CCEA GCSE SCIENCE: SINGLE AWARD (MODULAR)

SCIENCE



EXAM QUESTION PACK

MODULE 1 HIGHER TIER GSC12 PAPERS

STEMUP

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Rewarding Learning

Centre Number

71	

Candidate Number

General Certificate of Secondary Education
2011–2012

Science: Single Award (Modular)

Staying Alive
Module 1

Higher Tier

[GSC12]

GSC12

TUESDAY 15 MAY 2012, 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 six** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 45.
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	
Total Marks	

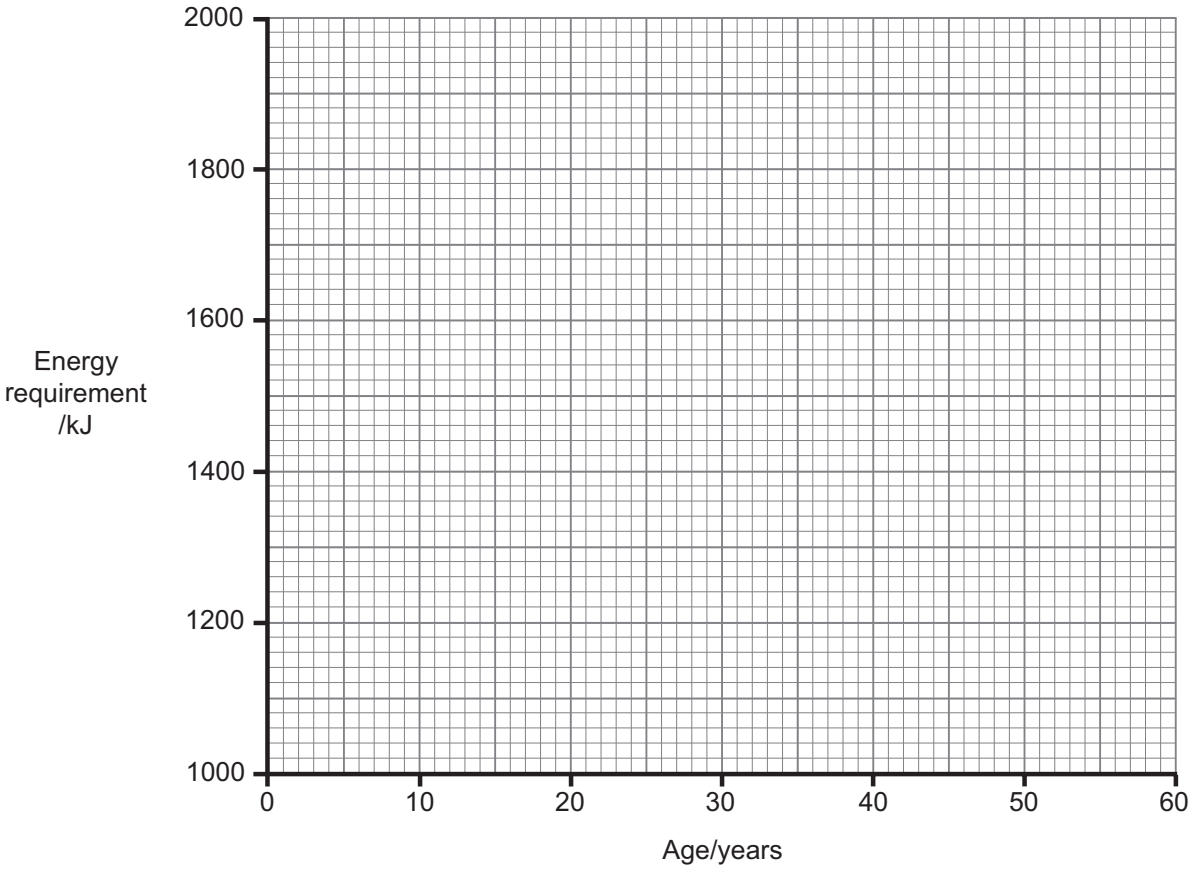
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Examiner Only	
Marks	Remark

1 The table below shows the energy requirements for people of various ages at three different levels of physical activity.

Energy/kJ / Age/years	Activity Levels		
	Low	**Medium**	**High**
8	1200	1400	1800
13	1500	1600	2200
18	1800	2000	2400
30	2000	2200	2400
50	1800	2000	2200
60	1600	1800	2000

(a) Plot and draw a line graph on the grid below of the energy requirement for people with **low** activity levels. [3]



(b) Use the data provided to:

(i) describe how activity levels affect energy requirements.

_____

_____ [1]

(ii) state **one** difference in the way that age affects energy requirements of people aged eight to thirty, and people aged thirty to sixty.

8–30 _____

30–60 _____ [2]

(c) Apart from age and activity level, state **one** other factor that affects energy requirements.

_____ [1]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

2 **(a)** Explain fully how a person suffering from 'compulsive eating disorder' may become obese.

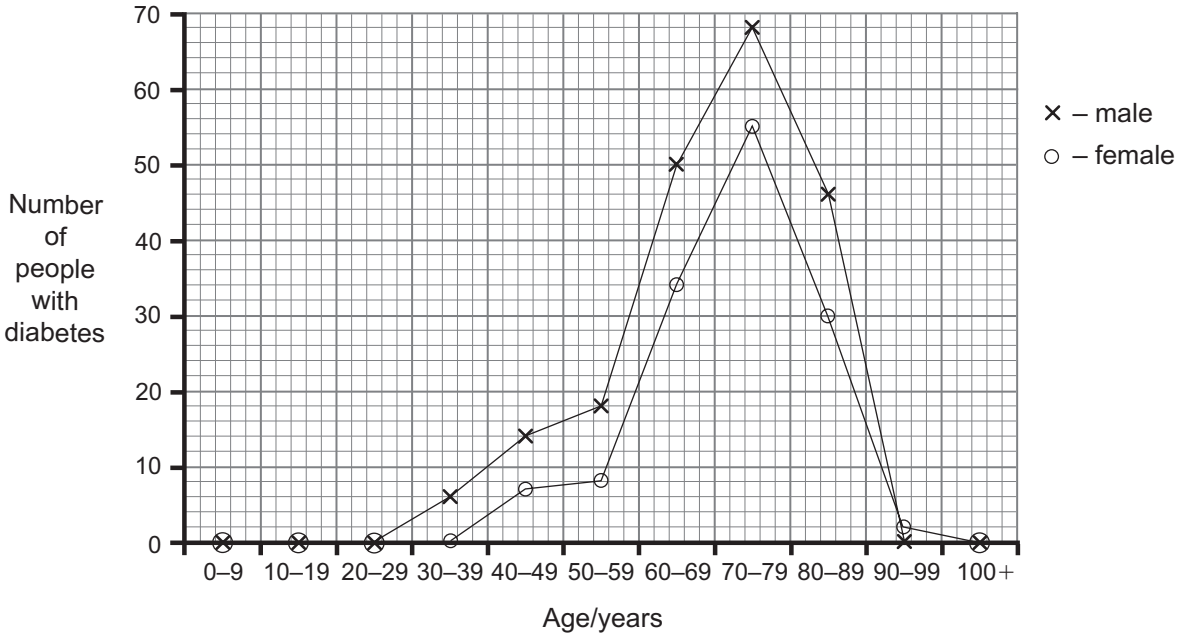
_____

_____

_____

_____ [3]

(b) The graph below shows the number of people with diabetes registered with one doctor in Belfast.



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(i) All these patients have type 2 diabetes. State **one** piece of evidence from the graph that shows this.

_____

_____ [1]

(ii) Calculate the number of males registered with diabetes.

Show your working.

Answer _____ [2]

(iii) Give a reason why it would not be valid to deduce from this data that more males suffer from diabetes than females.

_____

_____ [1]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

3 **(a)** The diagram shows a pipistrelle bat which, like a human, is a mammal.



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Pipistrelle bats hibernate (sleep) during the winter and only waken occasionally to get rid of excess water which is produced in their cells. Prior to hibernation they eat a lot in order to have a food store in their body cells.

Explain fully how this excess water is **produced** by the bat's body.

_____

_____

_____

_____ [4]

(b) Long ears in bats is dominant to short ears.

Let **(E)** represent the allele for long ears and **(e)** represent the allele for short ears.

(i) Draw a genetic diagram below to show how two long eared parents can have short eared offspring.

[3]

(ii) What is the expected ratio of short eared bats to long eared in these offspring?

_____ [1]

Examiner Only

Marks	Remark

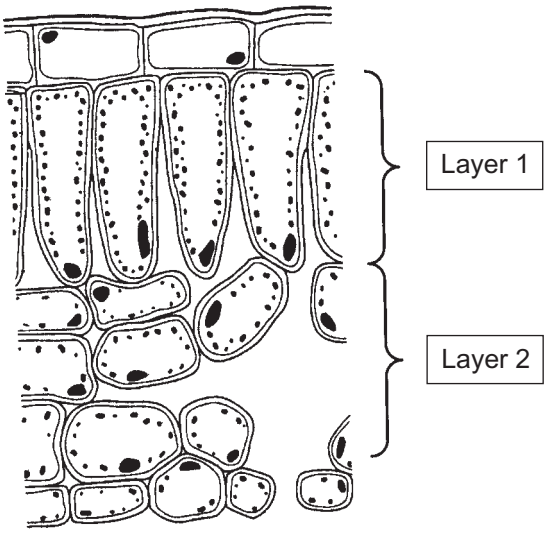
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Examiner Only	
Marks	Remark

4 **(a)** Describe the method for an experiment to show that chlorophyll is needed for photosynthesis.

[4]

(b) The diagram below shows an outline of the cell layers in a leaf.



lower side of leaf

© GCSE Biology for CCEA by R McIlwaine & J Napier, published by Hodder & Stoughton, 2003. ISBN 0340858257. " Reproduced by permission of Hodder Education

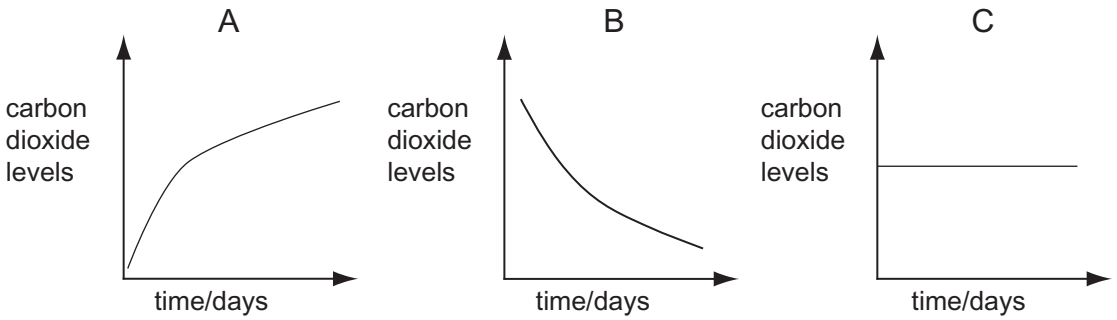
In which layer (1 or 2) will there be the higher rate of photosynthesis?

Explain your choice.

[3]

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(c) Plants are put into a new greenhouse and the amount of carbon dioxide is monitored for fourteen days.



Which graph shows the result you would expect over the 14 day period? Explain your answer.

_____

_____

_____ [2]

Examiner Only

Marks	Remark

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Examiner Only	
Marks	Remark

5 **(a)** Different processes have been used to identify the arrangement of bases in DNA. Two of these are quantitative analysis and modelling. For each process state the names of the scientist(s) who used them and describe the evidence they produced.

Quantitative analysis _____

_____

_____

Modelling _____

_____

_____ [4]

(b) What is meant by the 'base triplet hypothesis'?

_____

_____

_____ [2]

Examiner Only	
Marks	Remark

6 The picture below shows GM sunflowers.



© Tom Stoddart / Hulton Archive / Getty Images

The following statements (1–6) contain information about GM crops.

1. GM crops might breed naturally with wild plants.
2. Insect-resistant crops reduce the total use of pesticides.
3. GM crops have added nutritional values e.g. vitamins.
4. The long-term effects of eating GM crops are unknown.
5. Seeds for GM crops are more expensive than for conventional crops.
6. GM crops can provide sufficient yields despite a poor weather season.

