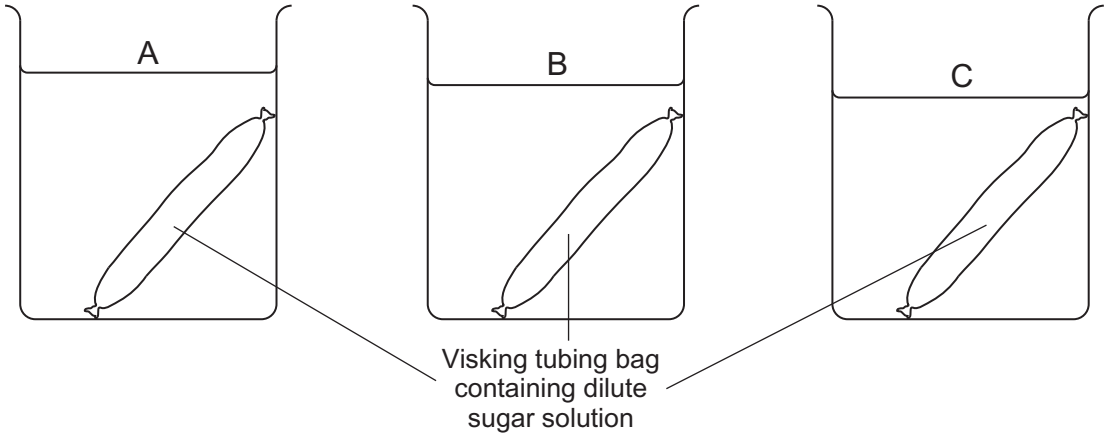
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_____ [3]

Examiner Only	
Marks	Remark

3 Paul filled three Visking tubing bags with dilute sugar solution as shown in the diagram. Visking tubing is selectively permeable.
He then placed each bag into one of three beakers, A, B and C.
One beaker contained water, another dilute sugar solution and the other concentrated sugar solution.



After being weighed the bags were left in the beakers for one hour. They were then removed, excess liquid on the outside dried and the bags reweighed. The results are shown in the table.

Beaker	Mass of Visking tubing bag at start/g	Mass of Visking tubing bag after one hour/g	Change in mass/g
A	10.0	14.9	+4.9
B	10.0	10.0	0
C	10.0	6.4	–3.6

(a) Use the results to work out which fluid was in each beaker. Write the letter of the correct beaker in the appropriate box.

Concentrated sugar solution – beaker ☐

Dilute sugar solution – beaker ☐ [2]

(b) Explain why the Visking tubing in beaker A increased in mass.

_____

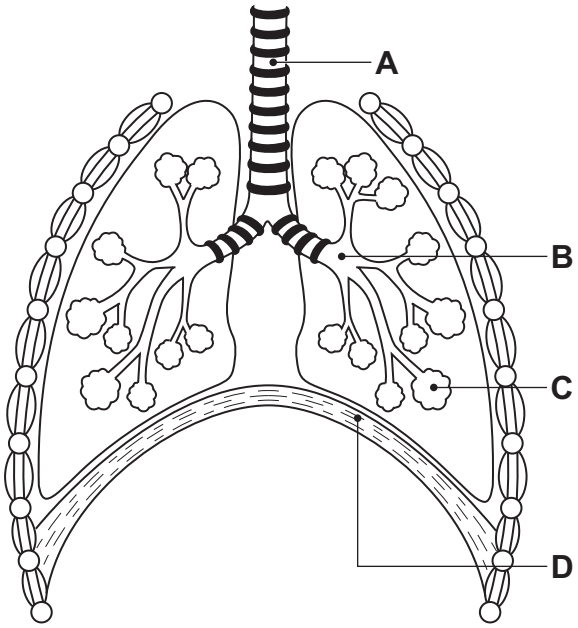
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_____

_____ [3]

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4 The diagram shows the human respiratory system.



(a) Which letter, **A**, **B**, **C** or **D** points to a bronchus?

_____ [1]

(b) Name the process by which oxygen moves from the alveoli into the blood.

_____ [1]

(c) Describe and explain the mechanism of inhalation (breathing in).

_____

_____

_____

_____

_____ [4]

Examiner Only

Marks	Remark

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5 **(a)** Name the type of micro-organism that causes the disease athlete's foot.

_____ [1]

(b) Describe how the body defends itself against bacteria that have entered the bloodstream.

_____

_____

_____

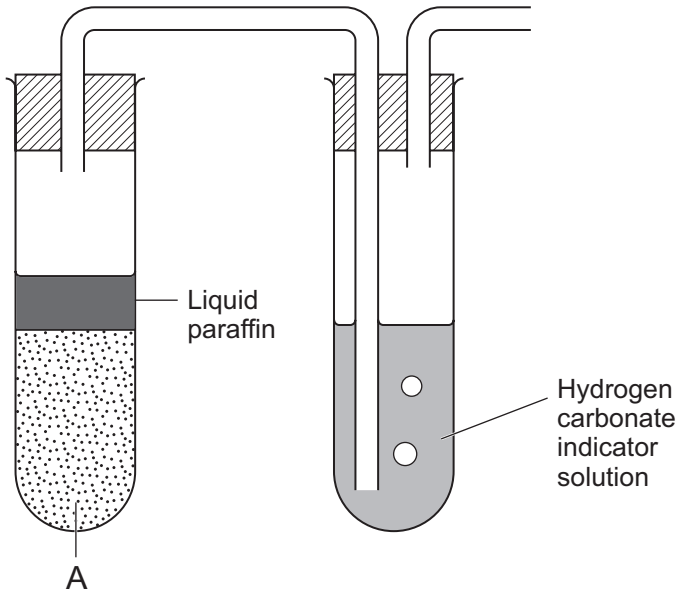
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_____ [3]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

6 The diagram shows the apparatus used to investigate anaerobic respiration.



(a) In addition to yeast, liquid paraffin and water, what else must be added to test tube A to ensure respiration takes place?

_____ [1]

(b) Describe two differences in the **products** of aerobic and anaerobic respiration.

1. _____

_____ [1]

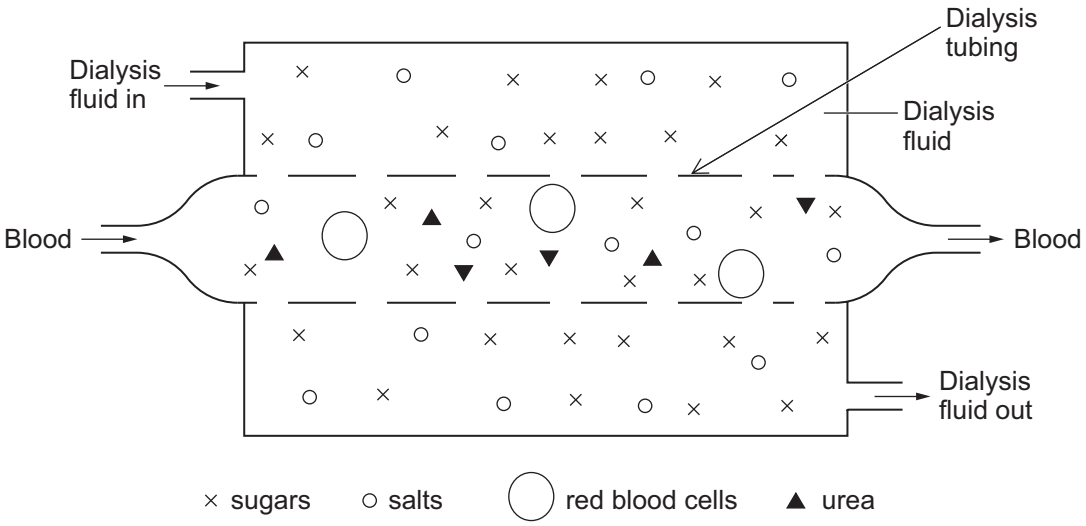
2. _____

_____ [1]

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Examiner Only	
Marks	Remark

7 The diagram represents an artificial kidney machine. The diagram shows the relative concentrations at the start of dialysis.



(a) Explain why the concentration of sugars (x) is the same in the dialysis fluid and in the blood.

_____ [1]

(b) Use the diagram and your knowledge to explain how urea is removed from the blood.

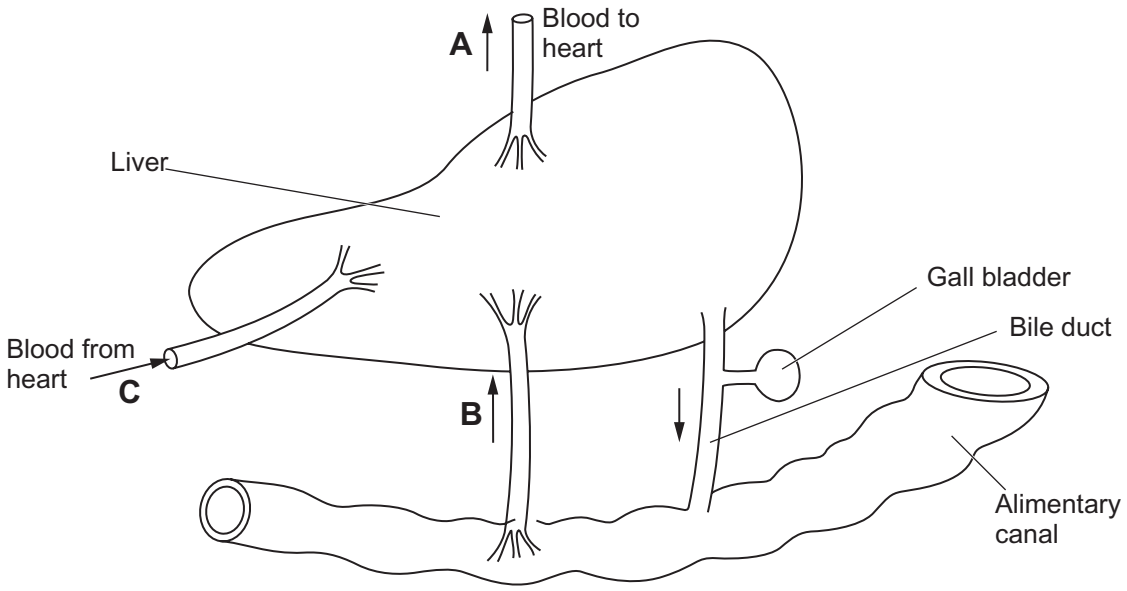
_____

_____

_____ [2]

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8 The diagram summarises how substances get to and from the liver.



