Version 1.0

General Certificate of Secondary Education (GCSE)
November 2012

Science B SCB2HP

(Specification 4500)

Unit 2: My Family and Home

Final M/S

Mark Scheme

Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all examiners participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for standardisation each examiner analyses a number of students' scripts: alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, examiners encounter unusual answers which have not been raised they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

MARK SCHEME

Information to Examiners

1. General

The mark scheme for each question shows:

- the marks available for each part of the question
- the total marks available for the question
- the typical answer or answers which are expected
- extra information to help the Examiner make his or her judgement and help to delineate what is acceptable or not worthy of credit or, in discursive answers, to give an overview of the area in which a mark or marks may be awarded.

The extra information is aligned to the appropriate answer in the left-hand part of the mark scheme and should only be applied to that item in the mark scheme.

At the beginning of a part of a question a reminder may be given, for example: where consequential marking needs to be considered in a calculation; or the answer may be on the diagram or at a different place on the script.

In general the right-hand side of the mark scheme is there to provide those extra details which confuse the main part of the mark scheme yet may be helpful in ensuring that marking is straightforward and consistent.

2. Emboldening

2.1 In a list of acceptable answers where more than one mark is available 'any **two** from' is used, with the number of marks emboldened. Each of the following bullet points is a potential mark.

2.2 A bold **and** is used to indicate that both parts of the answer are required to award the mark.

2.3 Alternative answers acceptable for a mark are indicated by the use of **or**. Different terms in the mark scheme are shown by a / ; eg allow smooth / free movement.

3. Marking points

3.1 Marking of lists

This applies to questions requiring a set number of responses, but for which candidates have provided extra responses. The general principle to be followed in such a situation is that 'right + wrong = wrong'.

Each error / contradiction negates each correct response. So, if the number of error / contradictions equals or exceeds the number of marks available for the question, no marks can be awarded.

However, responses considered to be neutral (indicated as * in example 1) are not penalised.

Example 1: What is the pH of an acidic solution? (1 mark)

Candidate	Response	Marks awarded
1	green, 5	0
2	red*, 5	1
3	red*, 8	0

Example 2: Name two planets in the solar system. (2 marks)

Candidate	Response	Marks awarded
1	Neptune, Mars, Moon	1
2	Neptune, Sun, Mars, Moon	0

3.2 Use of chemical symbols / formulae

If a candidate writes a chemical symbol / formula instead of a required chemical name, full credit can be given if the symbol / formula is correct and if, in the context of the question, such action is appropriate.

3.3 Marking procedure for calculations

Full marks can be given for a correct numerical answer, without any working shown.

However, if the answer is incorrect, mark(s) can be gained by correct substitution / working and this is shown in the 'extra information' column or by each stage of a longer calculation.

3.4 Interpretation of 'it'

Answers using the word 'it' should be given credit only if it is clear that the 'it' refers to the correct subject.

3.5 Errors carried forward

Any error in the answers to a structured question should be penalised once only.

Papers should be constructed in such a way that the number of times errors can be carried forward are kept to a minimum. Allowances for errors carried forward are most likely to be restricted to calculation questions and should be shown by the abbreviation e.c.f. in the marking scheme.

3.6 Phonetic spelling

The phonetic spelling of correct scientific terminology should be credited **unless** there is a possible confusion with another technical term.

3.7 Brackets

(…..) are used to indicate information which is not essential for the mark to be awarded but is included to help the examiner identify the sense of the answer required.

3.8 Ignore / Insufficient / Do <u>not</u> allow

Ignore of insufficient is used when the information given is irrelevant to the question or not enough to gain the marking point. Any further correct amplification could gain the marking point.

Do **not** allow means that this is a wrong answer which, even if the correct answer is given, will still mean that the mark is not awarded.

Quality of Written Communication and levels marking

In Question 2 candidates are required to produce extended written material in English, and will be assessed on the quality of their written communication as well as the standard of the scientific response.

Candidates will be required to:

- use good English
- organise information clearly
- use specialist vocabulary where appropriate.

The following general criteria should be used to assign marks to a level:

Level 1: basic

- Knowledge of basic information
- Simple understanding
- The answer is poorly organised, with almost no specialist terms and their use demonstrating a general lack of understanding of their meaning, little or no detail
- The spelling, punctuation and grammar are very weak.

Level 2: clear

- Knowledge of accurate information
- Clear understanding
- The answer has some structure and organisation, use of specialist terms has been attempted but not always accurately, some detail is given
- There is reasonable accuracy in spelling, punctuation and grammar, although there may still be some errors.

Level 3: detailed

- Knowledge of accurate information appropriately contextualised
- Detailed understanding, supported by relevant evidence and examples
- Answer is coherent and in an organised, logical sequence, containing a wide range of appropriate or relevant specialist terms used accurately.
- The answer shows almost faultless spelling, punctuation and grammar.

COMPONENT NUMBER: SCB2HP

COMPONENT NAME: My Family and Home

SERIES: November 2012

question	answer	extra information	mark
1(a)(i)	steel is second strongest steel is cheapest/cheaper	Allow strong Must be comparative either order	1 1
1(a)(ii)	**advantages:** lighter **or** less dense **disadvantages:** aluminium is not as good a conductor **or** aluminium is not as strong as copper	accept cheaper	1 1
1(b)(i)	(ceramic is) a good electrical insulator **or** does not conduct electricity **or** is a poor conductor of electricity		1
1(b)(ii)	ceramic is brittle	Accept breaks easily	1
1(c)	Correct answer with or without working gains 3 marks 11 discs counted 165 ÷ 11 = 15 kV per disc 390 ÷ 15 = 26 discs	accept 165 ÷ their 11 correctly calculated for **1** mark* allow ecf * any order	 1 1 1
1(d)	Step down transformer	Do not allow step up transformer	1
Total			**10**

COMPONENT NUMBER: SCB2HP

COMPONENT NAME: My Family and Home

SERIES: November 2012

question	answer	extra information	mark

2

Marks awarded for this answer will be determined by the Quality of Written Communication (QWC) as well as the standard of the scientific response. Examiners should also refer to the information on page 5, and apply a 'best-fit' approach to the marking.