Using the numbers (1–6) choose **two** statements (for each of **A** and **B**) which cause:

A many farmers to be in favour of growing GM crops and give reasons for your choices.

_____

_____

_____ [4]

B some people to be against the growing of GM crops and give reasons for your choices.

_____

_____

_____ [4]

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Rewarding Learning

General Certificate of Secondary Education
2011–2012

Science: Single Award (Modular)

Staying Alive
Module 1

Higher Tier

[GSC12]

TUESDAY 15 MAY 2012
9.15 am–10.00 am

MARK SCHEME

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				AVAILABLE MARKS
1	**(a)**	all plots correct smooth curve	2 4/5 correct – 1 mark 1 – must not be through origin [3]	
	(b)	**(i)** more active needs increase [1]		
		(ii) older they get needs increase, older adults get needs decrease [2]		
		(iii) gender/pregnancy [1]		7
2	**(a)**	eating too much constantly, intake exceeds energy needs eating more than need, excess stored as fat [3]		
	(b)	**(i)** no one under age of 30/all older/no one born with [1]		
		(ii) 6 + 14 + 18 + 50 + 68 + 46 202 [2] If one reading from graph incorrect – 1 mark		
		(iii) only 1 GP/location/only type 2 shown/low numbers [1]		7
3	**(a)**	Food/fat/glucose store, respired, for energy, produces water, not being used/ builds up. *Any* [4]		
	(b)	**(i)**	1 mark each correct parent 2 1 mark F1 all correct 1 Only mark F1 Sequentially if ee present. [3]	
		(ii) 1 : 3 [1]		8
4	**(a)**	destarched plant, variegated leaf, expose to light test for starch *Any* 2 steps	3 marks 1 mark 2 marks *Any* 4 [4]	
	(b)	1 – cells more area, more tightly packed, so more chloroplasts, close to light/ sites of photosynthesis/ photosynthesis needs light *Any* 3 [3]		
	(c)	C 1 photosynthesis = respiration, carbon dioxide in = carbon dioxide out 1 [2]		9

	E	e
E	EE	Ea
e	Ee	ee

					AVAILABLE MARKS
5	**(a)**	quantitative analysis – Chargaff, same amounts of A and T/C and G modelling – Watson and Crick, A links T/C links G		[4]	
	(b)	sequence of 3 bases, codes for 1 type of amino acid		[2]	6
6	A	2 – Labour saving/environmentally friendly/ financial (if not in 6/3)	2		
		6/3 – Financial saving	2	[4]	
	B	1 – environmental damage/superweeds	2		
		4 – health/environmental concerns/ not natural	2		
		Do not accept 5 – more expensive food		[4]	8
				Total	**45**

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Rewarding Learning

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71	

Candidate Number

General Certificate of Secondary Education
2011–2012

Science: Single Award (Modular)

Staying Alive
Module 1
Higher Tier

[GSC12]

GSC12

MONDAY 27 FEBRUARY 2012
9.30 am–10.15 am

TIME

45 minutes.

INSTRUCTIONS TO CANDIDATES

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Write your answers in the spaces provided in this question paper.
Answer **all seven** questions.

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7	
Total Marks	

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Examiner Only	
Marks	Remark

1 The poster below was used in an advertising campaign for 'CCEA' coffee.



The makers of 'TASTY' coffee complained to the ASA (Advertising Standards Agency) saying that the poster was misleading because the survey was unreliable.

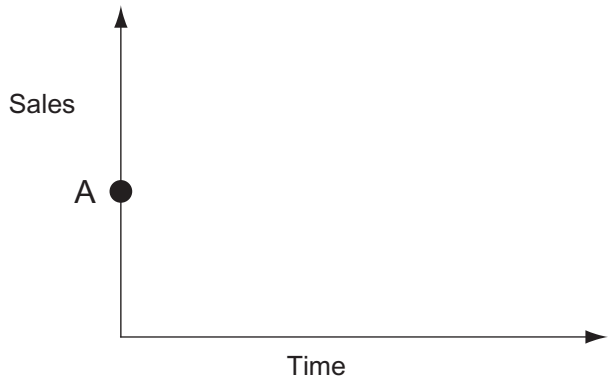
(a) State **three** pieces of information about the survey that would be needed to decide if it was unreliable.

_____

_____

_____ [3]

(b) The ASA ruled that the poster was not misleading. Starting at point A below sketch two lines to suggest what might happen to the sales of each coffee after this ruling was made public.
Label each line with the name of the coffee.



[2]

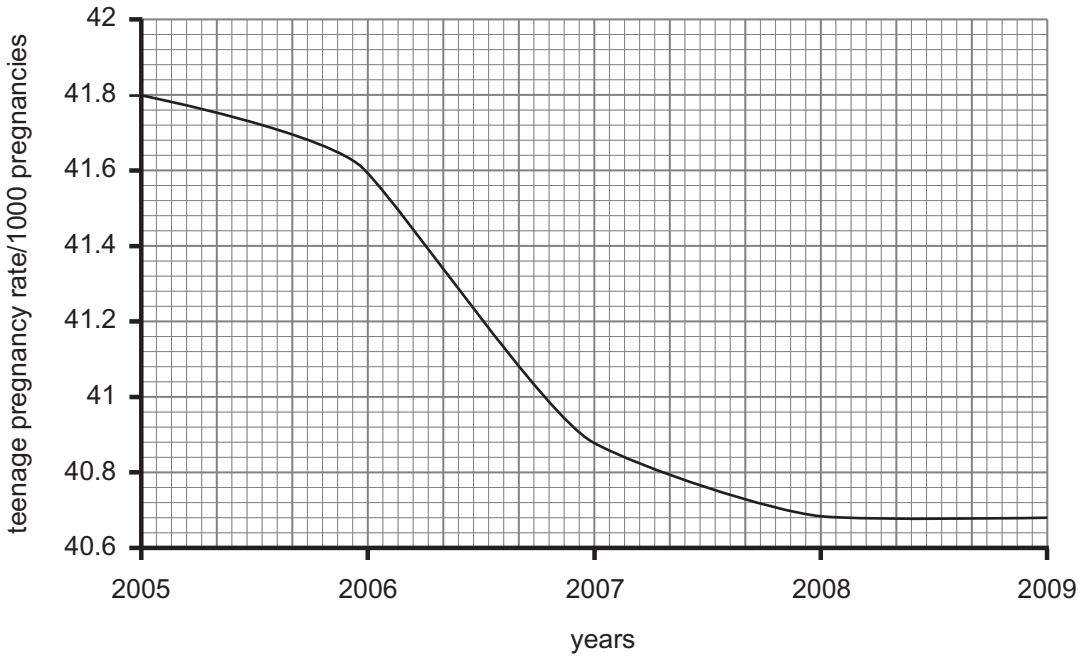
(c) A cup of coffee is mostly water. State **one** function of water in the diet.

_____ [1]

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Examiner Only	
Marks	Remark

2 The graph below shows the rate of teenage pregnancies in a city from 2005 to 2009.



The government introduced measures in 2005 aimed at reducing the rate of teenage pregnancies.

(a) Using data from the graph describe the evidence which would suggest that these measures are:

1. working.

_____ [1]

2. not working as well as hoped.

_____

_____ [2]

(b) It has been suggested that there is a higher rate of teenage pregnancies in England than in Northern Ireland.
How could you prove that this suggestion is correct?

_____

_____

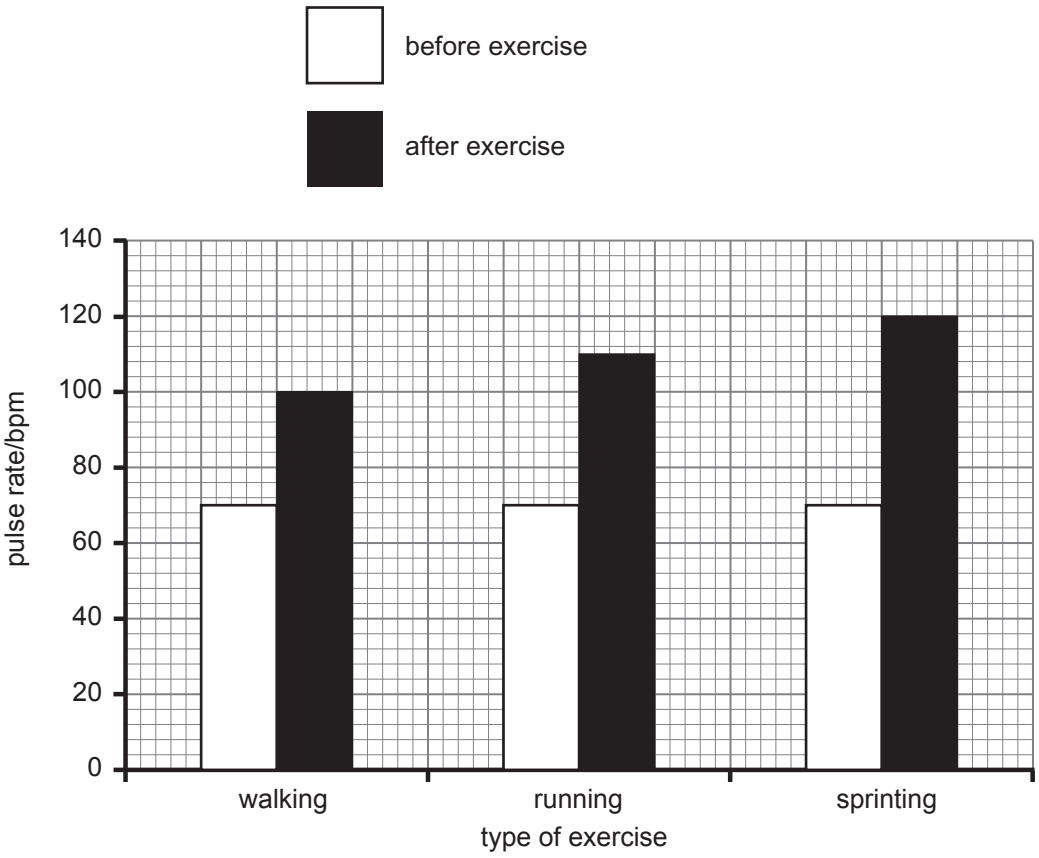
_____

_____ [3]

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Examiner Only	
Marks	Remark

3 Simon is in a football team and trains three times a week. The bar chart shows the effect of three types of exercise on Simon's pulse rate.



(a) Use the data in the bar chart to describe how the pulse rate changes with different types of exercises. Explain why these changes occur.

[3]

(b) Simon left the football team and stopped training for a year. Describe and explain the differences to his 'before' and 'after' pulse rates when he first returns to training.

[3]

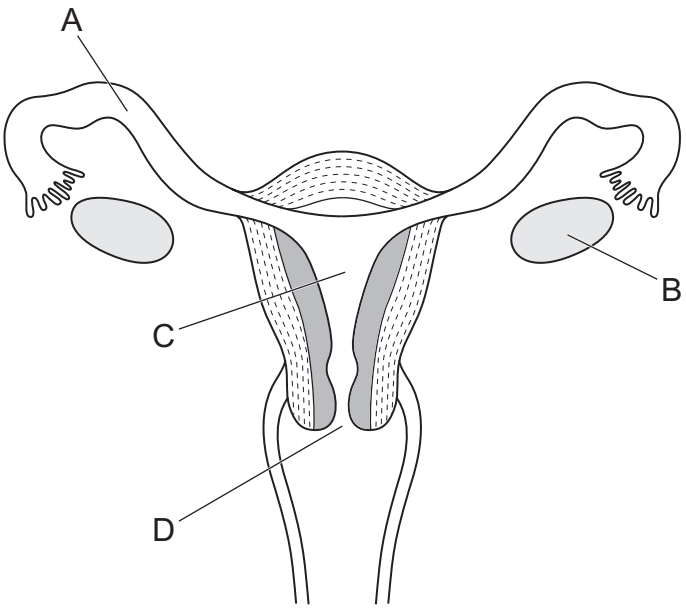
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(Questions continue overleaf)

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Examiner Only	
Marks	Remark

4 **(a)** The diagram shows the female reproductive system.