(a) Which blood vessel **A**, **B** or **C** is the hepatic artery? Explain your answer.

_____ [1]

(b) Bile is made in the liver and stored in the gall bladder. What is the function of bile in digestion?

_____

_____ [2]

(c) Describe one way in which the liver deals with excess glucose carried to it by vessel **B**.

_____ [1]

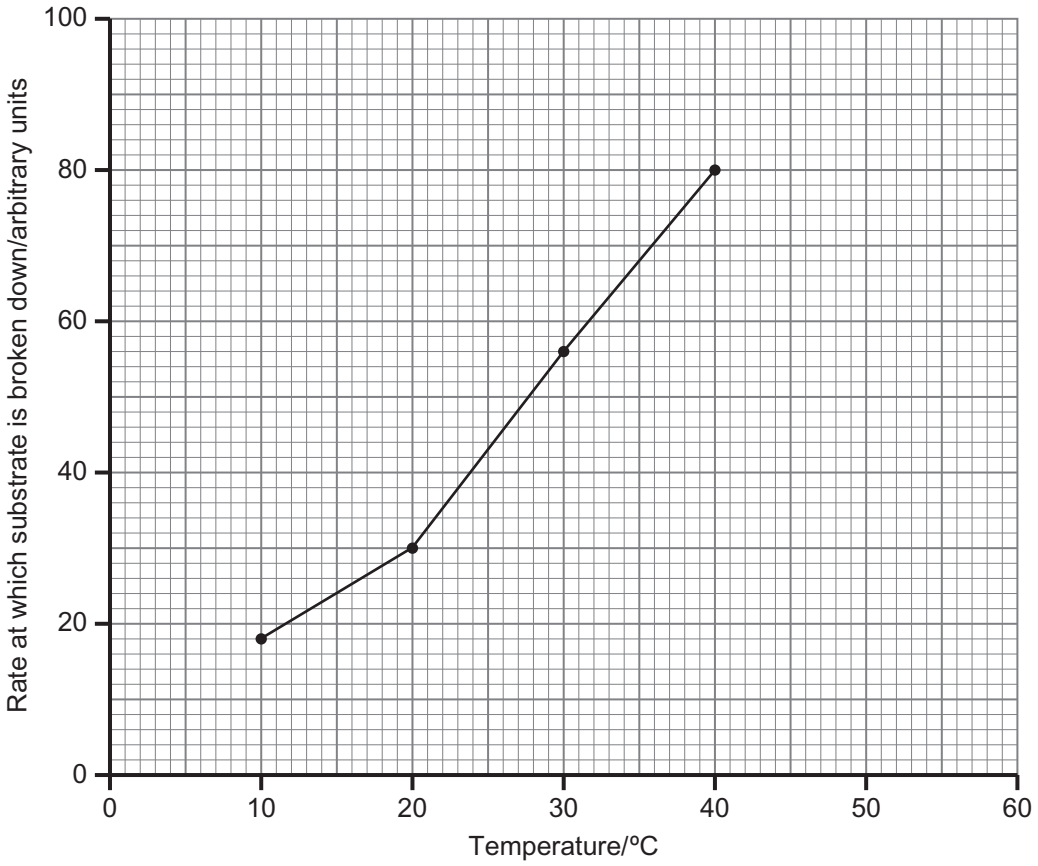
Examiner Only

Marks	Remark

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Examiner Only	
Marks	Remark

9 The temperature at which the enzyme amylase and its substrate are maintained will affect the rate of the reaction. The graph shows the effect of increases in temperature from 10 °C to 40 °C on the activity of amylase.



(a) Name the substrate used in the experiment.

_____ [1]

(b) Explain why an increase in temperature from 10 °C to 40 °C results in an increase in the rate of breakdown of the substrate.

_____

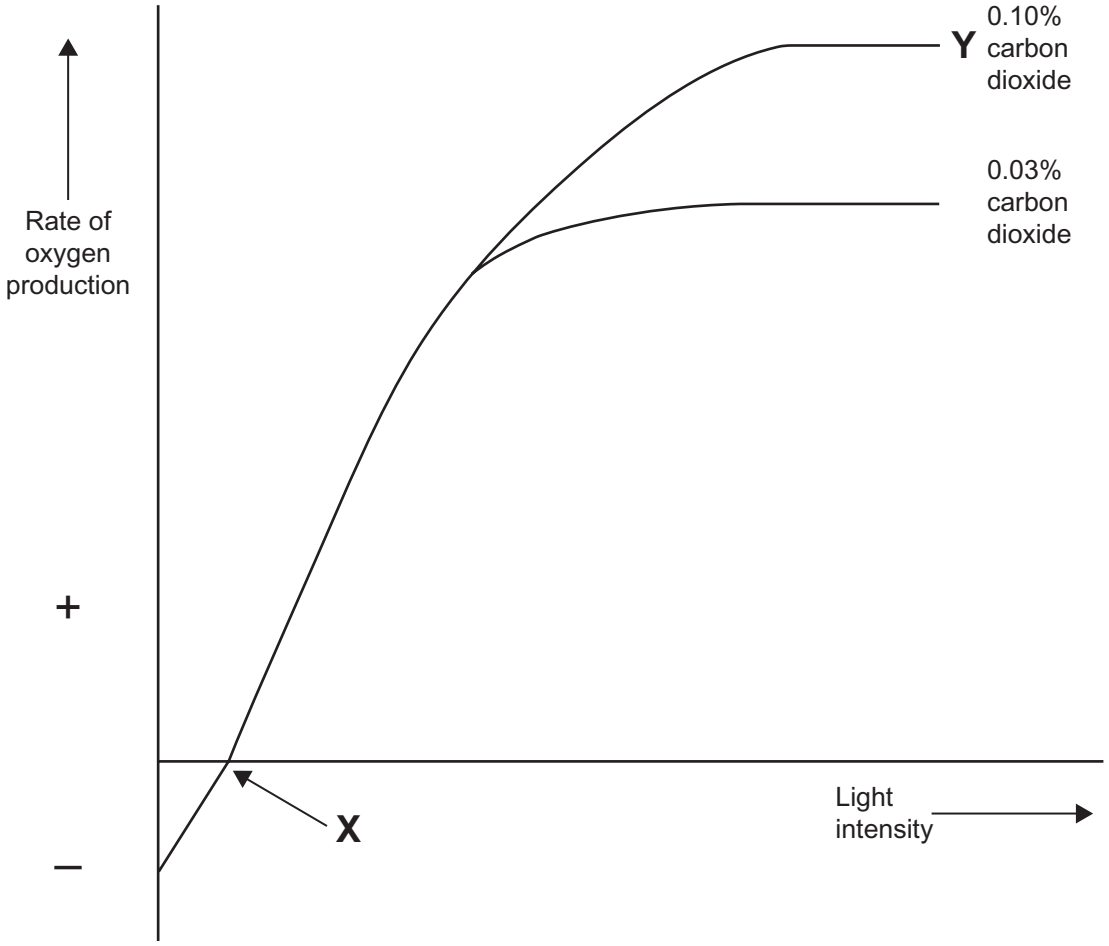
_____

_____ [2]

(c) Continue the graph to show what you would expect to happen to the rate of breakdown of the substrate if the temperature was increased to 60 °C. [1]

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10 The graph shows the effect of light intensity on the rate of oxygen production by a plant.



(a) Explain why the rate of oxygen production is zero at point **X**.

_____

_____

_____ [2]

(b) Using only information on the graph, give the factor that does **not** limit the rate of oxygen production at **Y**.

_____ [1]

Examiner Only

Marks	Remark

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Examiner Only	
Marks	Remark

11 (a) Define the term transpiration.

_____

_____ [1]

The table shows the results of an experiment which examined the effect of humidity on the rate of transpiration by a plant.

Humidity/%	Rate of transpiration/cm^3/h
20	9.0
40	4.5
60	2.5
80	1.0

(b) Describe and explain the effect of humidity on the rate of transpiration.

_____

_____

_____

_____ [2]

(c) List two factors which should have been kept constant during the experiment.

1. _____

2. _____ [2]

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12 (a) Give two differences between active uptake and diffusion.

Examiner Only

Marks	Remark

_____

_____

_____

_____ [2]

(b) An experiment was carried out to investigate how temperature affected the rate of nitrate uptake by two barley seedlings.
The results after 60 minutes were that the barley seedling kept at 4 ºC took up 50 units of nitrate ions. The other barley seedling kept at 24 ºC took up 300 units of nitrate ions. Suggest an explanation for the difference in these results.

_____

_____

_____

_____ [2]

(c) How would a shortage of nitrate ions affect a plant?

