GCSE

Science A

General Certificate of Secondary Education

Unit **A142/01:** Unit 2: Modules B2, C2, P2 (Foundation Tier)

Mark Scheme for June 2013

Annotations

Used in the detailed Mark Scheme:

Annotation	Meaning
/	alternative and acceptable answers for the same marking point
(1)	separates marking points
not/reject	answers which are not worthy of credit
ignore	statements which are irrelevant - applies to neutral answers
allow/accept	answers that can be accepted
(words)	words which are not essential to gain credit
<u>words</u>	underlined words must be present in answer to score a mark
ecf	error carried forward
AW/owtte	credit alternative wording / or words to that effect
ORA	or reverse argument

Available in scoris to annotate scripts:

✔	correct response
✖	incorrect response
BOD	benefit of doubt
NBOD	no benefit of doubt
ECF	error carried forward
0 , L1 , L2 , L3	indicate level awarded for a question marked by level of response
^	information omitted
CON	contradiction
R	reject

	❓	indicate uncertainty or ambiguity
	⬭	draw attention to particular part of candidate's response

ADDITIONAL OBJECTS: You **must** assess and annotate the additional objects for each script you mark. Where credit is awarded, appropriate annotation must be used. If no credit is to be awarded for the additional object, please use annotation as agreed at the SSU.

Subject-specific Marking Instructions

a.   Accept any clear, unambiguous response (including mis-spellings of scientific terms if they are *phonetically* correct, but always check the guidance column for exclusions).

b.   Crossed out answers should be considered only if no other response has been made. When marking crossed out responses, accept correct answers which are clear and unambiguous.

        e.g. for a one-mark question where ticks in the third <u>and</u> fourth boxes are required for the mark:

This would be worth   This would be worth   This would be worth
1 mark.   0 marks.   1 mark.

c.   The list principle:
        If a list of responses greater than the number requested is given, work through the list from the beginning. Award one mark for each correct response, ignore any neutral response, and deduct one mark for any incorrect response, e.g. one which has an error of science. If the number of incorrect responses is equal to or greater than the number of correct responses, no marks are awarded. A neutral response is correct but irrelevant to the question.

d. Marking method for tick-box questions:

If there is a set of boxes, some of which should be ticked and others left empty, then judge the entire set of boxes.
If there is at least one tick, ignore crosses and other markings. If there are no ticks, accept clear, unambiguous indications, e.g. shading or crosses. Credit should be given according to the instructions given in the guidance column for the question. If more boxes are ticked than there are correct answers, then deduct one mark for each additional tick. Candidates cannot score less than zero marks.

e.g. if a question requires candidates to identify cities in England:

Edinburgh ☐

Manchester ☐

Paris ☐

Southampton ☐

the second and fourth boxes should have ticks (or other clear indication of choice) and the first and third <u>should be blank</u> (or have indication of choice crossed out).

Edinburgh			✔			✔	✔	✔	✔	
Manchester	✔	✘	✔	✔	✔				✔	
Paris				✔	✔		✔	✔	✔	
Southampton	✔	✘		✔		✔	✔		✔	
Score:	**2**	**2**	**1**	**1**	**1**	**1**	**0**	**0**	**0**	**NR**

e. For answers marked by levels of response:
   i. **Read through the whole answer from start to finish**
   ii. **Decide the level** that **best fits** the answer – match the quality of the answer to the closest level descriptor
   iii. **To determine the mark within the level**, consider the following:

Descriptor	Award mark
A good match to the level descriptor	The higher mark in the level
Just matches the level descriptor	The lower mark in the level

   iv. Use the **L1**, **L2**, **L3** annotations in Scoris to show your decision; do not use ticks.

Quality of Written Communication skills assessed in 6-mark extended writing questions include:
- appropriate use of correct scientific terms
- spelling, punctuation and grammar
- developing a structured, persuasive argument
- selecting and using evidence to support an argument
- considering different sides of a debate in a balanced way
- logical sequencing.