© Focus Educational Software Ltd

(i) Name parts labelled A, B, C and D.

A _____ C _____

B _____ D _____ [2]

(ii) Describe the role of oestrogen in:

1. preparing the female body for reproduction.

_____

_____

_____ [2]

2. controlling the menstrual cycle.

_____

_____

_____ [2]

(b) Describe fully the pathway of a sperm from where it is produced to where it leaves the male body.

Examiner Only	
Marks	Remark

_____

_____

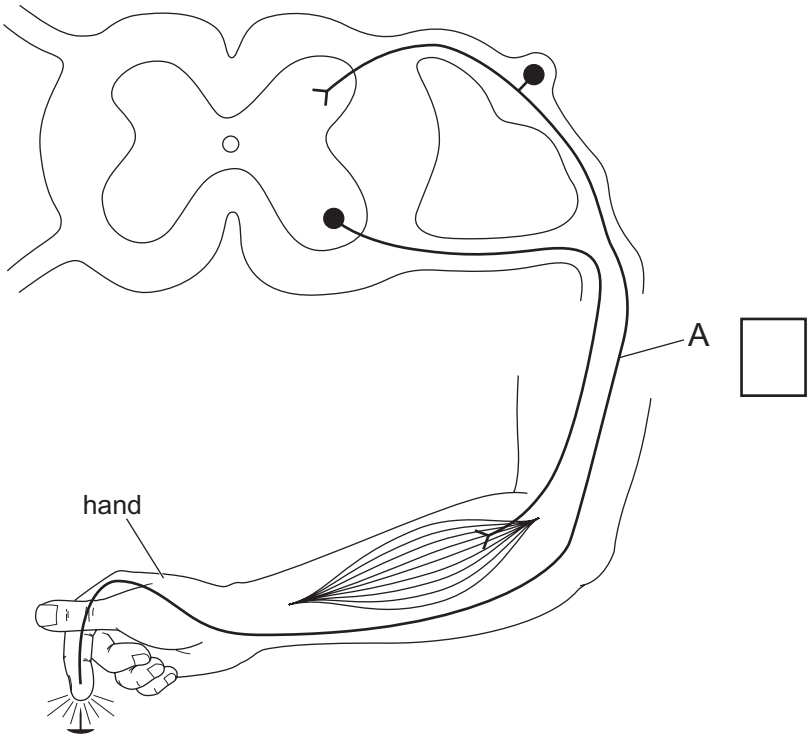
_____

_____ [3]

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5 The diagram shows part of the pathway of a reflex action.

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Marks	Remark



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(a) Complete the diagram by drawing and labelling the missing neurone. [2]

(b) Name the effector in this reflex action.

_____ [1]

(c) Draw an arrow in the box to show the direction of travel of the impulse in neurone A. [1]

(d) State **two** differences between a reflex and a voluntary action.

_____

_____

_____ [2]

(e) Suggest a reason why our knowledge of the brain has dramatically increased over the last 50 years.

_____ [1]

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Examiner Only	
Marks	Remark

6 **(a)** **(i)** The ability to roll the tongue is caused by a dominant gene (T).

Draw a genetic diagram below to show the possible genotypes of the children of parents who are both heterozygous for tongue rolling.
Circle any genotype of an individual who cannot roll their tongue.

[3]

(ii) Define the term 'phenotype'.

_____ [1]

(iii) If the gene for tongue rolling codes for ninety amino acids how many bases must it contain? Explain your answer.

_____

_____

_____ [2]

(b) What term is given to the shape of DNA?

_____ [1]

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7 It is hoped that individuals affected by some genetic diseases such as cystic fibrosis can have a better quality of life with the development of gene therapy.

Describe the process of 'gene therapy' and outline some benefits and disadvantages of it.

[4]

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Marks	Remark

THIS IS THE END OF THE QUESTION PAPER

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Rewarding Learning

General Certificate of Secondary Education
2011–2012

Science: Single Award (Modular)

Staying Alive
Module 1
Higher Tier

[GSC12]

MONDAY 27 FEBRUARY 2012
9.30 am–10.15 am

MARK SCHEME

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				AVAILABLE MARKS
1	**(a)**	number of people tested, any info to ensure representative of whole population e.g. ages, who conducted the tests	[3]	
	(b)	ascending line labelled CCEA, steady/descending line labelled TASTY	[2]	
	(c)	lubricant/solvent/transport	[1]	6
2	**(a)**	1. overall numbers reduced, [1] 2. reduction very small/no reduction last year [2]	[3]	
	(b)	compare figures, secondary sources – medical/internet, pro rata	[3]	6
3	**(a)**	Increases in all cases	[1]	
		Demand for more energy/food and oxygen	[1]	
		Sprinting uses most/walking uses least/biggest increase data quoted/smallest data quoted.	[1]	
	(b)	resting increases 'after' increases, heart muscle weaker, output decreases when not exercising (any three)	[3]	6
4	**(a)**	**(i)** oviduct, ovary, uterus, cervix $\frac{1}{2}$ mark each	[2]	
		(ii) 1. triggers secondary sexual characteristics, any example [2] 2. highest level causes ovulation, lowest causes menstruation [2]	[4]	
	(b)	leaves testes, travels along sperm duct, passes prostate, down urethra/through penis (any three)	[3]	9

			AVAILABLE MARKS
5	**(a)** correct location, association/connector neurone	[2]	
	(b) arm muscle	[1]	
	(c) upward arrow	[1]	
	(d) speed, pathway/coordinator	[2]	
	(e) examples/improvements of technology	[1]	7
6	**(a)** **(i)**		

	T	†
T	TT	T†
†	T†	(††)

1 mark both parents [1]
1 mark F1 [1]
†† circled 1 mark [1]

[3]

	(ii) Outward appearance caused by genes	[1]	
	(iii) 270, base triplet hypothesis/explained	[2]	
	(b) double helix	[1]	7
7	Inserting genes/DNA, into patients cells, Any 2 relieves symptoms, prolongs life, Any 1 harm to normal cells, short term effect Any 1	[4]	4
		Total	**45**

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2011–2012

Science: Single Award (Modular)

Staying Alive
Module 1

Higher Tier

[GSC12]

TUESDAY 8 NOVEMBER 2011
1.30 pm–2.15 pm

GSC12

TIME

45 minutes.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
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Total Marks	

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Examiner Only	
Marks	Remark

1 **(a)** The picture below shows cuttings of plants.



© *Geoff Wakeling*

The statements below give advice on taking cuttings.

A Select cuttings from a healthy plant.
B Quickly insert the cuttings into a pot containing moist compost and place in a large sealed plastic bag.

(i) For each statement suggest why it is necessary to follow this advice.

A _____

_____

B _____

_____ [2]

(ii) Taking cuttings is an example of cloning. Name the type of reproduction involved in taking cuttings.

_____ [1]

(iii) State two advantages of growing plants from cuttings.

1._____

2._____ [2]

(b) Suggest two reasons why many people find cloning of humans unacceptable.

1. _____

2. _____ [2]

2 The table below shows the results of the first recorded clinical experiment carried out by James Lind to investigate cures for scurvy.

He divided ten sailors who had scurvy into five groups. They all received the same diet but each group had a different addition as shown.

Group	Added to diet	Effect
1	Apple cider	Some improvement
2	Sulphuric acid	None
3	Vinegar	None
4	Seawater	None
5	2 oranges 1 lemon	Complete recovery

(a) Describe and explain fully the results of this investigation.

_____

_____

_____

_____ [3]

(b) (i) Name the chemical reaction that takes place in all living cells.

_____ [1]

(ii) Write the word equation for this reaction.

[2]

Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

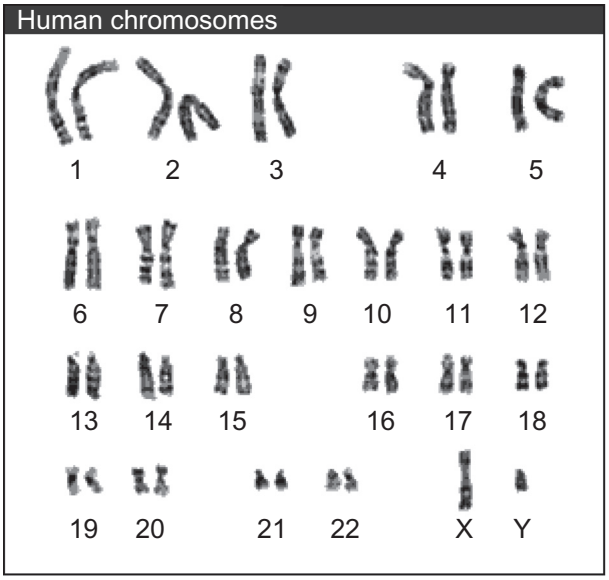
3 **(a)** Tom is heterozygous for eye colour and has brown eyes. His wife Sinead has blue eyes.

Let (B) represent the allele for brown eyes and (b) the allele for blue eyes.

Draw a genetic diagram below to show the possible genotypes of their children.

[3]

(b) The diagram below shows the chromosomes in a normal body cell.



Source: news.bbc.co.uk/2/hi/science/nature/1717396.stm

(i) These chromosomes consist of DNA molecules. What name is given to the shape of DNA?

_____ [1]

(ii) Describe how the arrangement of chromosomes would be different for a sperm cell compared with a normal body cell. Give the reason for this difference.

_____

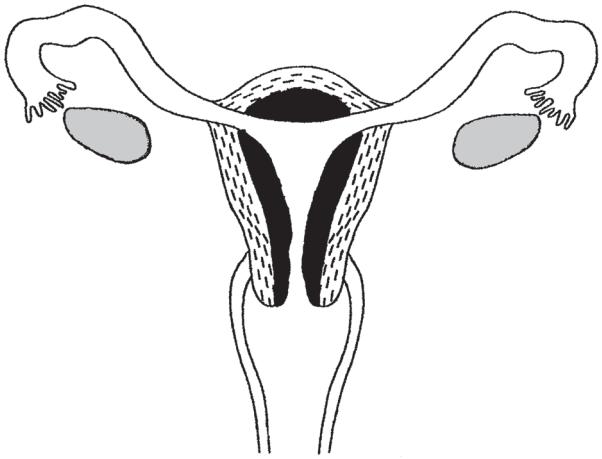
_____

_____ [2]

Examiner Only

Marks	Remark

4 Below is a diagram of the female reproductive system.



(a) Sperm is deposited in the vagina and moves from there to fertilise an ovum. List, in order, the names of the three structures that the sperm will travel through before fertilisation can take place.

_____ _____ _____ [2]

(b) Name the structures that are cut and tied during an operation to sterilise females.

_____ [1]

(c) This method of sterilising is permanent. Why might this be considered a disadvantage?

_____ [1]

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Examiner Only	
Marks	Remark

5 **(a)** A class wanted to find out if light is needed for photosynthesis to make starch. On the first day they set up the investigation and the following day they tested for starch.

(i) Describe how the investigation is set up on the first day.

_____

_____

_____

_____ [2]

(ii) State how you would test for starch describing and explaining the results you would expect to get.

_____

_____

_____

_____ [3]

(b) State where most chloroplasts are found in a leaf and explain the benefit of this to the plant.

_____

_____ [2]

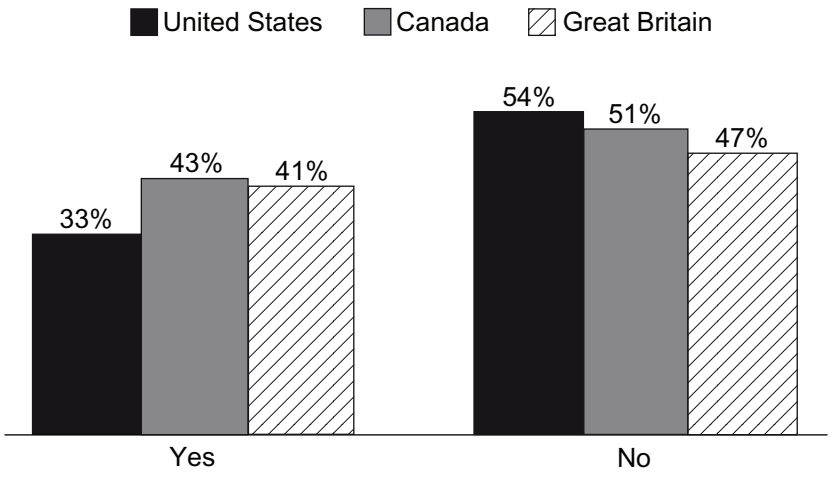
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Examiner Only	
Marks	Remark

6 **(a)** A survey was carried out to investigate people's attitude to GM crops. One of the questions asked was:

Do you believe that GM crops pose a serious health hazard to consumers?