_____ [1]

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Rewarding Learning

General Certificate of Secondary Education
2010–2011

Science: Double Award (Modular)

Living Organisms and the Processes of Life
End of Module Test

Higher Tier

[GDA02]

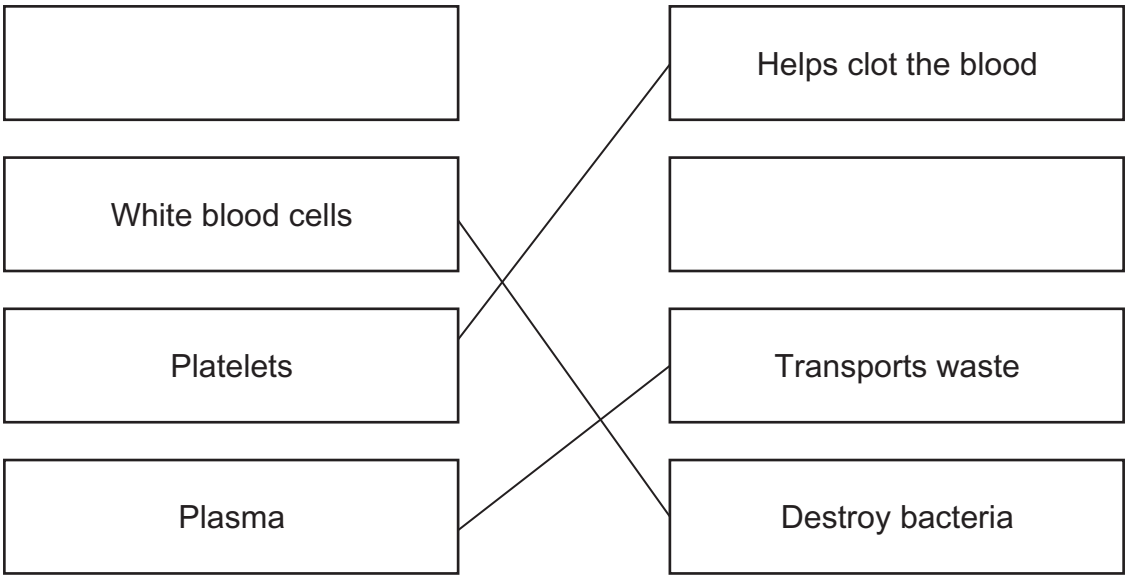
WEDNESDAY 10 NOVEMBER, AFTERNOON

MARK SCHEME

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			AVAILABLE MARKS
1	**(a)** Renal artery	[1]	
	(b) Glucose/oxygen/urea/amino acids/water/salts/ammonia	[1]	
	(c) Bladder	[1]	3

2 **(a)**



All 3 correct = [2]
1 correct = [1] [2]

(b) Any **three** from:
cholesterol; (**not** fat on its own)
causes blockage/clot/clogging up;
reduced blood flow;
less glucose/oxygen pass;
less respiration/energy;
for the heart muscle to contract;
heart muscle dies [3] 5

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				AVAILABLE MARKS
3	**(a)**	Concentrated sugar solution **C** Dilute sugar solution **B**	[2]	
	(b)	Any **three** from: more water molecules **outside**/less water molecules **inside**/more dilute solution outside; water molecules **move into** the Visking tubing; by osmosis; across a selectively permeable membrane	[3]	5
4	**(a)**	B	[1]	
	(b)	Diffusion	[1]	
	(c)	Any **four** from: Diaphragm contracts; diaphragm pulls down/flattens; **Intercostal muscles** (contract); ribs move up/out; volume of thorax increases; pressure in thorax decreases	[4]	6
5	**(a)**	Fungus	[1]	
	(b)	Any **three** from: Antigens on the bacteria surface; stimulates white blood cells/lymphocytes; to produce antibodies; antibodies join with the antigens/complementarity of antibody and antigen/**lock** onto antigens; clump forms; which is ingested/digested by phagocytes/phagocytosis; white blood cells engulf/surround/ingest/digest/broken down	[3]	4
6	**(a)**	Glucose/sugar	[1]	
	(b)	Any **two** from: alcohol or lactic acid; Anaerobic – ethanol made/no ethanol in aerobic; Anaerobic – small amount of energy/Aerobic – large amount of energy; Anaerobic – no water made/Aerobic – water produced	[2]	3

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				AVAILABLE MARKS
7	(a)	To prevent loss of sugars from the blood maintain sugar in blood – NOT so there is no concentration gradient/in question	[1]	
	(b)	Concentration gradient **explained**; not osmosis/**higher urea** in blood. moves by **diffusion**	[2]	3
8	(a)	**C – carrying blood from the heart** need C and blood from heart need both for 1 mark	[1]	
	(b)	Any **two** from: globules break down large globules O.K. emulsifies/large droplets to smaller droplets/increases surface area; facilitate lipase action; neutralise acid	[2]	
	(c)	Glucose → glycogen → fat → **increased** respiration/more respiration	[1]	4
9	(a)	Starch	[1]	
	(b)	As the temperature increases the enzyme and substrate move more rapidly/more **kinetic energy**; so **more collisions/more enzyme** – substrate complexes are formed	[2]	
	(c)	Must show decrease in activity	[1]	4
10	(a)	The oxygen produced in photosynthesis; equals oxygen used in respiration **or** rate of photosynthesis equals rate of respiration [1] for mention of photosynthesis and respiration [1] equal rates/O_2 produced = O_2 used	[2]	
	(b)	Light	[1]	3
11	(a)	Loss of water (by evaporation) from a plant/from leaves plant NOT water uptake	[1]	
	(b)	**Description:** As humidity increases, rate of transpiration decreases or converse. **Explanation:** At higher humidity, there is a reduced diffusion gradient – or described	[2]	
	(c)	Any **two** from: Light Temperature Windspeed Size of plant/species of plant/same no. of leaves Water in soil	[2]	5

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			AVAILABLE MARKS
12	**(a)** Active uptake is against concentration gradient/or described Requires energy	[2]	
	(b) At 24 °C, enzymes more active/more enzyme activity so more respiration/energy (for active uptake)	[2]	
	(c) Less amino/protein formed	[1]	5
		Total	**50**

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Rewarding Learning

Centre Number

71	

Candidate Number

General Certificate of Secondary Education
2009–2010

Science: Double Award (Modular)

Living Organisms and the Processes of Life
End of Module Test
Higher Tier

GDA02

A **[GDA02]**

THURSDAY 20 MAY 2010, MORNING

TIME

45 minutes.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
Write your answers in the spaces provided in this question paper.
Answer **all thirteen** questions.

INFORMATION FOR CANDIDATES

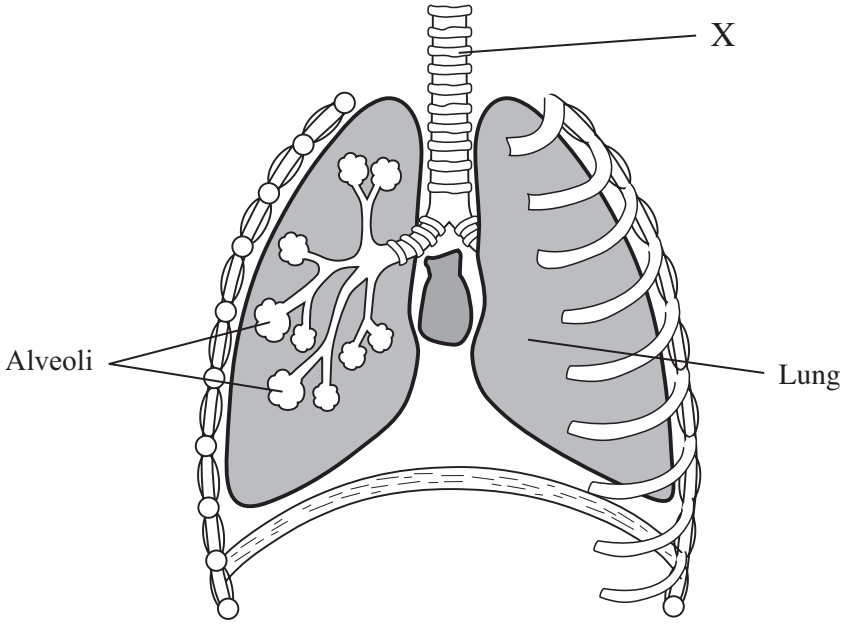
The total mark for this paper is 50.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
Total Marks	

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Examiner Only	
Marks	Remark

1 The diagram shows part of the respiratory system.



© Key Stage 4 revision GCSE Science Single and Double Award by Bob McDuell, Keith Hirst and Graham Booth, published by Stanley Thornes, 1998, ISBN 0748736670

(a) Name the part labelled X.

_____ [1]

(b) On the diagram, draw an arrow on the diaphragm to show the direction it moves during inhalation. [1]

(c) **(i)** Name the substance in cigarette smoke that causes lung cancer.

_____ [1]

(ii) Describe and explain the effect that carbon monoxide in cigarette smoke has on the body.

_____

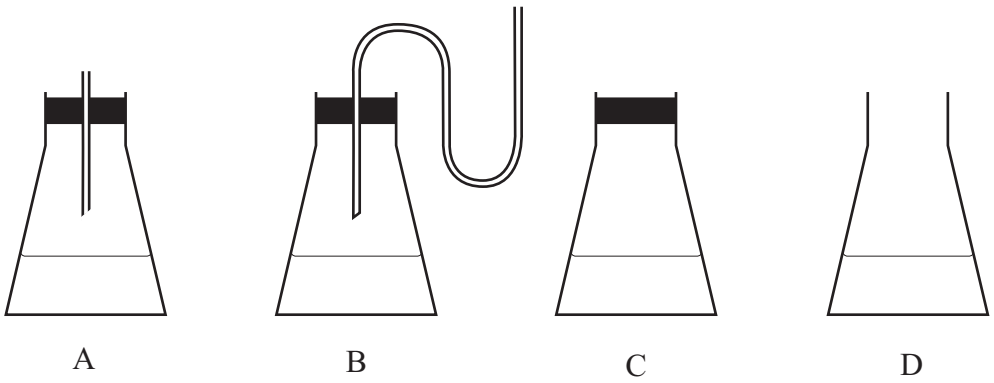
_____ [2]

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Marks	Remark

2 The diagram shows an experiment similar to one carried out by Pasteur.

All flasks contained sterile broth at the start of the experiment. Sterile broth is clear.