Question			Answer	Marks	Guidance
1	(a)		Earth's crust a mixture of hydrocarbons distillation	2	all three correct = 2 marks one or two correct = 1 mark
	(b)	(i)	idea of unbreakable / non toxic / light / easy to mould / durable / waterproof	1	**ignore** "strong / solid / hard /low melting point/ recyclable"
		(ii)	<table><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td>harder</td><td>✓</td><td>(1)</td></tr><tr><td>less flexible</td><td>✓</td><td>(1)</td></tr></table>	2	
	(c)		**Any two from:** plasticizer moves apart / separates long chain molecules OR increases distance between long chain molecules ; weakens / lowers forces between long chain molecules ; chains can move / slide over each other more easily ; less energy needed (to melt plastic or break forces)	2	**accept** "chain" or "molecule" for "long chain molecule" **accept** "chain" or "molecule" for "long chain molecule" Any unspecified reference to forces means 'between chains/molecules' **ignore** reference to forces within the chain.
			Total	7	

Question			Answer	Marks	Guidance
2	(a)		**any two from:** strength ; idea of elastic / stretches ; flexibility ; durability	2	**ignore** length / hard
	(b)		**Level 3 (5–6 marks):** Correct cord [C] chosen. All cords and all properties are considered in a logical order and include relevance of weight extending cord B by more than 140% noted. Quality of written communication does not impede communication of the science at this level. **Level 2 (3–4 marks):** Cord B or C chosen with reference to at least 3 cords and 2 properties are considered. Quality of written communication partly impedes communication of the science at this level. **Level 1 (1–2 marks):** Cord chosen with a reason that uses at least one property Answer may be simplistic. Quality of written communication impedes communication of the science at this level. **Level 0 (0 marks):** Insufficient or irrelevant science. Answer not worthy of credit.	6	**This question is targeted at grades up to C** **Indicative scientific points may include:** • Cord A has a minimum breaking strength below that needed • Cord B stretches too much. Mass of 80kg should extend cord 110% to 140%, 80kg on cord B would give more than 140% • 10 m of cord should have a mass of 2kg so cord D is too heavy **OR** Cord D needs more mass to stretch by 110% to 140% • So cord C chosen. **Use the L1, L2, L3 annotations in Scoris; do not use ticks.**
	(c)	(i)	231	1	

Question			Answer	Marks	Guidance
2	**(c)**	**(ii)**	important for safety; (1) **and any one from:** minimum breaking strength shows highest mass it will hold / least amount needed for it to break ; it might break when holding a mass within the range ; it might break when holding the mean mass	2	 **accept** "it could break before it got to the mean mass"
		(iii)	**any two from:** make sure they do have min breaking strength ; reliability ; repeatability ; idea of outliers	2	**ignore** references to fair test **reject** accuracy **accept** to get a range e.g. if you only test one cord and it's faulty you would not know.
			Total	**13**	

Question			Answer	Marks	Guidance
3	**(a)**		digital: A & D analogue: B, C & E	2	All correct = 2 marks one misplaced letter is one error = 1 OR correctly allocating each signal to the incorrect name (i.e. the two columns are reversed) = 1 mark
	(b)		**any two from:** noise can be removed ; can be stored on computers / other media e.g. iPod ; can be processed (by computers)	2	**reject** noise cannot be picked up
			Total	**4**	

Question			Answer	Marks	Guidance
4	**(a)**		emits (1) absorb (1) cancer (1)	3	
	(b)		<table><tr><td>radio photons not enough energy</td><td>✓</td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr></table>	1	
	(c)		action (1) e.g. wear covering clothing / tee-shirts / use sunscreen (at frequent intervals) / stay indoors explanation (1) e.g. because it absorbs / reflects / blocks UV	2	**accept** "People could move out of the area" but "move to another area" needs greater detail for action mark **accept** "stay indoors during mid-day hours" (1) "because UV intensity is greatest then" (1) explanation needs to refer to how UV (is reduced) **accept** "protects against UV" **ignore** reference to using less CFCs **reject** ideas to reduce the amount of CO2 e.g. "use fewer cars"
			Total	**6**	