The answers to this question are shown in the bar chart below.



Source: http://www.gallup.com/poll/19261/britons-show-distaste-biotech-foods.aspx

(i) Which group (Americans, Canadians or British) were least concerned about the safety of GM crops?

_____ [1]

(ii) Suggest one thing you would need to know before you could conclude that the results were reliable.

_____

_____ [1]

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(b) At present, the two main types of GM crops being grown are ones that have been inserted with a gene that:

1. makes them resistant to herbicides (chemicals that kills weeds).

2. makes them toxic to pests that live on them.

(i) Explain how these features (1 and 2) will be advantageous for the farmer.

_____

_____

_____

_____ [4]

(ii) Many people are opposed to the use of GM crops.

Give two reasons for this.

1. _____

2. _____ [2]

Examiner Only	
Marks	Remark

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Examiner Only	
Marks	Remark

7 The relative percentages of the bases in DNA, in different organisms, are shown in the table below.

	%			
Organism	**A**	**G**	**T**	**C**
Chicken	28.0	22.0	28.0	22.0
Rat	28.6	21.4	28.6	21.4
Human	29.3	20.7	29.3	20.7
Octopus	32.4	17.6	32.4	17.6

(a) What pattern for the relative percentage of bases is shown by the information in the table?

_____ [1]

(b) What is meant by the base triplet hypothesis?

_____

_____ [2]

(c) The shape of DNA was discovered using the processes of X-ray diffraction and modelling. For each process state the scientist(s) involved and describe how their research helped work out the structure of DNA.

_____

_____

_____

_____

_____

_____ [4]

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111951

Rewarding Learning

General Certificate of Secondary Education
2011–2012

Science: Single Award (Modular)

Staying Alive
Module 1
Higher Tier

[GSC12]

TUESDAY 8 NOVEMBER 2011
1.30 pm–2.15 pm

MARK SCHEME

STEMUP.CO.UK

					AVAILABLE MARKS
1	**(a)**	**(i)**	A so cuttings will be healthy, B so cuttings don't dry out	[2]	
		(ii)	asexual	[1]	
		(iii)	Any **two** from: desirable characteristics; quicker; many plants saves money; grow at same rate	[2]	
	(b)		Any **two** from: human rights, expectations, embryos killed, determining gender, playing God, not natural; no variation	[2]	7
2	**(a)**		cider/oranges/lemon show improvement; oranges/lemon contain vitamin C; sulphuric acid/vinegar/seawater contains no vitamin C	[3]	
	(b)	**(i)**	respiration	[1]	
		(ii)	Glucose + Oxygen ⟶ Carbon Dioxide + Water + Energy equation [1] for each side. Deduct [1] for no arrow	[2]	6
3	**(a)**		each parent – [1] F1 – Allow consequential marking [1]	[3]	
	(b)	**(i)**	double helix	[1]	
		(ii)	single/23 chromosomes – [1] make pairs/46 at fertilisation – [1]	[2]	6
4	**(a)**		cervix, uterus, oviduct order incorrect – [1]	[2]	
	(b)		oviduct	[1]	
	(c)		might want children later	[1]	4
5	**(a)**	**(i)**	Any **two** from**:** destarch plant, attach strip <u>black</u> paper, leave plant in light	[2]	
		(ii)	iodine; (yellow brown) to blue/black; where light present	[3]	
	(b)		upper side, receive more light	[2]	7

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					AVAILABLE MARKS
6	**(a)**	**(i)**	Americans	[1]	
		(ii)	number surveyed or any valid age group/no bias (for or against)	[1]	
	(b)	**(i)**	1 – plant can tolerate a herbicide that kills all other plants/weeds, so bigger yield/more money – [2] 2 – pests get poisoned, so less pesticides/less costs – [2]	[4]	
		(ii)	Any **two** from: safety, can't be certain, could poison people if put in food crops, superweeds	[2]	8
7	**(a)**		A = T and G = C – 1 mark	[1]	
	(b)		3 bases; codes for an amino acid	[2]	
	(c)		Franklin/Wilkins, Watson/Crick – 2 marks revealed shape, showed how bases were linked together	[4]	7
				Total	**45**

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Rewarding Learning

Centre Number

71	

Candidate Number

General Certificate of Secondary Education
2010–2011

Science: Single Award (Modular)

Staying Alive
Module 1

Higher Tier

[GSC12]

GSC12

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 six** questions.

INFORMATION FOR CANDIDATES

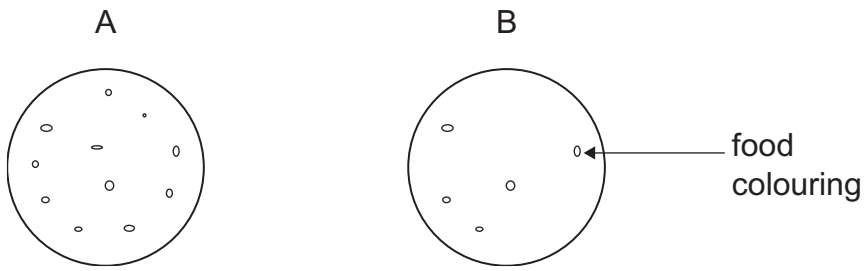
The total mark for this paper is 45.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
Total Marks	

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Examiner Only	
Marks	Remark

1 To investigate their tastebuds two people (A and B) put food colouring on their tongues. A piece of filter paper was then pressed onto the tongue to pick up the colour on the tastebuds. The results are shown below.



(a) (i) State which person (A or B) has the better sense of taste and give a reason for your choice.

_____

_____ [1]

(ii) Give two things that had to be done to ensure these results are valid.

1. _____

2. _____ [2]

(b) A tastebud is an example of a receptor. Name one **effector** in the body.

_____ [1]

(c) The child in the drawing below has just tasted lemon juice and her facial expression shows how sour it was.



Describe the role the brain played in co-ordinating her voluntary response to the sour taste.

_____

_____

_____

_____ [3]

Examiner Only

Marks	Remark

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Examiner Only	
Marks	Remark

2 The table below shows how much energy teenagers need to do certain activities for one hour.

Activity	Energy needed/kJ
sleeping	400
watching TV	600
walking	1200
running	2400

(a) State **two** ways that the body uses energy when sleeping.

_____

_____ [2]

(b) Explain fully why the body uses the greatest amount of energy when running.

_____

_____

_____ [3]

(c) Name the process which releases energy from food and state where it is carried out in the body.

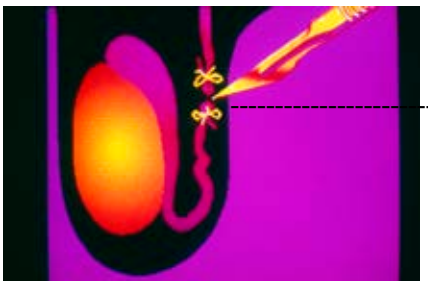
_____

_____ [2]

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Examiner Only	
Marks	Remark

3 The diagram below shows part of the sex organs of a man who has had a vasectomy.



© Mehau Kulyk / Science Photo Library

(a) A vasectomy is one method of birth control; others include condoms and 'the pill'. What general name is given to all birth control methods?

_____ [1]

(b) Describe what is done during a vasectomy and explain how this prevents fertilisation.

_____

_____

_____ [2]

(c) Suggest **two** advantages of using a condom rather than having a vasectomy.

_____

_____ [2]

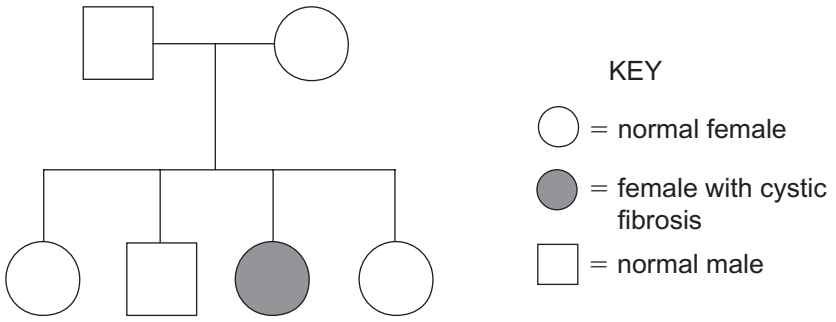
(d) Suggest a reason why some people disapprove of birth control.

_____ [1]

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Examiner Only	
Marks	Remark

4 **(a)** The diagram shows the pedigree of a family in which there is a history of cystic fibrosis.



(i) Using the letter f to represent the cystic fibrosis allele state the genotype of the child with cystic fibrosis.

_____ [1]

(ii) Draw a genetic diagram below to show how these parents can have a child who suffers from cystic fibrosis.

[3]

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Examiner Only	
Marks	Remark

(b) Genetic screening for Down's syndrome is done by examining the chromosomes in foetal cells following amniocentesis which is shown below.



© Monica Schroder / Science Photo Library

State **two** reasons why some parents will choose to have an abortion when there is a diagnosis of Down's syndrome.

_____

_____

_____ [2]

(c) **(i)** Suggest **two** reasons why it is important that the Government passes laws which allow only medical conditions that could be harmful to the baby to be genetically screened.

_____

_____

_____ [2]

(ii) It is important that the Government takes advice on the development of genetic screening. Suggest **one** type of expert whose knowledge will be useful.

_____ [1]

5 Below is a fish tank containing fish and a large plant.

Examiner Only	
Marks	Remark



© Ingram Publishing / Thinkstock

(a) Explain fully why the owner has been bubbling carbon dioxide from a cylinder into the tank.

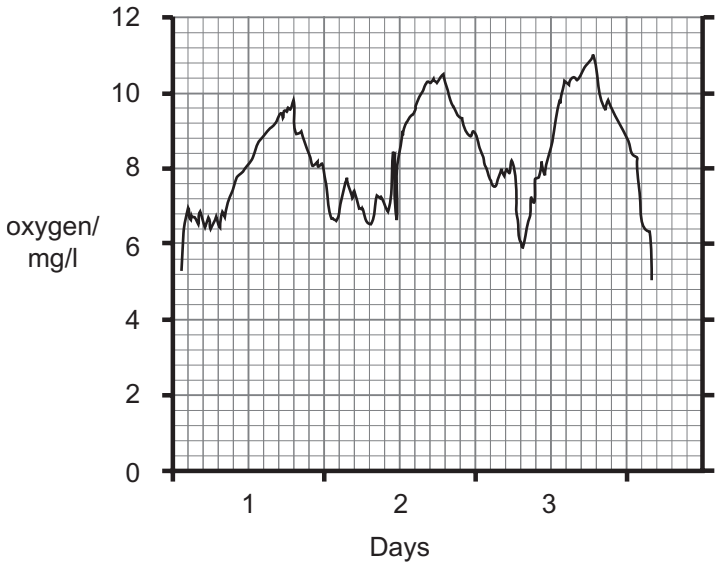
_____

_____

_____ [2]

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The graph below shows the oxygen levels in the fish tank over a 3 day period.



(b) Use the graph and your knowledge to explain fully the pattern of oxygen levels in the fish tank.

_____

_____

_____

_____ [4]

(c) Describe an experiment to show how light intensity affects the rate of photosynthesis.