The apparatus was left for one week at room temperature.

(a) Complete the results table below by placing a tick (✔) if you would expect the broth to be contaminated with micro-organisms after a week, or an ✘ if you would expect the broth to be uncontaminated.

Flask	Contaminated/uncontaminated after one week
A	
B	
C	
D	

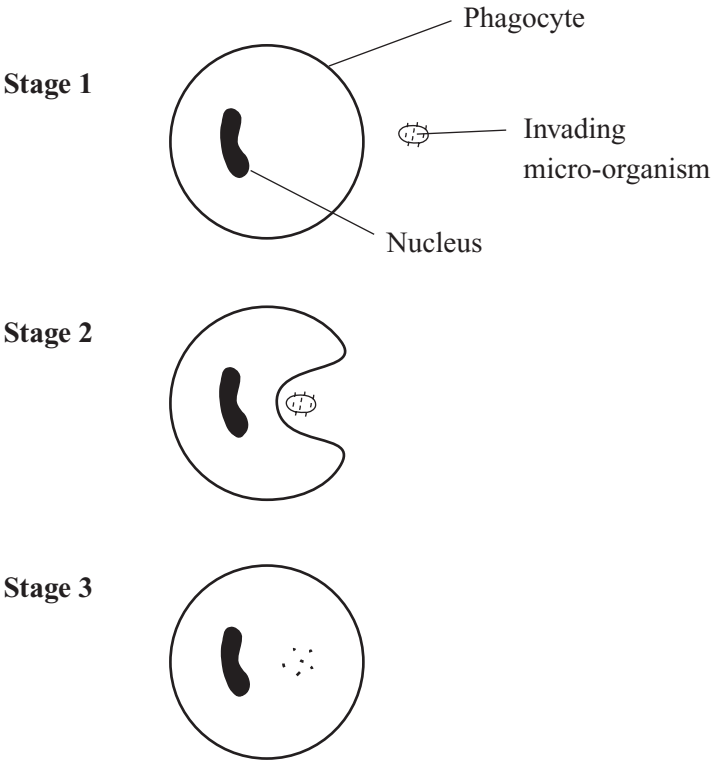
[3]

(b) Name the theory that the results of Pasteur's experiment disproved.

_____ [1]

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3 The diagram shows one way in which the body defends itself against micro-organisms.



Examiner Only	
Marks	Remark

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(a) Suggest what type of blood cell is a phagocyte.

_____ [1]

(b) Describe what is happening at:

Stage 2 _____

Stage 3 _____ [2]

(c) Describe another way in which the body defends itself once micro-organisms have entered the bloodstream.

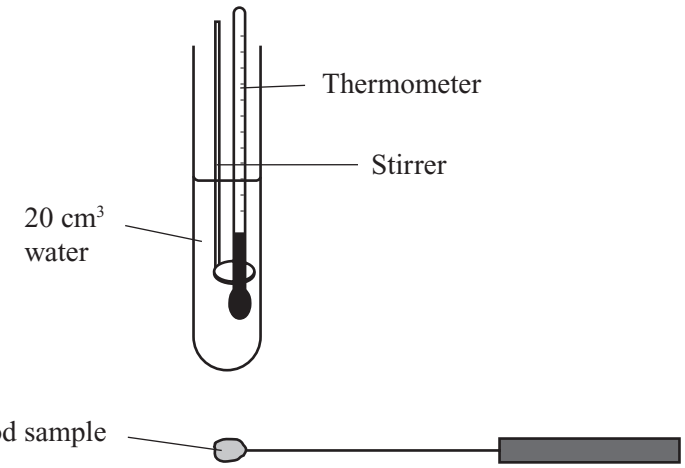
_____ [1]

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Marks	Remark

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Examiner Only	
Marks	Remark

4 The energy value of foods can be compared using the apparatus shown in the diagram.



(a) Using the apparatus and any additional materials, describe how you would compare the energy values of equal masses of biscuit and bacon.

_____

_____

_____

_____

_____

_____

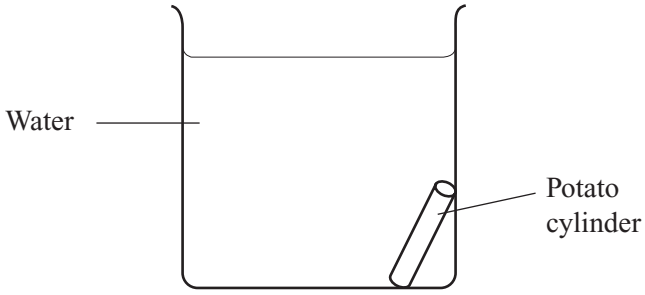
_____

_____ [4]

(b) How would you expect the results for the biscuit and the bacon to differ?

_____ [1]

5 The diagram shows a potato cylinder that has just been put into a beaker of water.



The cylinder was left in the water for 24 hours.

Describe and explain the change in the potato cylinder after 24 hours.

Description: _____

Explanation: _____

_____

_____

_____

_____ [4]

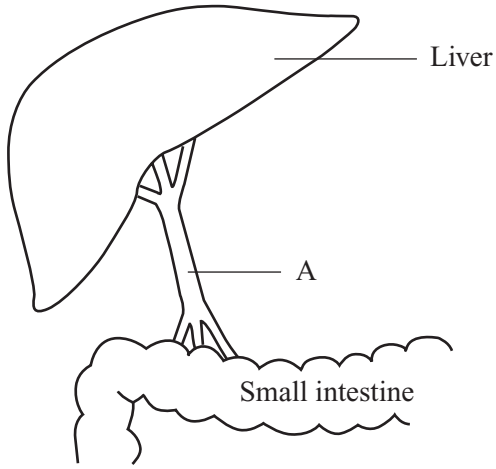
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Marks	Remark

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Examiner Only	
Marks	Remark

6 The diagram shows the blood vessel that transports absorbed food from the small intestine to the liver.



(a) Name blood vessel A.

_____ [1]

(b) When the blood sugar level rises the body returns it to normal. Describe the liver's role in this process.

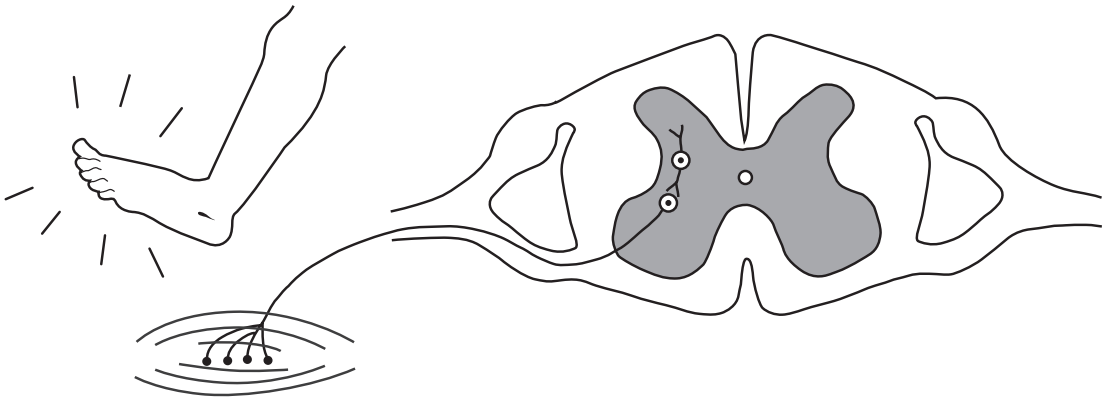
_____

_____

_____ [2]

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7 The diagram represents a reflex action.



(a) Complete the diagram by drawing in the sensory neurone. [1]

(b) Name the effector shown.

_____ [1]

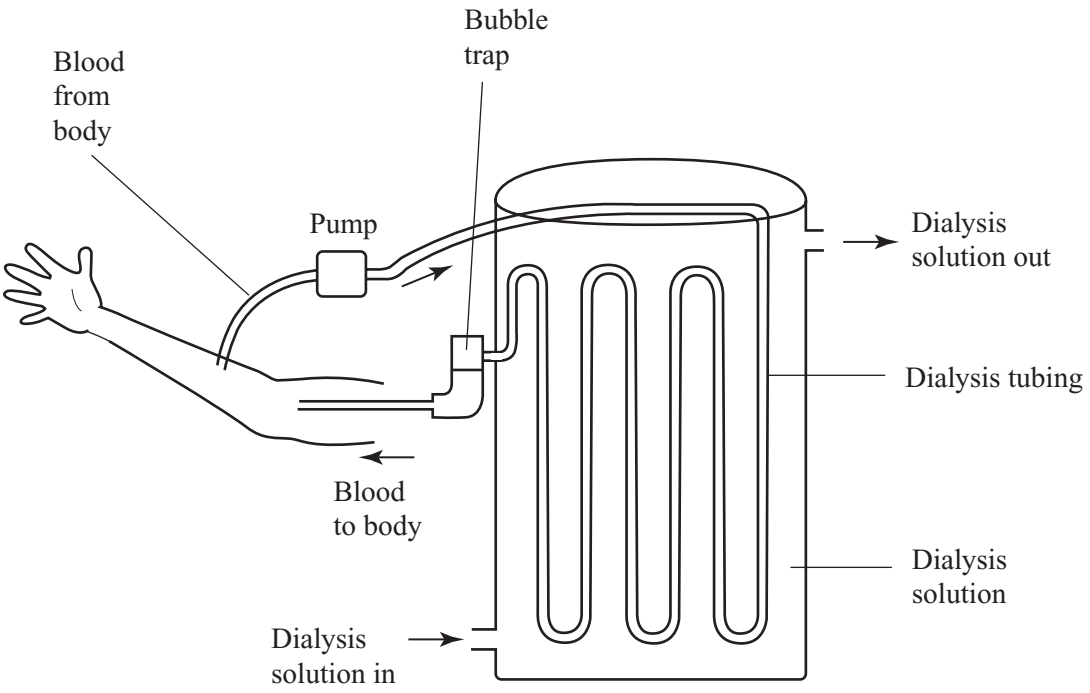
(c) On the diagram draw a line to the association neurone and label it A. [1]

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Marks	Remark

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8 The diagram shows a dialysis machine.