Question			Answer	Marks	Guidance
5	(a)	(i)	idea that doubling the distance more than halves the intensity / quarters the intensity (1) if it was halved it would be 6000 (not 3000 for Venus) / 3000 is quarter of 12000 (not half) / 12000 is 4 times 3000 (not 2 times) (1)	2	no mark for stating "no" / "he is not correct"
		(ii)	1500 (1) (it must be less as) Earth is further away from the Sun than Venus ORA (1)	2	independent marking
	(b)		**Level 3 (5–6 marks):** Recognises temperature of Venus as consequence of g.e. AND detailed explanation of g.e. in terms of trapping Sun's radiation AND consequences for earth Quality of written communication does not impede communication of the science at this level. **Level 2 (3–4 marks):** Compares CO_2 for Venus and Earth using data AND simply describes g.e. OR a consequence for earth Quality of written communication partly impedes communication of the science at this level. **Level 1 (1–2 marks):** Recognise that most of V's atmosphere is CO_2, OR simple description of g.e. OR simple consequences for earth Quality of written communication impedes communication of the science at this level. **Level 0 (0 marks):** Insufficient or irrelevant science. Answer not worthy of credit.	6	**This question is targeted at grades up to C** **Points relevant to the greenhouse effect (g.e.) may include:** • greenhouse gases absorb low frequency/IR radiation (emitted by warm planet) • this absorption results in planet heating up • CO_2 is a greenhouse gas **Points relevant to the use of data may include:** • Venus has more CO_2 **Points relevant to the consequences for Earth may include:** • greenhouse gases being produced in increasing quantities on Earth • Global warming will ensue **Use the L1, L2, L3 annotations in Scoris; do not use ticks.**
			Total	**10**	

Question			Answer	Marks	Guidance
6	(a)		<table><tr><td>a capillary</td><td></td></tr><tr><td>a vein</td><td></td></tr><tr><td>an artery</td><td>✓</td></tr><tr><td>the heart</td><td></td></tr></table>	1	
	(b)		contracts **AND** relaxes (1)	1	**both** needed for 1 mark
	(c)	(i)	(her blood pressure is) <u>normal</u>	1	
		(ii)	11	1	
		(iii)	idea of **partial** effectiveness / success (1) comment on **both** category (changes) (1)	2	**accept** "drug has not been completely effective / only partially successful" **reject** for "effective" or "not effective" alone **accept** a description of where it has succeeded/been effective **AND** where it hasn't **accept** "higher value **remains** in moderate hypertension category whereas lower value is **reduced** to mild hypertension category / nearly at normal category" **ignore** "reduces values" as that is in stem of question, must link to categories
		(iv)	idea of reducing the chance of heart disease / reduces the risk of strokes	1	**accept** reduces risk of heart attack **accept** Improves vision
	(d)	(i)	positive correlation	1	line must have highest point at the end **reject** line with zigzags/plateau(s) **ignore** minor deviations in freehand drawn lines

Question			Answer	Marks	Guidance
6	(d)	(ii)	**any two from:** correlation between high blood pressure and fizzy drinks does not mean that the fizzy drinks cause high blood pressure / AW ; other factors (example) cause high blood pressure ; Andrew is only one case	2	**ignore** yes / no; mark the explanation e.g. genetic / smoking / alcohol /stress / diet (qualified)
			Total	**10**	

Question			Answer	Marks	Guidance
7	(a)		**Level 3 (5–6 marks):** Describes what the vaccine contains AND how it will protect against HPV, by causing antibody production. AND the role of memory cells in making the person immune. Quality of written communication does not impede communication of the science at this level. **Level 2 (3–4 marks):** Describes what the vaccine contains AND how it will protect against HPV, by causing antibody production. Quality of written communication partially impedes communication of the science at this level. **Level 1 (1–2 marks):** Describes what the vaccine contains OR vaccine causes WBC antibody production OR recognises that vaccination leads to immunity. Quality of written communication impedes communication of the science at this level. **Level 0 (0 marks):** Insufficient or irrelevant science. Answer not worthy of credit.	6	**This question is targeted at grades up to E** **Indicative scientific points may include:** • vaccination contains disease causing organism / virus / pathogen (**not** the disease) • in a safe form/attenuated/weakened/dead/inactive • stimulates production of antibodies • from white blood cells (WBC) • also triggers production of memory cells • remain in the body • on infection (with HPV virus) • antibodies produced more quickly • do not suffer from the disease • are immune. **Use the L1, L2, L3 annotations in Scoris; do not use ticks.**
	(b)		Anne (1) (there is some risk / minor side effects but) the benefits (protection against cervical cancer) outweigh the risks (1)	2	wrong name = 0 no name with correct explanation = 1

Question			Answer			Marks	Guidance
7	(c)					2	
			this individual case does not prove that the vaccine is dangerous	✓	(1)		
			tests prove that the girl did not die from the vaccination	✓	(1)		
					Total	**10**	