_____

_____

_____

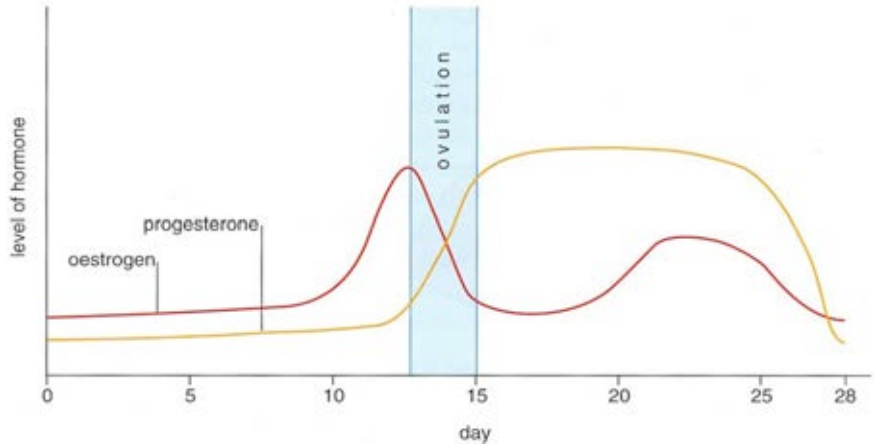
_____ [3]

Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

6 The graph below shows the relative levels of female hormones during the menstrual cycle.



© GCSE Science for CCEA by T Laverty, J Napier & R White, published by Hodder Murray, 2006. Reproduced by permission of Hodder Education.

(a) Use the graph and your knowledge to:

(i) name the hormone which stimulates ovulation.

_____ [1]

(ii) describe how and why menstruation happens.

_____

_____

_____ [3]

(b) Describe the role testosterone plays in preparing the male body for reproduction.

_____

_____

_____ [3]

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Rewarding Learning

General Certificate of Secondary Education
2010–2011

Science: Single Award (Modular)

Staying Alive
Module 1

Higher Tier

[GSC12]

THURSDAY 19 MAY 2011, MORNING

MARK SCHEME

STEMUP.CO.UK

					AVAILABLE MARKS
1	**(a)**	**(i)**	A, most tastebuds		
		(ii)	1. same size area/paper, 2. same place on tongue	[2]	
	(b)		muscle	[1]	
	(c)		received signals, from tongue/tastebuds/receptor, sent signal to face/facial muscles/effector	[3]	7
2	**(a)**		any 2 correct e.g. breathing, heart beating, digestion	[2]	
	(b)		muscles work harder, need more food/oxygen, to respire, or heart, needs to work harder/pump blood faster, to supply muscles *any* 3	[3]	
	(c)		respiration, all body cells	[2]	7
3	**(a)**		contraception/ives	[1]	
	(b)		sperm ducts cut, to stop sperm leaving	[2]	
	(c)		prevents STDs/safe sex, not permanent, no operation	[2]	
	(d)		any correct e.g. beliefs/unnatural/religion	[1]	6
4	**(a)**	**(i)**	ff	[1]	
		(ii)	Parents [2] F1 [1]	[3]	
	(b)		disabled child; worry about coping; not fair on child *any two*	[2]	
	(c)	**(i)**	designer babies, gender imbalance	[2]	
		(ii)	scientists, geneticists or any correct	[1]	9
5	**(a)**		more photosynthesis, increased plant growth	[2]	

	F	f
F	FF	Ff
f	Ff	ff

				AVAILABLE MARKS
	(b)	night – respiration only, no photosynthesis, oxygen levels fall [1] day – photosynthesis exceeds respiration, oxygen levels rise [1] *any* 4	[4]	
	(c)	plant underwater different amounts of light measure oxygen levels/result	[3]	9
6	**(a)** **(i)**	oestrogen	[1]	
	(ii)	fall in progesterone, no pregnancies, lining breaks down	[3]	
	(b)	triggers secondary sexual characteristics/example, develops testes/penis/prostate, production of sperm	[3]	7
			Total	**45**

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Rewarding Learning

Centre Number

71	

Candidate Number

General Certificate of Secondary Education
2010–2011

Science: Single Award (Modular)

Staying Alive
Module 1

Higher Tier

[GSC12]

GSC12

WEDNESDAY 23 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 six** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 45.
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For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
Total Marks	

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Examiner Only	
Marks	Remark

1 **(a)** **(i)** Describe the roles the pancreas and the liver play in keeping blood glucose levels constant.

_____

_____

_____

_____ [3]

(ii) Name the condition which results in the loss of the control of blood glucose levels.

_____ [1]

(b) Cystic fibrosis is an inherited disease.

The gene which causes it (f), is recessive to the normal gene (F).

Complete the genetic diagram below to show how two parents who do not suffer from cystic fibrosis can have a child who does.

		f
F		

[3]

(c) Scientists are trying to clone lungs which would replace lungs damaged by cystic fibrosis. Some people do not agree with cloning. Suggest **one** reason for this.

_____ [1]

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Examiner Only	
Marks	Remark

2 **(a)** The table below shows the cost of treating patients for some medical conditions.

Condition	Cost/£
Diabetes type 1	4000
Knee cartilage operation	2000
Heart attack	20000
Cystic fibrosis	5000

(i) Suggest **two** ways that some of the money is used to treat people with diabetes type 1.

_____

_____ [2]

(ii) Suggest **three** reasons why a knee cartilage condition is the cheapest to treat.

_____

_____

_____ [3]

(b) Apart from the cost of treating heart attacks suggest **two** other ways that they can affect society.

_____

_____ [2]

(c) Explain how regular exercise benefits the circulatory system.

_____

_____

_____ [2]

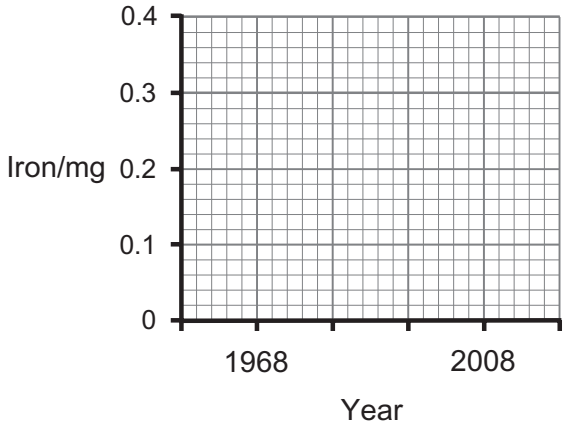
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Examiner Only	
Marks	Remark

3 According to some nutritionists, the mineral content of cheese is less today than it was forty years ago. The table below shows their analysis of two cheeses.

Mineral	Year	Cheddar	Mozzarella
Iron/mg	1968	0.21	0.24
	2008	0.10	0.07
Calcium/mg	1968	210	212
	2008	189	120

(a) (i) Draw a bar chart on the grid below to show how the iron content of both cheeses has changed.



[3]

(ii) Calculate the reduction in iron content for mozzarella cheese between 1968 and 2008.

_____ mg [1]

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(b) (i) For each mineral suggest one way that a low intake may affect human health.

Iron _____ [1]

Calcium _____ [1]

The nutritionists who produced these results make and sell mineral supplements.

(ii) Explain why this might make you question their results.

_____

_____ [2]

Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

4 **(a)** Anorexia and bulimia are both eating disorders.

Give **two** ways in which they are similar and **two** ways in which they are different.

_____

_____

_____

_____ [4]

(b) Suggest **one** occupation that might have a higher than average number of people suffering from bulimia and suggest **one** reason for this.

_____

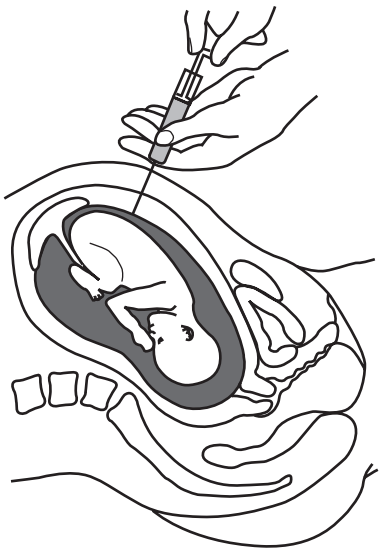
_____

_____ [2]

(c) People who suffer with anorexia and bulimia do not follow government guidelines. Name one other medical condition which may be caused by not following the guidelines on healthy eating.

_____ [1]

5 Jane and Tom are going to become parents for the first time and have decided that Jane should have an amniocentesis test.



(a) Suggest a reason for wanting the test.

_____

_____ [1]

(b) Describe the process of amniocentesis.

_____

_____

_____

_____ [3]

(c) Sometimes the results of genetic screening lead to genetic counselling. Explain why this is necessary.

_____

_____

_____ [2]

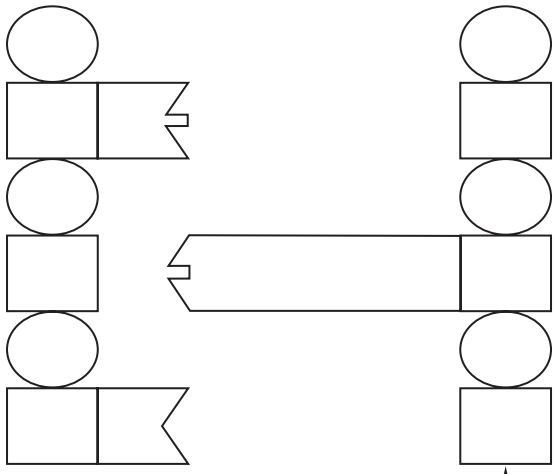
Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

6 **(a)** Below is a partially completed diagram of the structure of DNA.

(i) Complete the diagram by drawing in the missing bases. [1]



(ii) How many different bases does your completed diagram show?

_____ [1]

(iii) State **one** fact that Watson and Crick discovered about these bases.

_____ [1]

(iv) Name **one** other scientist who researched the bases in DNA.

_____ [1]

(b) State how the **base triplet hypothesis** explains the link between the DNA code and the formation of proteins.

_____

_____

_____

_____ [3]

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Rewarding Learning

General Certificate of Secondary Education
2010–2011

Science: Single Award (Modular)

Staying Alive
Module 1

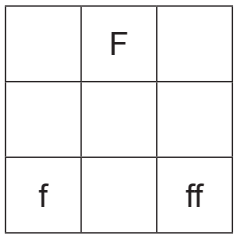
Higher Tier

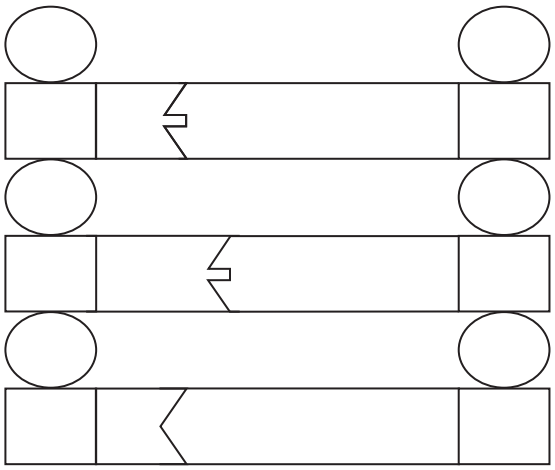
[GSC12]

WEDNESDAY 23 FEBRUARY 2011, MORNING

MARK SCHEME

STEMUP.CO.UK

				AVAILABLE MARKS
1	**(a)**	**(i)**	level rises/pancreas produces insulin/glucose to glycogen/stored in liver Any **three** [3]	
		(ii)	diabetes Type 1 [1]	
	(b)		 Parents F and f [2] F1 ff [1] [3]	
	(c)		Any ethical issue, e.g. religious/unnatural/consequences (designer babies) [1]	8
2	**(a)**	**(i)**	medication (include equipment), therapy/long term complication/ medical staff/hospital stays. Any **two** [2]	
		(ii)	short term, one operation, can be cured/less medication, less serious, easier to treat, less equipment/less staff, less hospital time [3]	
	(b)		cost of benefits, loss of job/emotional cost to families, family takes care/less serious, cost to employers/sick pay [2]	
	(c)		strengthens heart muscle/less chance blockage of clot or heart attack/ more blood pumped/beat less often [2]	9
3	**(a)**	**(i)**	all bars correct [2] 2 or 3 bars correct [1] type of cheese indicated (key) [1] [3]	
		(ii)	0.17 mg [1]	
	(b)	**(i)**	Iron – anaemia lower energy [1] Calcium – rickets/weak bones/osteoporosis [1]	
		(ii)	want to sell product, evidence may not be reliable, biased/not fair. Any **two** [2]	8

