GCSE

Further Additional Science

FAS1HP

Mark scheme

4410

June 2015

Version: 1.0 Final

Mark schemes are prepared by the Lead Assessment Writer 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 associates 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 associate understands and applies it in the same correct way. As preparation for standardisation each associate 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, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Assessment Writer.

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.

Further copies of this Mark Scheme are available from aqa.org.uk

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 Assessment Objectives and specification content that each question is intended to cover.

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 and underlining

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.

2.4 Any wording that is underlined is essential for the marking point to be awarded.

3. Marking points

3.1 Marking of lists

This applies to questions requiring a set number of responses, but for which students 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)

Student	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)

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

3.2 Use of chemical symbols / formulae

If a student 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 is 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 or insufficient are 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(c) students 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.

Students 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.

Question	Answers	Extra information	Mark	AO / Spec. Ref.
1(a)(i)	fungus		1	AO1 344d
1(a)(ii)	oxygen / O_2	accept air accept O_2 do **not** allow O^2/ O / O2	1	AO2 344d
1(a)(iii)	glucose (syrup)	allow carbohydrate / sugar ignore food / starch allow oxygen if oxygen / air not given in (a)(ii)	1	AO1 344d
1(b)	any **two** from: • quicker • suitable for vegetarians • cheaper • more efficient **or** less land / methane	ignore high in protein ignore sustainability unqualified ignore less pollution unqualified allow less animals harmed / killed allow food chain is shorter **or** has less trophic levels allow less energy lost (from the food chain) do **not** allow no energy lost allow low(er) in calories (than some meat) allow low(er) in fat / healthier (than some meat) allow source of fibre / prevent constipation	2	AO3 344a/d
Total			**5**	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
2(a)	any **two** from: • carbon dioxide / CO_2 • urea • protein • water / H_2O • hormones / insulin	ignore food / waste / alcohol / drugs / enzymes ignore glucose and oxygen allow **two** correct hormones for 2 marks allow **two** correct food components for 2 marks allow antibodies allow antitoxins	2	AO1 321a,322b /c,331a
2(b)(i)	plasma platelets		1 1	AO1 322a
2(b)(ii)	(cardiac) muscle	allow muscular	1	AO1 321b

Question	Answers	Extra Information	Mark	AO / Spec. Ref
2(c)			6	AO3 32, 321f

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	There is at least one advantage of the artificial valve identified **or** at least one disadvantage of the artificial valve identified.	There is a description of at least one advantage of the artificial valve **and** at least one disadvantage of the artificial valve.	There is a description of the advantages and disadvantages of the artificial valve **or** a description of several advantages of the artificial valve and at least one disadvantage.

examples of the points made in the response	**extra information**
Advantages of artificial valves: • abundant supply of artificial heart valves	ignore information copied directly from the table without value added
• (so) shorter waiting time	ignore can take many years to find a suitable human donor
• not made from another living being so no ethical argument • (made from durable material so) less likely to tear • lasts longer before replacement needed • no need for tissue typing • no need to take immunosuppressant drugs **or** won't be rejected • proven as a long term treatment	
Disadvantages of artificial heart valve: • risks relating to blood clotting • so medication for rest of natural life • could be rejected • material could wear out **or** start to leak • valve can be noisy	

Total		**11**

Question	Answers	Extra information	Mark	AO / Spec. Ref.
3(a)	any **two** from: • (volume of) peat compost has been steady and then declined **or** volume of peat compost has declined since 2005 • (volume of) peat-free compost has increased (since 1999) • (volume of) peat is higher than peat-free until 2005, then peat-free compost is higher (than peat) • total volume of peat and peat-free compost has increased	allow 2007 instead of 2005 allow 2007	2	AO2 342d
3(b)	increases carbon dioxide (in the atmosphere)	ignore methane	1	AO1 342
3(c)	any **one** from: • reduces biodiversity • destruction of habitats • disruption of food chains		1	AO1 342b
Total			**4**	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
4(a)	(rapid) growth in population (size) increase in the standard of living	 accept description of increased standard of living eg more packaging, more food thrown away or overbuying resources	1 1	AO1 341a
4(b)(i)	41.5	allow 1 mark for 9733 ÷ 23454 **or** allow 1 mark for 0.415 **or** allow 1 mark for 41.49 **or** 41 **or** 41.4	2	AO2 341
4(b)(ii)	any **four** from: arguments for: • there has been a reduction in total waste • there has been an increase in (total mass of) recycling • there has been an increase in the percentage of waste recycled • it (may) not be possible to achieve zero waste arguments against: • there is still a lot of waste (not recycled) • there has only been a small reduction in total waste • there was one year (2006) where total waste went up • the rate of increase of percentage recycled is slowing down • no information on materials reused • no information on waste from factories / industry	max 3 marks for a one sided argument allow as reason against if clear allow still more than half or 56.8% of waste (not recycled)	4	AO3 341