0 marks	Level 1 (1–2 marks)	Level 2 (3–4 marks)	Level 3 (5–6 marks)
No relevant content	The student's account is brief and incomplete.	The student's account is lacking in some detail. Some technical terms are used and explained correctly	The student's account is essentially correct and is in a logical sequence. A number of technical terms have been used correctly

examples of the points made in the response	extra information
• Homeostasis/negative feedback	
• Exercise makes the athlete hot/raises her temperature	
• Response is to increase heat loss	Allow to cool the body down
• Correct reference to thermoregulatory centre/temperature sensors inside the brain	
• Dilation/vasodilation of blood vessels supplying the skin (capillaries)	Mention of veins/capillaries dilating is incorrect
• More blood flowing near body surface/skin	
• More heat lost by radiation from skin	
• (More) sweating	
• (More) heat lost as sweat evaporates	Allow 'more heat lost' without explanation once only
• so body temperature falls	
• Hairs lie flat (to increase heat loss by convection)	

Total			6

COMPONENT NUMBER: SCB2HP

COMPONENT NAME: My Family and Home

SERIES: November 2012

question	answer	extra information	mark
3(a)	hydrochloric acid enzymes / protease	either order	1 1
3(b)	oxides carbonates	either order accept bicarbonate	1 1
3(c)	$H^+ + OH^- \rightarrow$ H_2O	or $OH^- + H^+$ ignore state symbols	1 1
Total			**6**

COMPONENT NUMBER: SCB2HP

COMPONENT NAME: My Family and Home

SERIES: November 2012

Question 2 continued

question	answer	extra information	mark
4(a)	homeostasis		1
4(b)	the body systems react to reverse the change from normal conditions	owtte	1
4(c)	insulin removes glucose from blood		1
	converts glucose to glycogen	must be correct spelling	1
	glucagon converts glycogen to glucose	must be correct spelling	1
	puts glucose into blood		1
	correct reference to liver		1
Total			**7**

COMPONENT NUMBER: SCB2HP

COMPONENT NAME: My Family and Home

SERIES: November 2012

question	answer	extra information	mark
5(a)(i)	40 / 100 × 35 = 14	correct answer with or without working gains **2** marks	1 1
5(a)(ii)	0.32 **or** 0.64 provided that working shows 28MJ as the starting point.	Correct answer with or without marking If answer incorrect 16/20 x 14= 11.2 **or** **16** /20 x 14 correctly calculated **or** their **16** /20x28 correctly calculated gains 1 mark and 11.2/35 **or** 22.4/35 **or** their 11.2/35 correctly calculated **or** their 22.4/35 correctly calculated gains 1 mark ecf from **5(a)(i)** ie correct calculation from their answer to **5(a)(i)** gains **3** marks	3
5(a)(iii)	C_5H_{12} + **$8O_2$** → **$5CO_2$** + **$6H_2O$** all formulae correct balancing correct	Formulae on correct sides of equation 2 formulae correct for **1** mark capitals and subscripts must be clearly correct.	 2 1
5(b)(i)	• Any two from • Mpg goes up then down • Mpg increases to 40mph/at first • Mpg decreases after 58mph • Mpg best between 38 and 58 mph	Allow converse answers in terms of fuel used where appropriate	2

Question 5 continues on the next page …

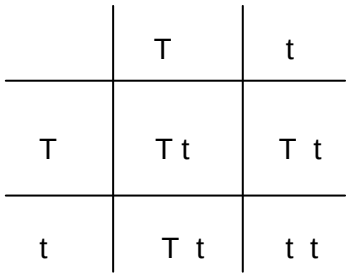
Question 5 continued…

question	answer	extra information	mark
5(b)(ii)	• higher speed uses more fuel • more expense • fuel non-renewable **or** more fuel use means more pollution		1 1 1
Total			**13**

COMPONENT NUMBER: SCB2HP

COMPONENT NAME: My Family and Home

SERIES: November 2012

question	answer	extra information	mark
6(a)	any **four** from: • need a bigger group • should all be the same sex • should all be the same age • should be the same ethnicity • should have a similar social background		4
6(b)	height the idea that food has an effect on growth	The idea of nutritional deficiency essential for second mark. 'environmental factors' is insufficient	1 1
6(c)(i)		Man genotype correct Woman genotype correct Progeny all correct Allow 1 mark for progeny from their parental genotypes.	1 1 1
6(c)(ii)	0.25 / 25% / ¼ / 1:3	not 1:4 or 3:1	1
6(c)(iii)	Punnett square just shows probability. Genotype of children is down to chance each time	answer shows understanding of chance or randomness in production of progeny genotype each time.	1
Total			**11**

COMPONENT NUMBER: SCB2HP

COMPONENT NAME: My Family and Home

SERIES: November 2012

question	answer	extra information	mark
7(a)	radio waves microwaves visible light ultraviolet gamma rays	all correct deduct **1** mark for each movement needed to correct order	3
7b(i)	the number of waves per second		1
7(b)(ii)	higher frequency shorter wavelength the higher the frequency the higher the energy the shorter the wavelength the higher the energy	In each case accept the converse	1 1 1
Total			**7**