				AVAILABLE MARKS
4	**(a)**	Both frightened of being overweight, both can't see bodies way really are, both life threatening, both malnourished, both have dental problems. Any **two** [2] Anorexics starve themselves, bulimics binge eat, anorexics always very underweight, bulimics can be normal weight, anorexics avoid social situations that involve eating, bulimics eat then purge. Any **two** [2]	[4]	
	(b)	models, jockeys, ballet dancers, ice skaters, athletes any implication of **needing** to fit the profile	[2]	
	(c)	heart disease/stroke/diabetes/compulsive eating disorder/obesity	[1]	7
5	**(a)**	family members have **inherited** disease/to find out if baby has **inherited** disease **or** named inherited disease	[1]	
	(b)	needle/syringe into womb/amnion or description [1], amniotic fluid taken out/baby's cells [1] DNA/genes/chromosomes is screened [1]	[3]	
	(c)	baby has illness **or** named inherited problem if test is positive, need reassurance/advice, make decisions (to decide whether to abort or not/about future pregnancies)	[2]	6
6	**(a)**	**(i)** if match (✓) 	[1]	
		(ii) 4	[1]	
		(iii) A–T, C–G	[1]	
		(iv) Chargaff	[1]	
	(b)	sequence of 3 (DNA) bases/codes for 1 type of amino acid/form proteins Any **three**	[3]	7
			Total	**45**

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Rewarding Learning

Centre Number

71	

Candidate Number

General Certificate of Secondary Education
2010–2011

Science: Single Award (Modular)

Staying Alive
Module 1

Higher Tier

[GSC12]

GSC12

TUESDAY 9 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 six** questions.

INFORMATION FOR CANDIDATES

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1	
2	
3	
4	
5	
6	
Total Marks	

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Examiner Only	
Marks	Remark

1 **(a)** Complete the table below by naming a structure in the body that carries out each function.

Function	Name of structure
co-ordinator	
effector	
receptor	

[3]

(b) Explain fully how a reflex action helps to avoid a severe burn if you accidentally touch something hot.

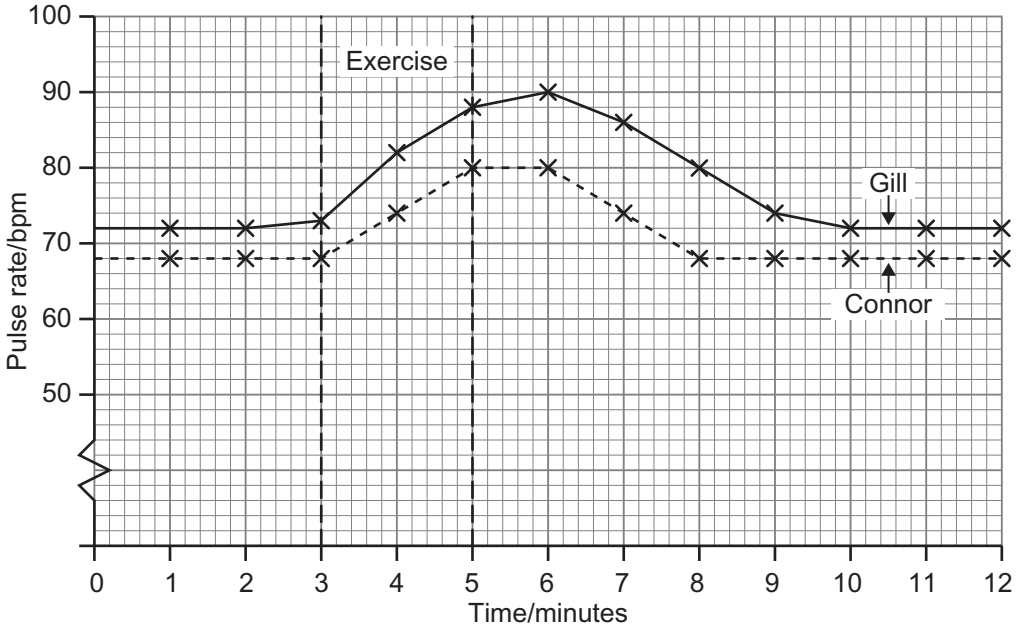
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_____ [2]

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Examiner Only	
Marks	Remark

(c) The graph shows the pulse rate of two 15 year old students before, during and after exercise. Exercise took place from 3–5 minutes.



(i) How many minutes after starting exercise did Gill's pulse rate reach its peak?

_____ minutes [1]

(ii) Which pupil (Gill or Connor) recovered quicker from exercise? Explain your answer.

_____

_____ [1]

(iii) Gill continued to exercise every day for a number of weeks but Connor stopped exercising. Suggest how this would affect their recovery rates.

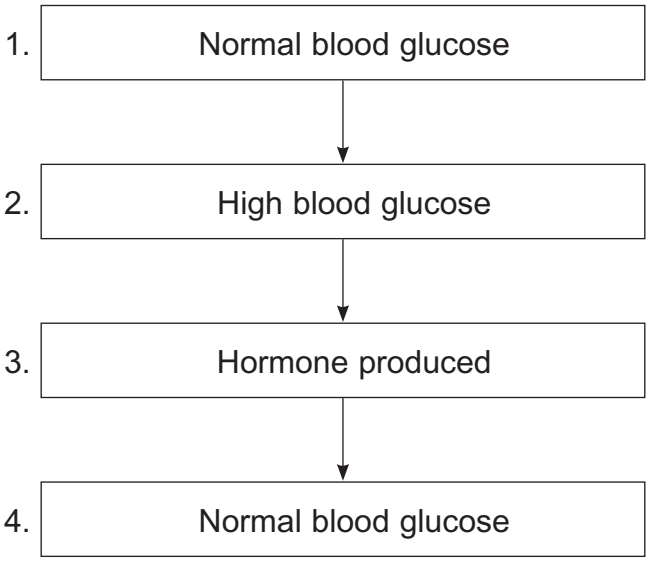
_____

_____ [1]

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Examiner Only	
Marks	Remark

2 The flow chart below shows some stages in the control of blood glucose levels.



(a) (i) Suggest what happened between stages 1 and 2 to increase the person's blood glucose level.

_____ [1]

(ii) Name the hormone produced at stage 3 and describe how it works to reduce glucose levels.

_____

_____

_____ [3]

(b) The number of people suffering from Type 2 diabetes is increasing.

(i) Suggest **two** reasons for this.

_____

_____

_____ [2]

(ii) State **one** difference between Type 1 diabetes and Type 2 diabetes.

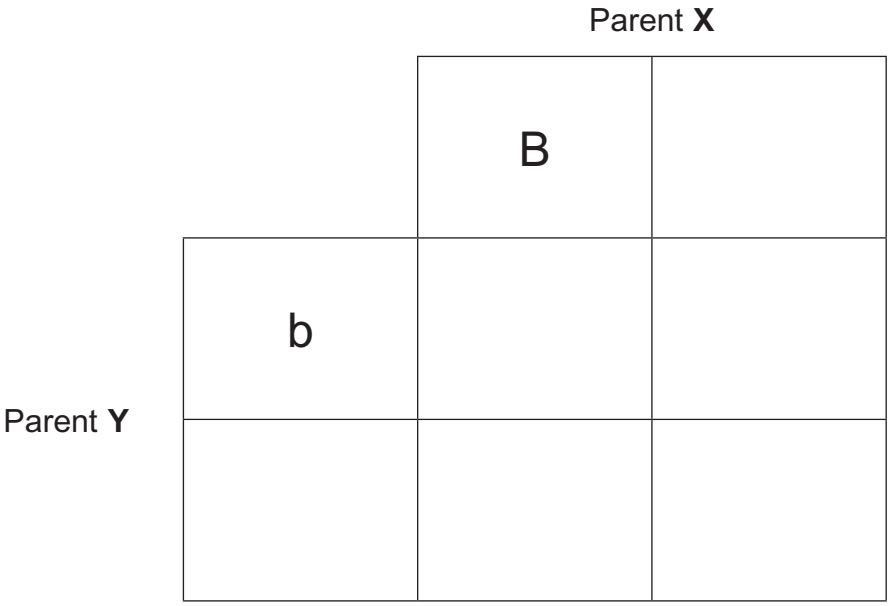
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_____ [1]

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Examiner Only	
Marks	Remark

3 **(a)** **(i)** Parent **X** is heterozygous for brown eyes and Parent **Y** is homozygous for blue eyes. Using 'B' to represent the allele for brown eyes and 'b' the allele for blue eyes complete the Punnett square below.



[2]

(ii) What phenotype will the genotype Bb give?

_____ [1]

(iii) What percentage of the children are likely to have the genotype Bb?

_____ [1]

(b) Doctors can now diagnose genetic abnormalities in babies before they are born. This is called genetic screening. State **one** advantage and **one** disadvantage of genetic screening.

_____

_____

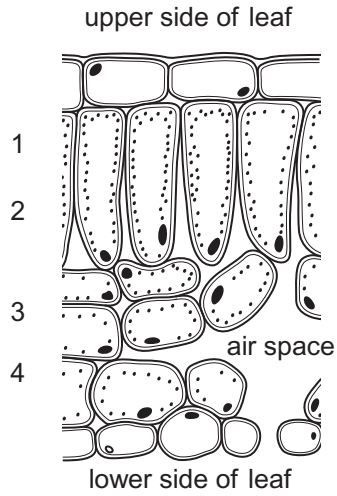
_____

_____ [2]

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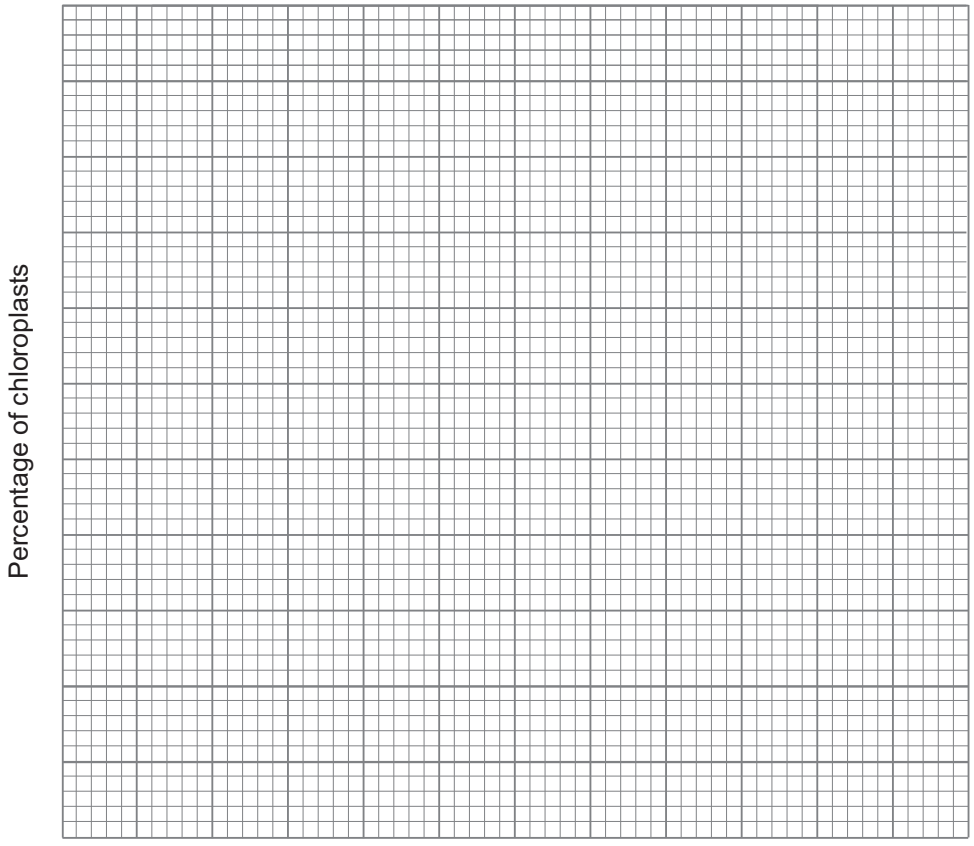
Examiner Only	
Marks	Remark

4 **(a)** Below is a diagram of a section through a leaf and the percentage of chloroplasts in the different regions of a leaf.