(a) Name two wastes that diffuse out of the blood into the dialysis solution.

1. _____

2. _____ [2]

(b) Explain how useful substances, e.g. sugars and amino acids, are retained in the blood.

_____

_____

_____ [1]

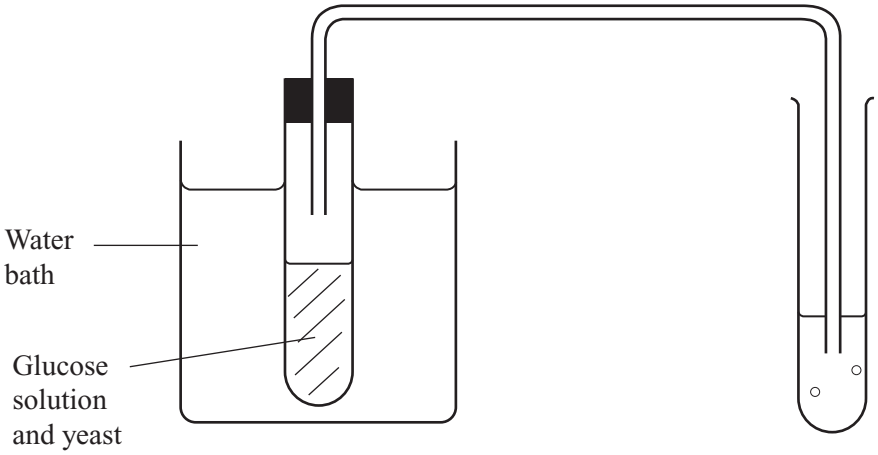
Examiner Only

Marks	Remark

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Examiner Only	
Marks	Remark

9 The diagram shows the apparatus used to show the effect of temperature on anaerobic respiration in yeast.



(a) (i) When setting up the experiment, suggest how you would ensure that the glucose solution is anaerobic at the start of the experiment.

_____

_____ [1]

(ii) Describe how you would ensure that the glucose solution remains anaerobic throughout the experiment.

_____ [1]

(b) Describe how you would use the apparatus to show the effect of temperature on the rate of anaerobic respiration.

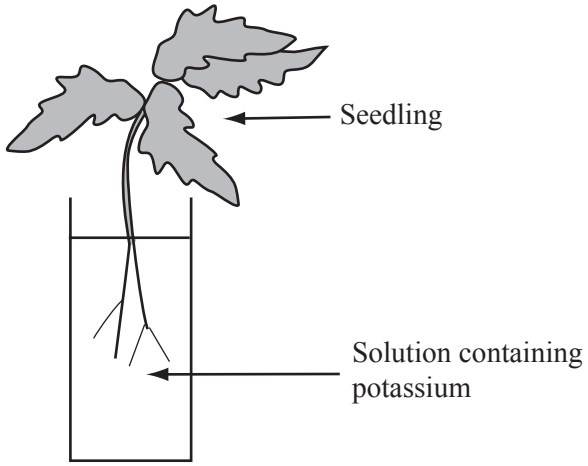
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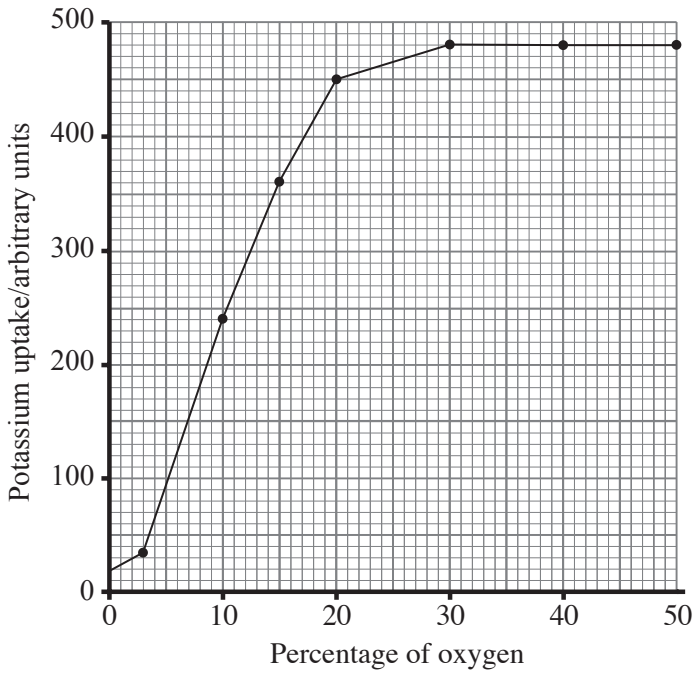
_____ [2]

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10 An experiment was carried out to determine the effect of oxygen on the uptake of potassium ions by seedlings.



The seedlings were placed in seven solutions containing potassium ions. Each solution had a different percentage of oxygen present. The uptake of potassium ions is shown in the graph.



Examiner Only

Marks	Remark

(a) State **two** factors, apart from size/type of seedlings, that should be controlled to ensure a fair test.

1. _____

2. _____ [2]

(b) Explain how the results indicate that potassium uptake is by active transport.

_____

_____

_____

_____ [2]

(c) Suggest why the potassium uptake levels off at the higher percentage oxygen levels.

_____

_____ [1]

Examiner Only	
Marks	Remark

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11 One effect of adrenaline is to relax the muscles surrounding the bronchioles. Explain why this is a benefit in preparation for 'flight or fight'.

_____

_____

_____

_____

_____ [3]

Examiner Only	
Marks	Remark

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12 The activity of the enzyme lipase was investigated at three different temperatures. The initial pH of the reaction mixture was 7.0 in all cases. The final pH was measured after 60 minutes and the results are presented in the table.

Temperature/°C	pH of reaction mixture after 60 minutes
20	6.8
35	5.8
50	7.0

(a) Suggest what product produced by the action of lipase affects pH.

_____ [1]

(b) Describe and explain the effect of temperature on lipase activity.

_____

_____

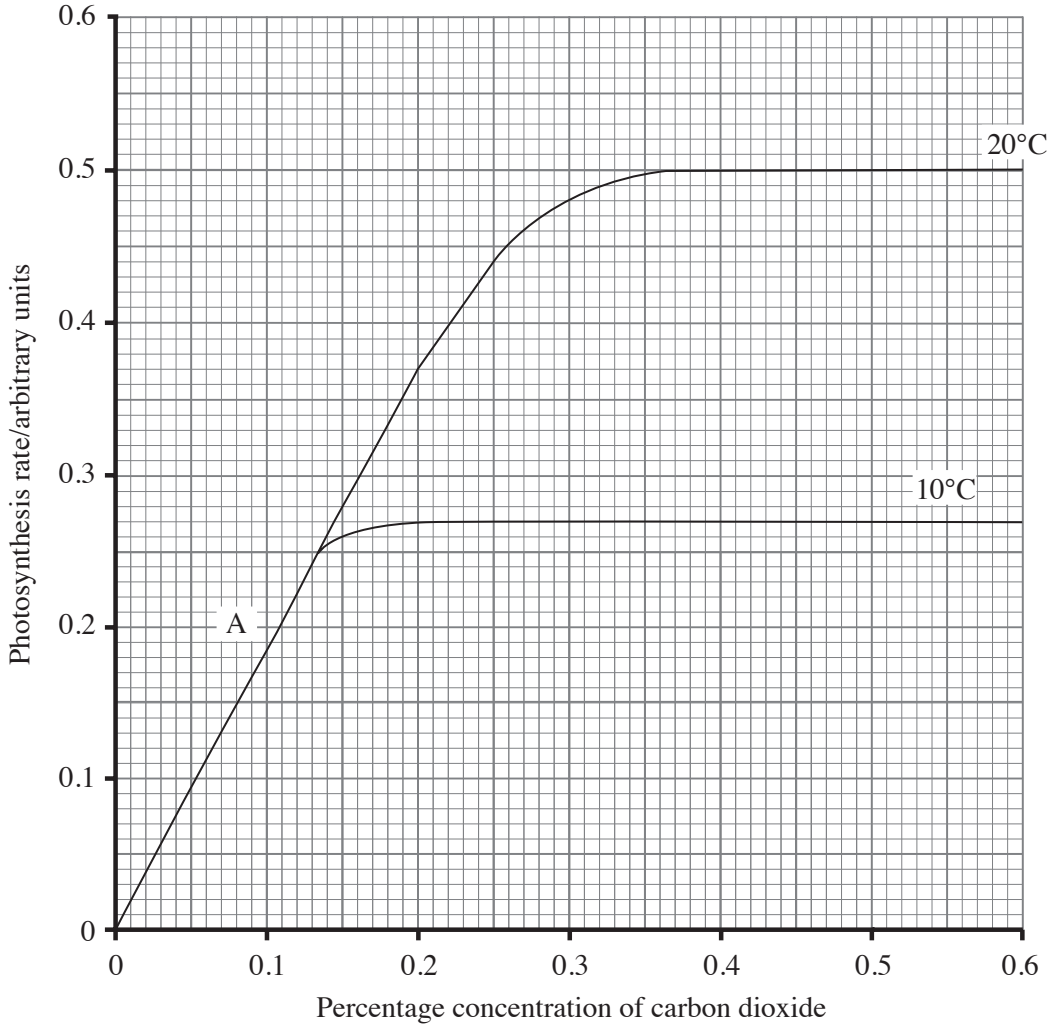
_____

_____ [3]

Examiner Only

Marks	Remark

13 The graph shows the effect of carbon dioxide concentration on the rate of photosynthesis at different temperatures for tomato plants.



