OCR
RECOGNISING ACHIEVEMENT

GCSE

Additional Applied Science

General Certificate of Secondary Education

Unit **A191/02:** Science in Society (Higher Tier)

Mark Scheme for January 2013

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This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.

All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

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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
words	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:

	indicate uncertainty or ambiguity
BOD	benefit of doubt
CON	contradiction
	incorrect response
ECF	error carried forward
	draw attention to particular part of candidate's response
NBOD	no benefit of doubt
R	reject
	correct response

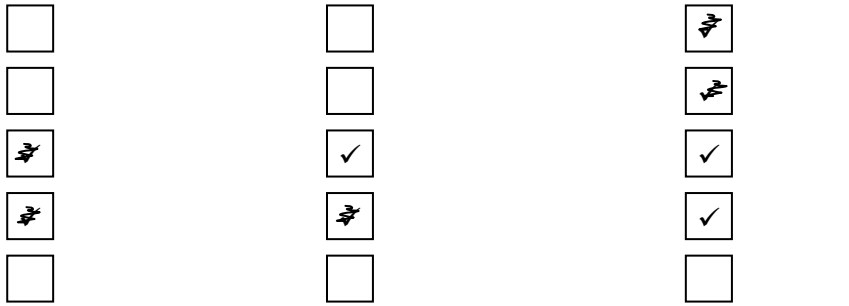
L1 , L2 , L3	indicate level awarded for a question marked by level of response
^	information omitted

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.

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



This would be worth 1 mark. *This would be worth 0 marks.* *This would be worth 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, eg 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, eg 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)		two from: to avoid injuries to clients; to allow for current medical conditions; make client aware of potential harm; to meet safety regulations/apparatus safe;	2	
	(b)	(i)	$\text{BMI} = \frac{\text{body mass (kg)}}{[\text{height (m)}]^2}$; 92 / 3.24; 28.4 ;	3	28.4 on its own scores 2 marks. **Allow** 92 / 1.8^2 **Allow** 28 / 28.40 / 28.395 but not 28.0 / 28.39
		(ii)	Overweight;	1	**Ecf** from 1bi
		(iii)	any two from: variations in bone density (not taken into account); she could have just had a meal or drink/wearing heavy clothes / shoes; different proportion of muscle tissue; muscle weighs more than fat;	2	**Ignore** reference to gender/ height
			Total	**8**	

Question			Answer	Marks	Guidance
2			**Level 3 (5–6 marks)** Most advantages and limitations relating to viewing bacteria with explanations Quality of written communication does not impede communication of the science at this level. **Level 2 (3–4 marks)** Some advantages and limitations relating to viewing bacteria. Quality of written communication partly impedes communication of the science at this level. **Level 1 (1–2 marks)** Mention an advantage and limitation relating to viewing bacteria using an electron microscope. . 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 A*** **relevant points include:** **general** • both advantages and limitations considered **specific** **advantages** • good magnification so can see very small objects • good resolving power to see greater detail • good depth of field to see 3D images/near and far in focus • 3D images. **limitations** • limited availability because of cost or size • cannot view living bacteria because vacuum/preparation procedure • long set up time because complex to set up/complex preparation of samples. • Expensive because……. running costs/training/samples coated in gold/cost of operatives • Not portable due to heavy/size **ignore** references to cost unless qualified **Use the L1, L2, L3 annotations in Scoris; do not use ticks.**
			Total	**6**	

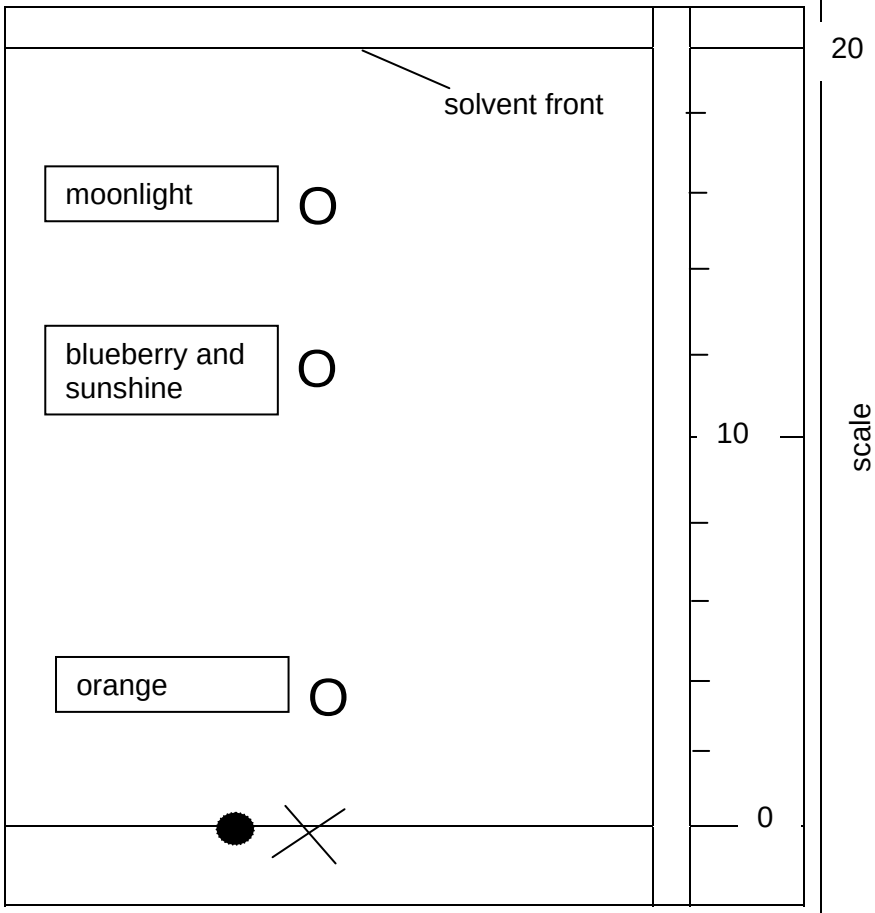
Question			Answer	Marks	Guidance
3	(a)		2 – blood vessels (near surface of skin) (vaso)dilate; 3 – skin turns red; 4 – skin loses heat to the surrounding air;	3	**Allow** enlarge / get wider **Reject** movement of blood vessels **Allow** goes pink **Ignore** darker **Reject** references to evaporation / sweating
	(b)		water evaporates; absorbs / takes (latent) heat; from the skin;	3	 **Ignore** makes us feel cooler
			Total	**6**	