Region of leaf	Percentage of chloroplasts
1	42
2	36
3	14
4	8

(i) Scale the grid below and draw a bar chart of these results.



[3]

(ii) Describe the trend shown by the results.

_____

_____ [1]

(iii) Explain fully the reason for this trend.

_____

_____

_____ [2]

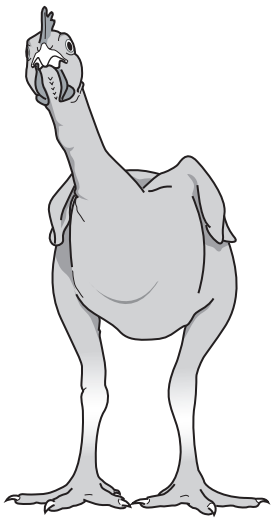
(b) Write the word equation for the process of photosynthesis below.

[2]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

5 **(a)** Scientists have bred a controversial fast growing, featherless chicken which is shown below.



(i) In terms of respiration, explain why the fast growing chicken will need more food per day than a normal chicken.

_____

_____

_____ [2]

(ii) Suggest **two** advantages of this breed for chicken farmers.

_____

_____ [2]

(iii) Suggest a reason why some people may not agree with breeding animals like this.

_____ [1]

(b) Some of the plants that we eat have had their genes changed. Name this process and state **two** advantages.

_____

_____

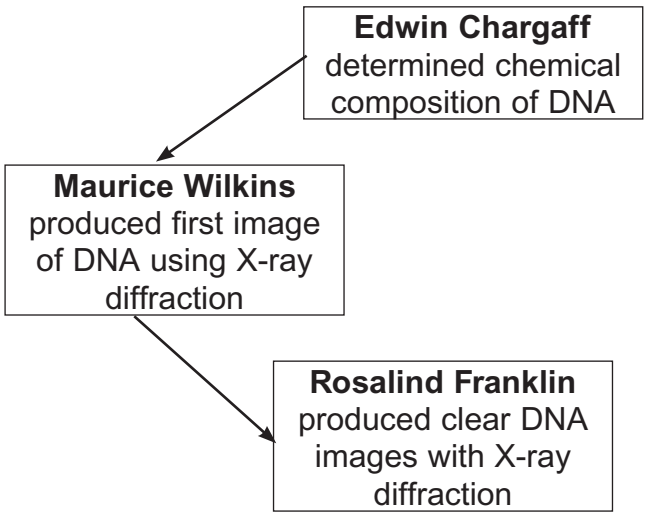
_____

_____ [3]

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Examiner Only	
Marks	Remark

6 **(a)** The diagram below shows some of the steps which led to the discovery of the structure of DNA.



Name the two scientists who built on Franklin's discovery.
Name the process they used and state what they discovered about DNA structure.

_____

_____

_____ [3]

(b) Draw a short, labelled length of DNA to show how the different components including the bases link together.

[3]

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(c) Explain the base triplet hypothesis.

Examiner Only	
Marks	Remark

_____

_____

_____ [2]

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110951

Rewarding Learning

General Certificate of Secondary Education
2010–2011

Science: Single Award (Modular)

Staying Alive
Module 1

Higher Tier

[GSC12]

TUESDAY 9 NOVEMBER 2010, AFTERNOON

MARK SCHEME

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				AVAILABLE MARKS
1	**(a)**	brain/spinal cord; muscle; any correct example of receptor	[3]	
	(b)	brain not control/spinal cord is, faster, shorter pathway	[2]	
	(c)	**(i)** 3	[1]	
		(ii) Connor 2 mins whereas Gill is 3 mins	[1]	
		(iii) Gill gets shorter and Connor's increases in length	[1]	8
2	**(a)**	**(i)** had a meal	[1]	
		(ii) insulin; causes liver; to absorb glucose; stores as glycogen; increases respiration	[3]	
	(b)	**(i)** Any **two:** more processed/junk food; more obesity; less exercise	[2]	
		(ii) age of onset/treatment	[1]	7
3	**(a)**	**(i)**		

		b
	Bb	bb
b	Bb	bb

parent correct – [1]
F1 – [1](sequential)

50% brown

[2]

		(ii) brown	[1]	
		(iii) 50% (sequential)	[1]	
	(b)	Early treatment/parents can be prepared/will know parental dilemma/safety	[2]	6
4	**(a)**	**(i)** correct scaling of each axis [1] × 2 = [2] all bars correct [1]	[3]	
		(ii) amount of chloroplasts decrease as layers increase	[1]	
		(iii) less sunlight, less chlorophyll/more chlorophyll, traps more light	[2]	
	(b)	carbon dioxide + water ⟶ sugar + oxygen $[\frac{1}{2}]$ each ([–1] if No/incorrect + and arrows)	[2]	8

					AVAILABLE MARKS
5	**(a)**	**(i)**	food provides energy; growth needs energy; energy from respiration (two from three); needs more energy	[2]	
		(ii)	easier/cheaper to process/more meat/more money/quicker process	[2]	
		(iii)	ethical reason/safety fears	[1]	
	(b)		genetic engineering or G.M., disease could be prevented/desirable characteristics selected/increased genetic diversity/crop example	[3]	8
6	**(a)**		Watson + Crick, modelling, double helix/base links	[3]	
	(b)		correct drawing + labels	[3]	
	(c)		3 bases, code for one amino acid	[2]	8
				Total	**45**

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GCSE

Science: Single Award (Modular)

End of Module Tests

May 2010

Mark Schemes

Issued: October 2010

Rewarding Learning

General Certificate of Secondary Education
2009–2010

Science: Single Award (Modular)

Staying Alive
Module 1

Higher Tier

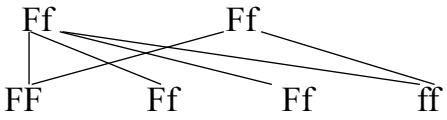
[GSC12]

THURSDAY 20 MAY 2010, MORNING

MARK SCHEME

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				AVAILABLE MARKS
1	**(a)**	**(i)** 40	[1]	
		(ii) 125 Very poor Allow 121+	[1]	
		(iii) Exercise (more) no ref. to diet/genetic/illness Stronger heart	[1]	
	(b)	**(i)** Stop smoking/reduce stress/exercise more/not alcohol	[1]	
		(ii) Any valid (must relate to **(b)(i)**) Happy with lifestyle/can't be bothered	[1]	5
2	**(a)**	**(i)** high in fat, high in energy/calories Stored as fat – any **two**	[2]	
		(ii) Balanced diet [1] – 1 mk, high in vitamins [1] Any one 1 mk to keep healthy (named problem) [1] reduce risk of heart attack [1]	[2]	
	(b)	iron, red (blood) cells	[2]	
	(c)	bulimia – binge eating/vomiting	[1]	7
3	**(a)**	**(i)** Pedigree mk as Punnet		



F1 only shown [1]

or

	F	f
F	FF	Ff
f	Ff	ff

Parents [1] each
2 × [1] =[2]
F1 [1]

c.mk.
(poss 2 mks)

[3]

		(ii) higher cost/not accepted/life expectancy/threat to life	[2]	
	(b)	egg cell, haploid	[2]	7

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				AVAILABLE MARKS
4	(a)	(i)	Carbon dioxide + Water ⟶ Glucose/food/sugar Any order 3 for [2] 1/2 for [1] [2]	
		(ii)	decrease, photosynthesis slows, less light only if linked to photosynthesised [2]	
		(iii)	so oxygen can be seen [1]	
	(b)		upper part of leaf so (more) light/unless qualified [2]	
	(c)		uses oxygen or produces carbon dioxide [1] uses glucose or release energy [1] (Only accept reverse if process specified) Any relation to equation [2]	9
5	(a)		liver no longer reacts to insulin; so glucose not converted to glycogen [2]	
	(b)		short term; still passed on to next generation [2]	
	(c)		pancreas; cells can't produce insulin/glucose not stored in liver/muscles [2]	
	(d)		variation that promotes resistance being inherited more/more sugary (processed) food available/obesity or less exercise [1] Internet/medical/surveys [1] [2]	8
6	(a)		stimulus in foot/pain; spinal cord; through sensory neurone; relay neurone; motor neurone; muscle contracts any **four** [4]	
	(b)		protection/speed [1]	5
7	(a)		Wilkins, Franklyn [2]	
	(b)		bases/base pairs only [1]	
	(c)		6 [1]	4
			Total	**45**

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Centre Number

71	

Candidate Number

General Certificate of Secondary Education
2009–2010

Science: Single Award (Modular)

Staying Alive
Module 1
Higher Tier

[GSC12]

GSC12

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 six** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 45.
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	
Total Marks	

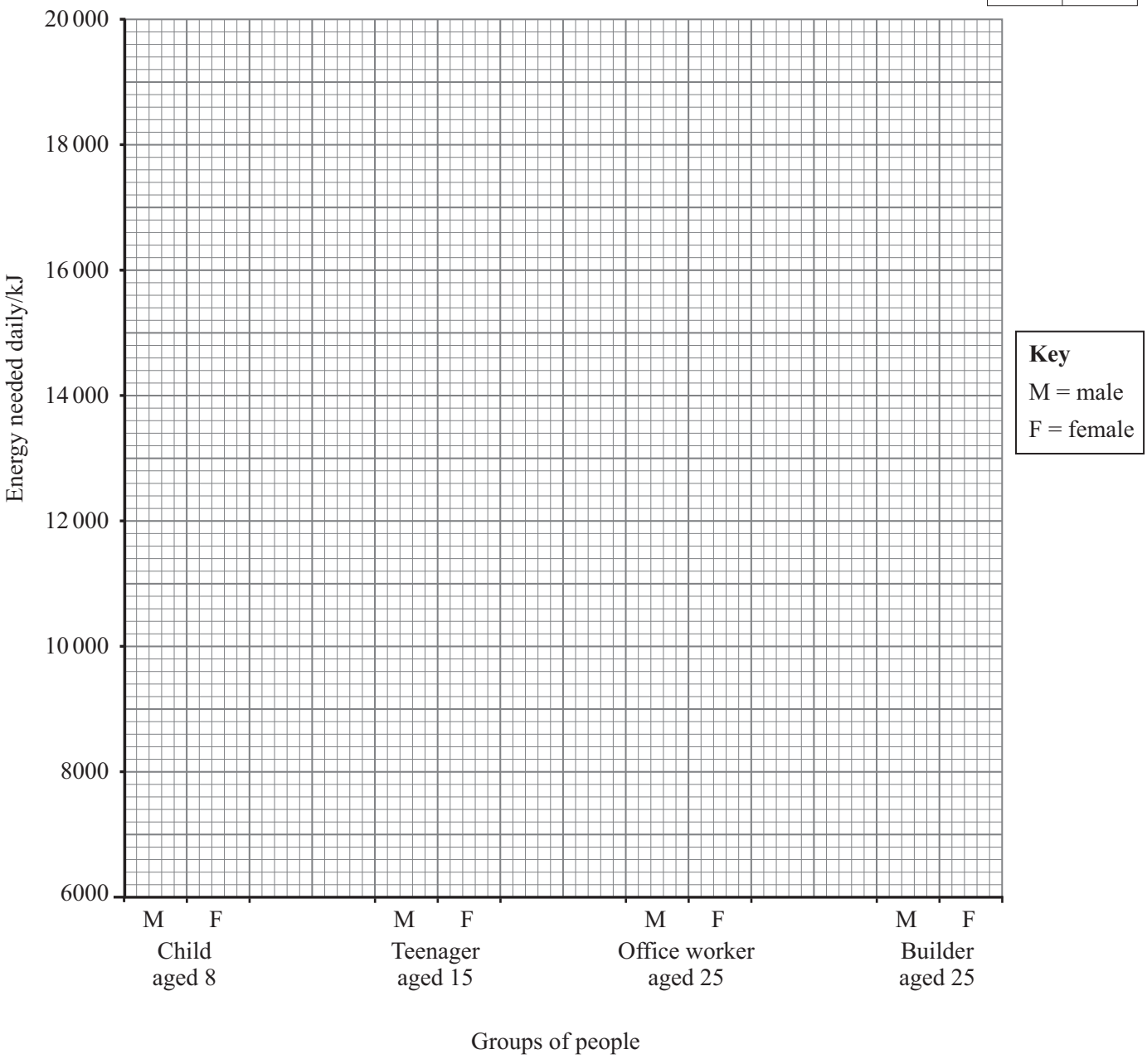
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Examiner Only	
Marks	Remark

1 **(a)** The table below shows the daily amount of energy needed by different groups of people.