(a) Name the environmental factor limiting the rate of photosynthesis at A.

_____ [1]

(b) Suggest a reason why the optimum temperature for photosynthesis of many plants is 20°C rather than 40°C.

_____

_____ [2]

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Marks	Remark

THIS IS THE END OF THE QUESTION PAPER

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GCSE

Science: Double Award (Modular)

End of Module Tests

May 2010

Mark Schemes

Issued: October 2010

Rewarding Learning

General Certificate of Secondary Education
2009 – 2010

Science: Double Award (Modular)

Living Organisms and the Processes of Life
End of Module Test
Higher Tier

[GDA02]

THURSDAY 20 MAY 2010, MORNING

MARK SCHEME

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				AVAILABLE MARKS
1	**(a)**	Trachea/windpipe/cartilage/ring of cartilage	[1]	
	(b)	Arrow points down (from diaphragm)	[1]	
	(c)	Tar	[1]	
	(d)	Any **two** from: binds to red blood cells/haemoglobin; irreversible; displaces oxygen/less oxygen carried/greater affinity	[2]	5
2	**(a)**	✓ ✗ ✗ ✓	[3]	
		4 correct – [3] marks 3 correct – [2] marks 2 correct – [1] marks		
	(b)	**Spontaneous** generation	[1]	4
3	**(a)**	White blood cells/white	[1]	
	(b)	Stage 2: Ingestion/engulfing/eating/surrounds; Stage 3: Digestion/broken down/destroys/dissolves	[2]	
	(c)	**Active** immunity/production of antibodies	[1]	4
4	**(a)**	Any **four** from: Ensure that food is completely burned; Take initial temperature of water; Set food alight/use Bunsen to burn food at start; Hold burning food at a **set distance** from base of tube; Stir water; Take final temperature (work out difference (change in temp); Replace water (with fresh water) and repeat for second food sample; Do repeats to improve reliability If put food in water → can get 3 marks for 3 correct statements	[4]	
	(b)	Bacon has more energy/larger increase in temperature Bacon burns longer	[1]	5

				AVAILABLE MARKS
5	Any **four** from: Mark all together irrespective of where they occur i.e. mark as complete paragraph for 4 marks **Description**: Cylinder increases in size/length/expands/turgid/firmer/heavier **Explanation**: High concentration of water **outside cylinder**; So water moves in; by osmosis; across a selectively permeable membrane		[4]	4
6	**(a)** Hepatic portal vein Not hpv		[1]	
	(b) Any **two** from: Under influence of insulin; Converts glucose → glycogen; Converts glucose → fat; **increased** respiration; **increased** uptake into cells/glucose.		[2]	3
7	**(a)** Sensory neurone enters through dorsal root and starts on foot		[1]	
	(b) Muscle		[1]	
	(c) Association neurone labelled		[1]	3
8	**(a)** Any **two** from: Urea/salt(s)/water		[2]	
	(b) No concentration gradient/**same** level of useful substances in dialysis solution as in the blood		[1]	3
9	**(a)** **(i)** Boil solution		[1]	
	(ii) Thin **layer of oil** on top of solution/add oil		[1]	
	(b) Any **two** from: To heat up the water bath/vary the temperature; count number of bubbles; in a set time how quickly limewater goes cloudy → 1 mark		[2]	4

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				AVAILABLE MARKS
10	**(a)**	Any **two** from: Concentration of potassium ions in the solutions/Same volume of solution; Length of time left in solutions; Temperature pH Same light	[2]	
	(b)	Any **two** from: With increased oxygen; there is increased respiration/energy; to move potassium ions against a concentration gradient/ low to high conc.	[2]	
	(c)	Seedlings have taken up as much K^+ as they can/or need/some other factor limits uptake, e.g. amount of potassium remaining/no K^+ left/ O_2 is no longer limiting	[1]	5
11		Any **three** from: Wider/dilated bronchioles/bigger bronchioli; Allows increased air/oxygen to the lungs; So more oxygen diffuses across alveoli/into the blood; So more respiration/energy For muscle concentration	[3]	3
12	**(a)**	Fatty acids	[1]	
	(b)	Any **three** from: Optimum temp for lipase is 35°; at lower temperature, less collisions between enzyme and substrate; at higher temperature (50°C), lipase is denatured	[3]	4
13	**(a)**	Carbon dioxide	[1]	
	(b)	Enzymes; are denatured	[2]	3
			Total	**50**

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Rewarding Learning

Centre Number	
71	

Candidate Number

General Certificate of Secondary Education
2009–2010

Science: Double Award (Modular)

Living Organisms and the Processes of Life
End of Module Test
Higher Tier

A **[GDA02]**

GDA02

WEDNESDAY 24 FEBRUARY 2010, MORNING

TIME

45 minutes.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
Write your answers in the spaces provided in this question paper.
Answer **all twelve** questions.

INFORMATION FOR CANDIDATES

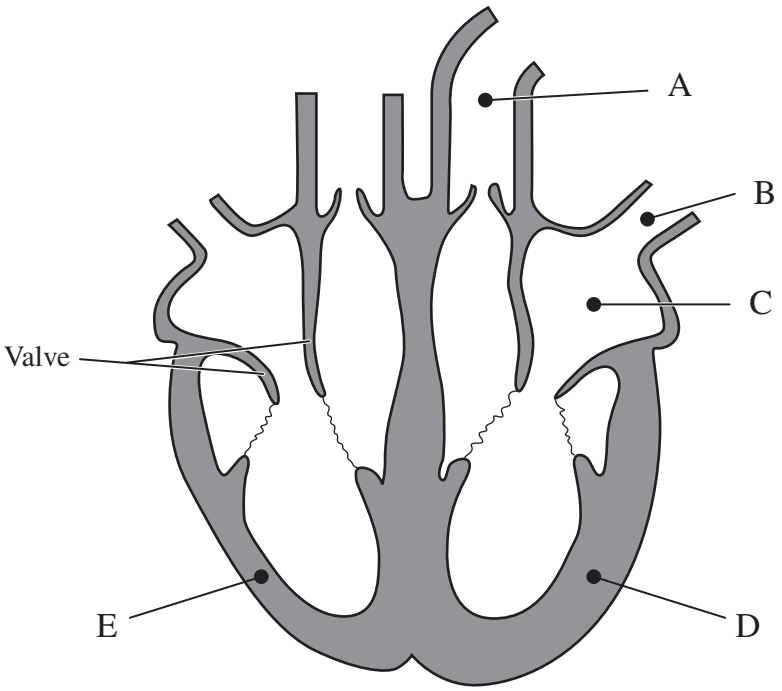
The total mark for this paper is 50.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

For Examiner's use only	
Question Number	Marks
1	
2	
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7	
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10	
11	
12	
Total Marks	

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Examiner Only	
Marks	Remark

1 The diagram shows a section through a heart.



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(a) Name parts A, B and C.

A _____

B _____

C _____ [3]

(b) Shade the side of the heart that contains oxygenated blood. [1]

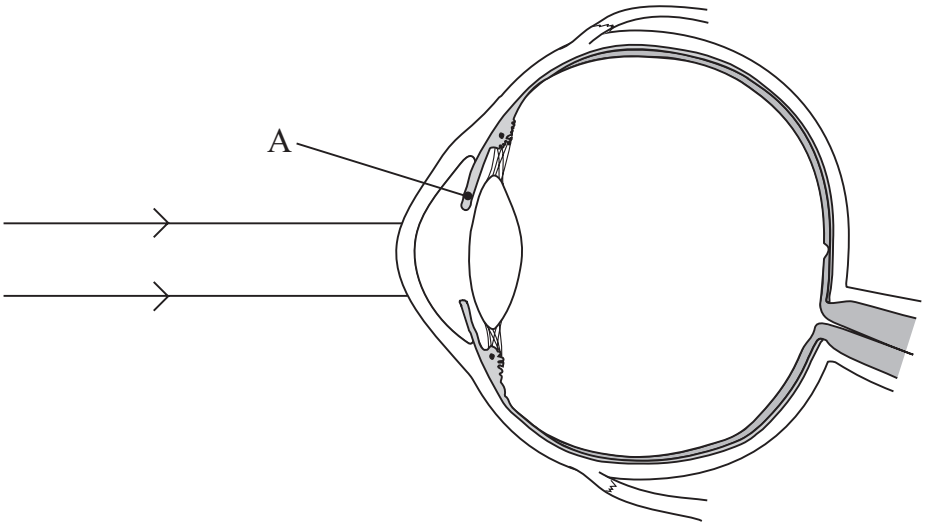
(c) Explain why muscle D in the heart is thicker than muscle E.

_____

_____ [1]

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2 A section through the human eye is shown in the diagram.



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(a) Name part A and state its function.