Question	Answers	Extra information	Mark	AO / Spec. Ref.
4(c)(i)	any **two** from: • reduce biodiversity **or** extinction • change in migration patterns • change in species distribution • change in climate	ignore rise in sea levels ignore temperature change accept correct examples of climate change eg storms, flooding, drought references to weather changing is insufficient allow ice caps melting or habitat destruction	2	AO1 343a
4(c)(ii)	any **one** from: • absorbed by oceans / ponds / lakes • peat bogs	allow used for skeletons / shells of sea creatures allow in fossil fuels / limestone	1	AO1 343b
Total			**11**	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
5(a)(i)	has the least amount of glucose (to) transfer energy (for the run)	allow least amount of fat **or** no fat allow (to) release energy (for the run) do **not** allow produces energy do **not** allow 'energy for respiration'	1 1	AO2 311d/e
5(a)(ii)	any **one** from: • cells will work inefficiently • absorb too much water / swell / overhydrate • lose too much water / shrink / dehydrate	ignore turgid / flaccid cells burst is insufficient allow cramp in muscle	1	AO2 311c/f
5(b)	any **three** from: • thermoregulatory centre • (has temperature) receptors • (which) monitor blood temperature (as it flows through the brain) • (temperature) receptors in the skin • (receptors) send impulses to the brain	ignore vasoconstriction / vasodilation / sweating allow hypothalamus impulses sent to the thermoregulatory centre = 2 marks	3	AO1 332b/c

Question	Answers	Extra information	Mark	AO / Spec. Ref.
5(c)(i)	(sports drinks) contain a lot of glucose		1	AO1 / AO2 333c
	(a person with diabetes) does not produce insulin **or** does not produce enough insulin	allow (person with diabetes) has cells which do not respond to insulin do **not** allow insulin produced by liver	1	
	so <u>blood</u> glucose / sugar levels will rise too high **or** to a dangerous level		1	
5(c)(ii)	inject insulin **or** have an insulin pump (fitted)	do **not** allow swallow insulin accept exercise accept inhale insulin accept take metformin **or** other correctly named drug allow pancreatic transplant	1	AO1 333d
Total			**10**	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
6(a)	- 32.0	allow **2** marks for 32.0 **or** -32 allow **1** mark for calculation of change: (-)24 **or** 32	3	AO2 311a/b/c
6(b)	(egg cell has) gained water		1	AO1 / AO2 311a/b/c
	by osmosis		1	
	through a partially permeable membrane		1	
	(because) the sugar solution is less concentrated (than inside the egg)	allow the concentration of water is higher in the solution **or** the water potential is higher in the solution	1	
	so water moves from the dilute solution (in the solution) to the more concentrated (in the egg)	allow so water moves <u>down</u> its concentration gradient **or** so water moves from a high concentration <u>of water</u> to a lower concentration (of water) do **not** allow movement along a gradient	1	
Total			**8**	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
7(a)	(the kidney) filters the blood	ignore refs to hormones and drugs	1	AO1 331a/c
	(and then) reabsorbs <u>all</u> of the glucose		1	
	reabsorbs some of the ions	allow salts ignore minerals	1	
	reabsorbs some of the water		1	
	releases urea (in urine)		1	
7(b)(i)	should fall from 28 (to the end of dialysis)	ignore any line drawn after end of dialysis allow + / - 0.5 square graph line must fall to / below below 15	1	AO2 331d/e
7(b)(ii)	should stay level at about 6 throughout	ignore slight variations allow + / - 1 square ignore any line drawn after end of dialysis	1	AO2 331d/f
7(c)(i)	immune system	allow white blood cells / lymphocytes	1	AO1 331g/h
	(produces) antibodies		1	
	(which) attack the antigens (on the transplanted kidney)	non-matching antigens insufficient	1	
7(c)(ii)	any **one** from: • tissue typing (to find match) • treating with drugs that suppress the immune system	accept treat with immunosuppressants	1	AO1 331i
Total			**11**	