	Energy needed daily/kJ	
Groups of people	**Male**	**Female**
Child aged 8	8800	8800
Teenager aged 15	12 600	9600
Office worker aged 25	11 600	9500
Builder aged 25	20 000	12 600

(i) Draw a **bar chart** of these energy needs on the grid below. [2]



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(ii) Describe and explain the difference in the amount of energy needed daily by the male office worker and the male builder.

_____

_____

_____[2]

(b) Below is some of the equipment you would use to compare the amount of energy in crisps to the amount of energy in shredded wheat.

boiling tubes : stand : measuring cylinder :

forceps : Bunsen burner : thermometer

Describe how you would carry out this experiment.

Your answer should include **one** thing done to make the results valid. (fair test)

_____

_____

_____

_____

_____

_____[4]

Examiner Only

Marks	Remark

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Examiner Only	
Marks	Remark

2 **(a)** In a TV advertisement for Flora Buttery a chef said "most people prefer the taste of Flora to that of Lurpak Lighter Spreadable".



© *"Flora and Flora Buttery are trade marks of Unilever Plc. Image reproduced with their kind permission"*



© *Arla Foods Ltd*

Small print at the bottom of the screen then states:

"Out of 200 people surveyed, 48% preferred Flora Buttery, 45% Lurpak Lighter Spreadable, 7% had no preference".

(i) Calculate how many more people preferred Flora to Lurpak. Show your working out.

_____ [2]

The Advertising Standards Agency (ASA) concluded that the advertisement was "likely to mislead".

(ii) Use this information to suggest **two** reasons why the ASA reached this conclusion.

_____

_____

_____

_____[2]

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(iii) Give **one** reason why people with heart disease should use these products sparingly.

_____

_____[1]

(b) Another common disease in the UK is diabetes Type 2.

(i) Give **two** reasons why the number of young people with diabetes Type 2 is increasing.

_____

_____

_____[2]

(ii) Apart from heart disease, give **one** long-term medical problem (complication) associated with untreated or poorly controlled diabetes.

_____[1]

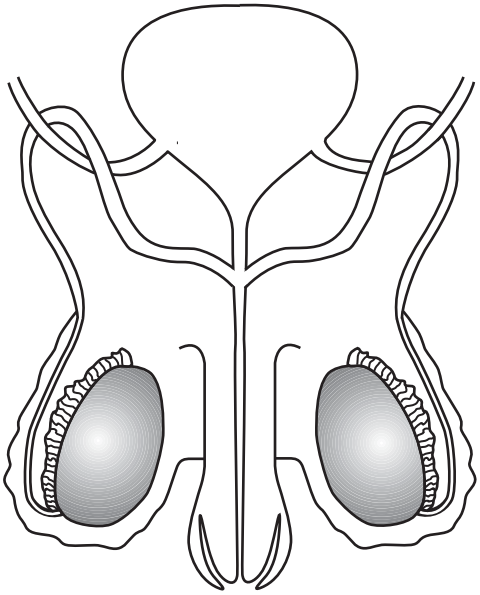
Examiner Only

Marks	Remark

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Examiner Only	
Marks	Remark

3 Below is a diagram of the male reproductive system, but it does not show the prostate gland.



© Illustrated Biology by BS Beckett, published by Oxford University Press, 1978, ISBN 0199140448

(a) (i) Draw the prostate gland on the diagram above. [1]

(ii) Fully describe the function of the prostate gland.

_____

_____[2]

(iii) Suggest a reason why males have two testes.

_____[1]

(b) Name and describe the procedure involved during a male sterilisation operation.

_____

_____[2]

(c) Suggest **two** reasons why some people do not approve of using contraceptive methods.

_____

_____[2]

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Examiner Only	
Marks	Remark

4 **(a)** Explain fully why regular exercise makes the heart stronger.

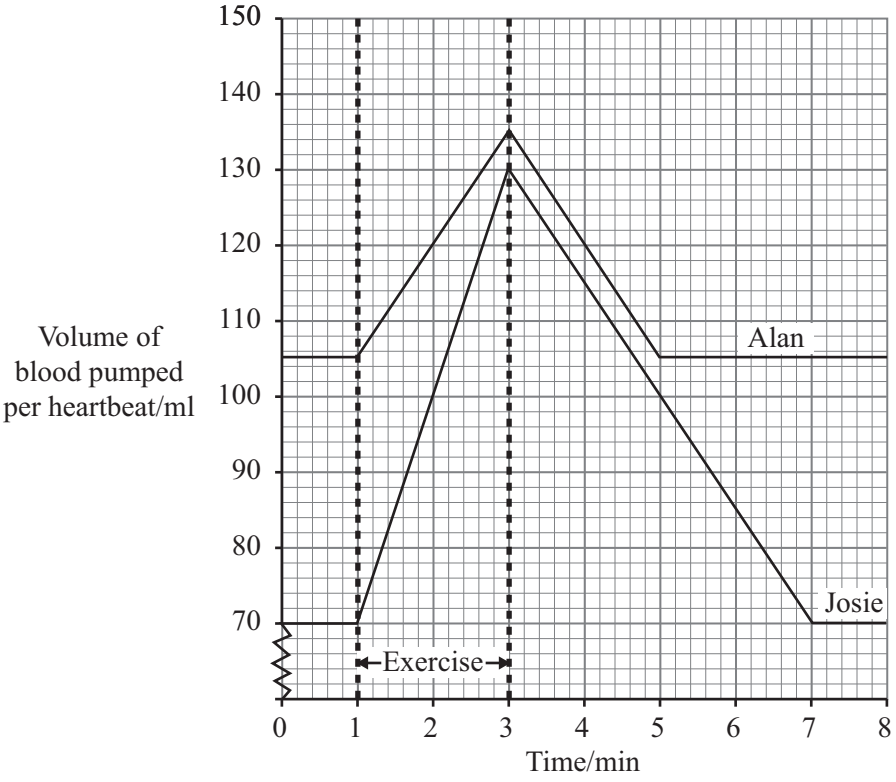
_____

_____

_____

_____ [3]

(b) The graph below compares the volume of blood pumped per heartbeat for Alan and Josie over a period of eight minutes.



(i) Calculate the volume of **extra** blood that was pumped per heartbeat by Josie at the end of the exercise.

_____ ml [1]

(ii) State **two** pieces of evidence shown in the graph which suggests that Alan has a stronger heart than Josie.

_____

_____

_____

_____ [2]

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Examiner Only	
Marks	Remark

5 **(a)** The relative percentage of the bases in DNA of different organisms are shown in the table below.

	Percentage of bases			
Organism	**A**	**G**	**T**	**C**
Chicken	28	22	28	22
Rat	29	21	29	21
Human	30	20	30	20
Octopus		19	31	

(i) What pattern for the percentage of bases is shown by the first three organisms?

_____

_____ [1]

(ii) Complete the table by adding in the percentages of base A and base C in octopus DNA. [1]

(iii) Name the structures that DNA is packaged into in the nucleus.

_____ [1]

(iv) How do the DNA 'packages' in a sperm cell differ from other body cells?

_____ [1]

(b) Two of the different lines of evidence that led to scientists identifying the structure of DNA relied on the processes of X-ray diffraction and modelling. For each process, state the names of the scientist(s) using them and describe the evidence they produced.

X-ray diffraction _____

_____

Modelling _____

_____ [4]

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Examiner Only	
Marks	Remark

6 **(a)** Photosynthesis is a key process which is essential for life.

(i) Explain fully the above statement.

_____

_____

_____[3]

(ii) Name **two** raw materials needed for photosynthesis and state where the plant obtains each one from.

_____

_____

_____

_____[2]

(b) Describe the main differences between the processes of photosynthesis and respiration.

_____

_____

_____[2]

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GCSE

Science: Single Award (Modular)

March 2010

Mark Schemes

Issued: May 2010

Rewarding Learning

General Certificate of Secondary Education
2009 – 2010

Science: Single Award (Modular)

Staying Alive
Module 1
Higher Tier

[GSC12]

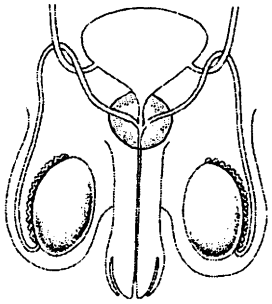
WEDNESDAY 24 FEBRUARY, MORNING

MARK SCHEME

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					AVAILABLE MARKS
1	**(a)**	**(i)**	All 8 bars correct [2] 6/7 correct [1] less 6 [0]	[2]	
		(ii)	builder needs more; as more active gives numbers	[2]	
	(b)		measure out water record starting temperature/set food alight using BB/ place under the water in the boiling tube/calculate rise in temp [3] max. Same water volume/food held same distance from water/ same food mass/repeat [1] max. burn for same time	[4]	8
2	**(a)**	**(i)**	3% [1]; 6 [2] gives Flora 96, Lurpak 90 Allow in correct order	[2]	
		(ii)	Ad implies that a lot of people preferred Flora but only small amount actually did/more people showed no preference/ not many preferred Flora not much difference only small numbers/small print (Any **two**) 7% showed no pref/could have been Lurpak Lot buying Lurpak as well More/7% liked either	[2]	
		(iii)	High in fat/cholesterol	[1]	
	(b)	**(i)**	Any **two** from: Increasing obesity/less exercise/ more processed or sugary foods fast food	[2]	
		(ii)	Blood pressure/blindness/kidney failure/amputation	[1]	8

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		AVAILABLE MARKS
3 **(a)** **(i)**  [1]		
© Illustrated Biology by BS Beckett, published by Oxford University Press, 1978, ISBN 0199140448		
(ii) adds fluid to sperm/so can swim to egg/to form semen/ sperm can flow (Any **two**) [2]		
(iii) reserve [1]		
(b) Vasectomy/sperm ducts cut or cut near testes/tubes (7) [2]		
(c) Unnatural Religious; ethical; encourage promiscuity (Any **two**) Safety sided effects/stops life/implied – people think as abortion/ don't think it's right [2]		8
4 **(a)** More vol blood pumped (7) increases cardiac output (7) increases demand for energy more respiration/more food or oxygen/more blood around body to body cells **heart muscle** used more/strengthened [3]		
(b) **(i)** 60ml [1]		
(ii) Any **two** from: higher volume pumped at rest/is higher/ less extra blood needed/shorter recovery time/ Alan's didn't rise as much [2]		6

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					AVAILABLE MARKS
5	**(a)**	**(i)**	A same as T – 1:1 increase by 1 C same as G – 1:1 decrease by 1 [1]		
		(ii)	A = 31 C = 17 [1]		
		(iii)	chromosomes or genes [1]		
		(iv)	23 chromosomes half the (chromosomes) if above genes (7) [1]		
	(b)		Wilkins and or Franklin/helical shape and or bases inside [2] Watson and or Crick/double helix and or bases paired [2] [4]		8
6	**(a)**	**(i)**	Light traps energy/in glucose/makes food/transferred to animals/ by feeding/implication of animals able to live because of it/ gives us oxygen (Any **three**) [3]		
		(ii)	Carbon dioxide through stomata/from air [1]; water through root hairs/from soil/when rains [1]		[2]
	(b)		Reverse or example e.g. uses CO_2 releases CO_2 [1] Respiration releases energy and Photosynthesis uses energy [1] produce food a store of energy ref. to time day anytime [2]	7	
				Total	**45**

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