A _____

Function _____

_____ [2]

(b) Two parallel rays of light are drawn. Continue both rays to show how they are focused on the retina. [2]

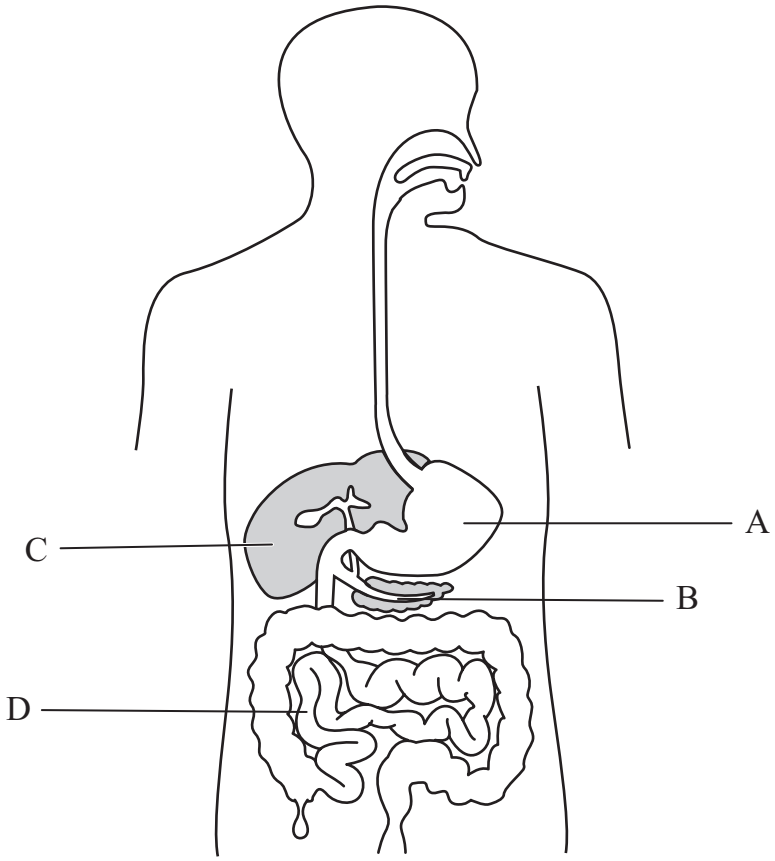
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Marks	Remark

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Examiner Only	
Marks	Remark

3 The diagram shows the digestive system and associated organs.



© GCSE Biology for CCEA by Rose McIlwaine & James Napier, published by Hodder & Stoughton, 2003, ISBN 0340858257

(a) Explain why it is important that food is digested.

_____[1]

(b) In which of the labelled parts on the diagram (A, B, C or D) does protein digestion begin?

_____[1]

(c) Complete the table below to show the type of food broken down and the products of digestion by the enzymes named in the table.

Enzyme	**Food broken down**	**Product**
Protease		
Amylase		

[2]

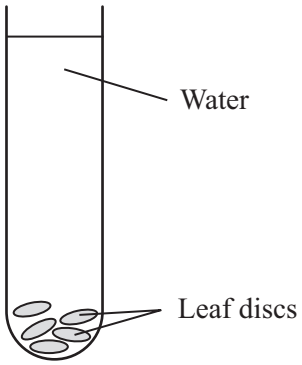
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(Questions continue overleaf)

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4 Jane cut five leaf discs from a geranium plant and placed them in water.



When bright light is shone on the leaf discs, bubbles of gas form on them and the leaf discs rise to the surface.
Jane carried out an experiment to investigate the effect of light intensity on the time taken for the discs to rise to the surface.
Her results are shown in the table.

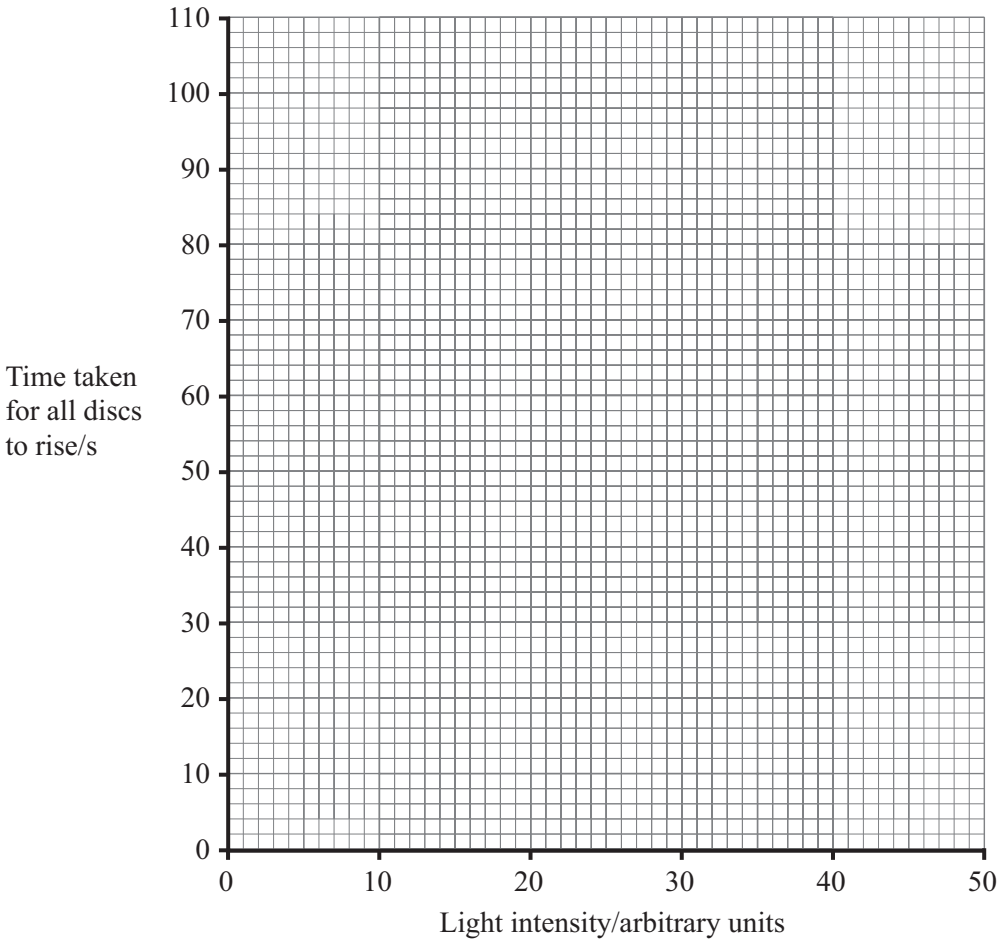
Light intensity/ arbitrary units	**Time taken for all discs to rise/seconds**
10	105
20	80
30	50
40	20
50	10

Examiner Only

Marks	Remark

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(a) Plot the information in the table on a line graph.



[3]

(b) Describe the trend shown by the graph and explain the results.

_____

_____

_____ [3]

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Marks	Remark

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Examiner Only	
Marks	Remark

5 Saltmarsh plants are found in salty soils in coastal regions. They have higher concentrations of salt in their root cells than is present in the surrounding sea water.

(a) Name the process involved in **water** uptake in plant roots.

_____ [1]

(b) Suggest how the high concentrations of salt in their root cells help these plants.

_____

_____

_____ [3]

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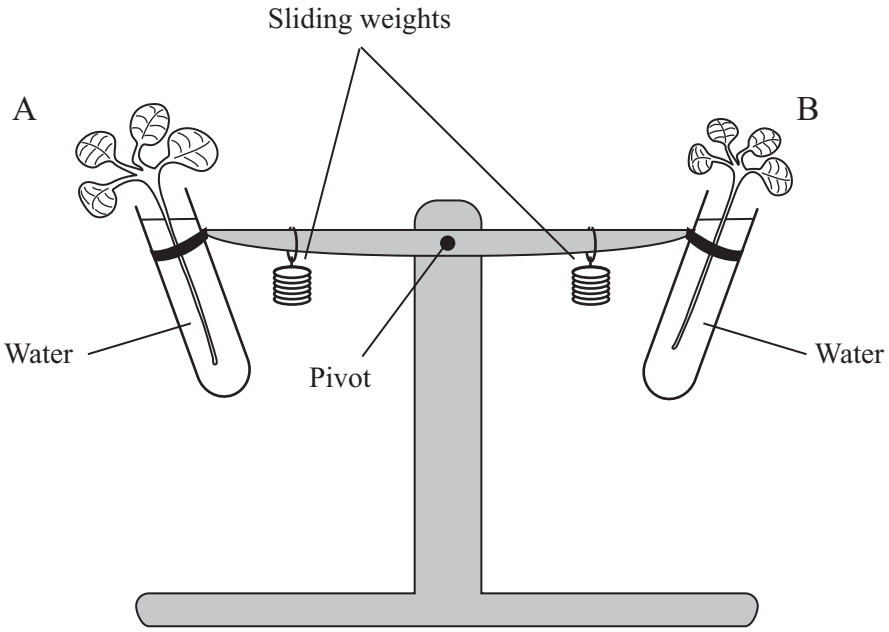
(Questions continue overleaf)

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Examiner Only	
Marks	Remark

6 **(a)** A student set up this apparatus to investigate transpiration from plant shoots.

Shoot A has larger leaves than shoot B.



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(i) How would the student make the sides balance at the beginning of the experiment?

_____ [1]

(ii) Describe and explain which side of the balance would be higher after 4 hours.

_____

_____

_____ [2]

(b) In very dry weather, the stomata close and this affects gas exchange. Explain why plant growth is restricted when this happens.

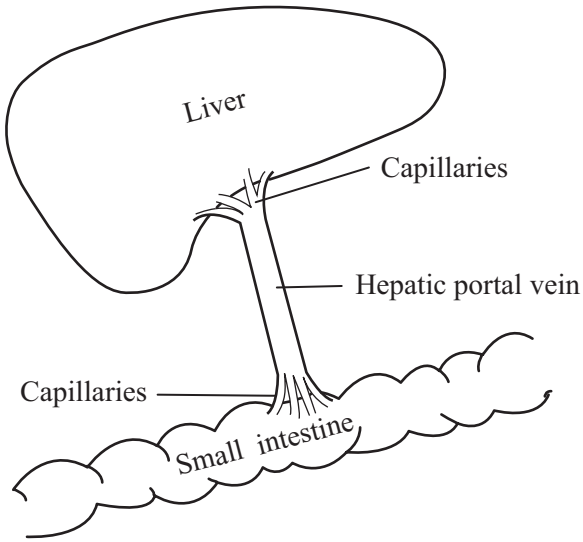
_____

_____

_____ [2]

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7 The diagram shows the liver and the small intestine.



(a) Use the diagram and your knowledge to suggest how the hepatic portal differs in structure from all other veins.

_____ [1]

(b) Explain the role of the liver in the assimilation of glucose.

_____

_____ [2]

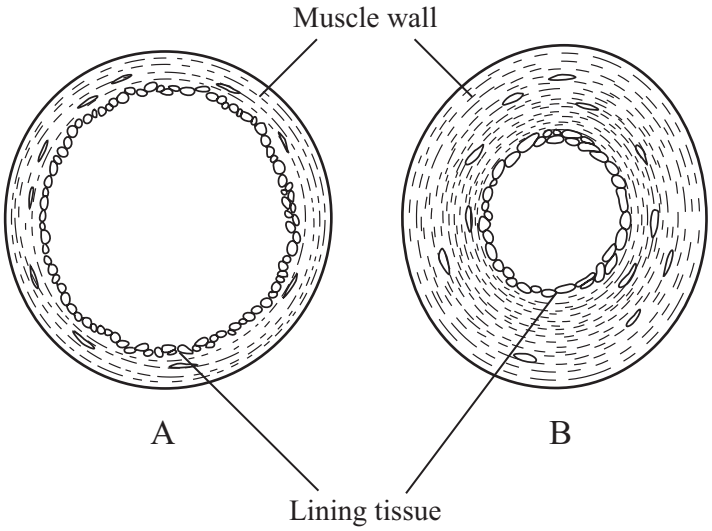
Examiner Only

Marks	Remark

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Marks	Remark

8 The diagrams show an artery and vein in cross section.



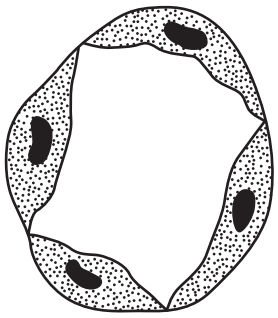
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(a) Use the diagram and your knowledge to explain how you know that blood vessel A is the vein.

_____

_____ [2]

(b) The following diagram shows a capillary in cross section.



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Use the diagram and your knowledge to suggest how its function is related to its structure.

_____

_____ [1]

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9 Excess amino acids are broken down to urea in the liver.

Describe the pathway of the urea until it is eliminated from the body.

_____

_____

_____

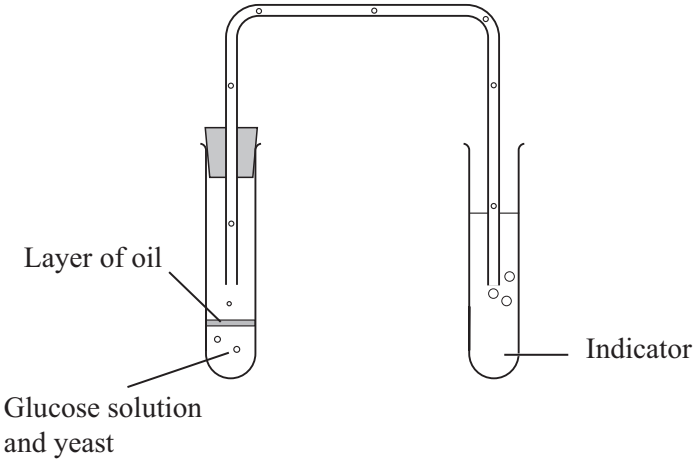
_____

_____ [3]

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Marks	Remark

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10 The diagram shows the apparatus used to investigate anaerobic respiration in yeast.



(a) When setting up this experiment, how is the dissolved oxygen removed from the glucose solution to give anaerobic conditions?

_____ [1]

(b) Explain why a colour change in the indicator does **not** prove that the respiration is anaerobic.

_____

_____ [2]

(c) Compare the energy released during anaerobic respiration to that released during aerobic respiration.

_____ [1]

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Marks	Remark

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11 A crop of barley was grown under two different conditions.

Soil ploughed	Soil not ploughed
Crop yield **4 tonnes/unit area**	**Crop yield** **2.8 tonnes/unit area**

Ploughing helps aeration of the soil. Explain why the field that was ploughed before planting the crop gave a better yield than the field that was not ploughed.

_____

_____

_____

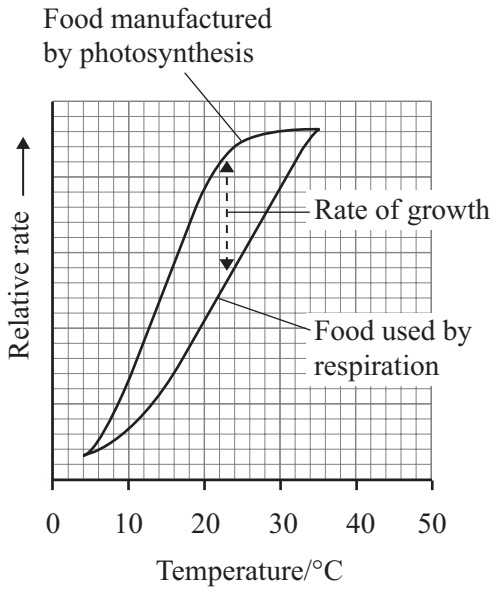
_____

_____ [4]

Examiner Only

Marks	Remark

12 The graph shows the effect of temperature on the rate of photosynthesis and respiration in a plant.



(a) Explain why the rate of both processes is low at 5 °C.

_____

_____

_____ [2]

(b) Use the **graph** to suggest why it is better to grow crops at 25 °C than 15 °C.

_____

_____

_____ [2]

(c) Suggest why crops often produce greater yields when growing close to the sea or a large lake.

_____

_____ [1]

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GCSE

Science: Double Award (Modular)

End of Module Tests

March 2010

Mark Schemes

Issued: May 2010

Rewarding Learning

General Certificate of Secondary Education
2009 – 2010

Science: Double Award (Modular)

Living Organisms and the Processes of Life
End of Module Test
Higher Tier

[GDA02]

WEDNESDAY FEBRUARY 2010, MORNING

MARK SCHEME

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				AVAILABLE MARKS
1	**(a)**	A – Aorta B – Pulmonary vein C – Left atrium	[3]	
	(b)	Left side heart shaded	[1]	
	(c)	Muscle D pumps blood round the body/converse E only has to pump to lungs	[1]	5
2	**(a)**	A – iris; Controls amount of light that enters the eye/protects eye	[2]	
	(b)	Bending of rays at cornea/or lens; Focus onto retina	[2]	4
3	**(a)**	So that it can be absorbed/so that it can get into bloodstream	[1]	
	(b)	A	[1]	
	(c)	Protein ⟶ Amino acids Both needed Starch ⟶ Glucose/(not carbohydrate) Sugar/ Maltose Both needed	[2]	4
4	**(a)**	All points correct = 2 3/4 points correct = 1 Line = 1	[3]	
	(b)	As light increases, it takes less time for discs to rise/quicker; More oxygen; more photosynthesis	[3]	6
5	**(a)**	Osmosis	[1]	
	(b)	Maintain concentration gradient/or create one/ To allow **water intake**/prevent water loss; For photosynthesis/or described turgor/solvent	[3]	4

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					AVAILABLE MARKS
6	**(a)**	**(i)**	B is heavier/or A is lighter Move the sliding weight towards B/or further away from pivot **towards B** add extra weight to **slide B**	[1]	
		(ii)	A; A loses more water/more transpiration/uses more water (A); larger leaves/larger surface area/more stomata	[2]	
	(b)		Less carbon dioxide; diffuses into the leaf **for photosynthesis**;	[2]	5
7	**(a)**		HPV starts and ends in capillaries	[1]	
	(b)		Glucose is converted to glycogen; under the influence of insulin; glucose converted to fat/ increased uptake of glucose/increased rate of respiration; (Any **two**)	[2]	3
8	**(a)**		Less muscle/large lumen; Less pressure (any **two**)	[2]	
	(b)		Thin wall/one cell thick so easier for diffusion	[1]	3
9	**(a)**		Any **three** in correct sequence: hepatic vein/vena cava/aorta/renal artery; to the kidney; converted to urine; in ureter; to bladder; urethra to outside	[3]	3
10	**(a)**		Boil the solution (not heat)	[1]	
	(b)		carbon dioxide; is produced in aerobic **and** anaerobic respiration/in both	[2]	
	(c)		Less produced in an aerobic or more in aerobic. Aerobic is more efficient.	[1]	4

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			AVAILABLE MARKS
11	Any **four** from: Plenty of oxygen; plenty of oxygen; for respiration/energy; or better germination; } 4 for active uptake; more plants; photosynthesis; of minerals/named mineral; better root development; } 2 against a concentration gradient more mineral uptake 1 mark **minerals**:	[4]	4
12	**(a)** Any **two** from: Both processes controlled by **enzymes**; Less collisions between molecules; Molecules have less energy/less kinetic energy	[2]	
	(b) More growth → optimum temp for growth; Bigger difference between rate of photosynthesis and respiration	[2]	
	(c) To obtain extra reflected light/more humid/less sandy free draining soil ground wet/soils not waterlogged/less frost/More H_2O:	[1]	5
		Total	**50**

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