Question			Answer	Marks	Guidance
4			**Level 3 (5–6 marks)** A detailed account of most stages with some explanations and in the correct order. Quality of written communication does not impede communication of the science at this level. **Level 2 (3–4 marks)** A detailed account of most stages in the correct order but with little or no explanation. Quality of written communication partly impedes communication of the science at this level. **Level 1 (1–2 marks)** Brief account of the basic stages with no detail or explanation. 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 A** **Indicative scientific points at Level 3 may include:** • counselling explained eg to include consequences such as coping with failure or multiple births • hormone treatment explained eg to stimulate egg production • embryo selection explained eg to reduce failure rate • scientific detail **Indicative scientific points at Level 2 may include:** • counselling • hormone treatment • embryo selection/multiple implantations • monitoring • sperm and eggs from Tom and Jane • method of collecting eggs • method of egg implantation **Indicative scientific points at Level 1 may include:** • collection of eggs • fertilisation in glass dish/outside mother • implantation • sensible order **Use the L1, L2, L3 annotations in Scoris; do not use ticks.**
			Total	**6**	

Question			Answer	Marks	Guidance
5	(a)		Any three from: to cause veins to enlarge / to makes veins more prominent / veins easier to see; to avoid infection owtte; vein is near surface / vein is at lower pressure so safer; to link sample with donor / avoid contamination	3	**Allow** remove bacteria/so nothing gets on needle/prevent cross contamination **Ignore** keep it clean/germs/dirt
*	(b)	(i)	**7**	1	If no answer on line accept 7in the bottom box.
*		(ii)	baby is OK / normal;	1	7 and above, is normal 4–6 is fairly low 3 and below, is critical Treat monitoring as neutral for APGAR of 7. **ecf** so answers for (bi)should match levels indicated above
*		(iii)	*Any 2 from:* Idea that hard to tell skin colour/ best guess; Idea that pulse rate scores 1 even if only 1 beat per min; Idea of difference between feeble cry and a cry; Idea of difference between bends easily and bends with resistance; Idea of difference between weak and regular breathing; Idea that baby's condition /score could change; Categories quite close / needs to be subdivided; Only one medic's opinion / more than one medic should do it; Score could be between 1 or 2;	2	**Ignore** repeat the test unless linked to two medics
*	(c)		any idea of benefit to the patient; outweighs the risk;	2	"to save baby from even bigger risk" = 2 marks
			Total	**9**	

Question			Answer	Marks	Guidance
6			neither S R neither S neither R	4	7 correct = 4 marks 6 or 5 = 3 marks 4 or 3 = 2 marks 2 = 1 mark < 2 = 0 mark
			Total	**4**	

Question			Answer	Marks	Guidance
7			**Level 3 (5–6 marks)** Answer includes several relevant scientific points and some reference to calibration. Quality of written communication does not impede communication of the science at this level. **Level 2 (3–4 marks)** Answer includes some relevant scientific points. Quality of written communication partly impedes communication of the science at this level. **Level 1 (1–2 marks)** Answer includes one or two relevant points. 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** **relevant scientific points for L3 may include:** • test known concentrations • what data is collected • plot results from known concentrations • find unknown concentration • use graph to find concentration **relevant scientific points for L2 may include:** • set to zero • put sample in tube *in correct context* • measure light • reference to graph **relevant scientific points for L1 may include:** • some idea of what a colorimeter is • some idea of how it is used **Ignore** answers that do not relate to a colorimeter. **Use the L1, L2, L3 annotations in Scoris; do not use ticks.**
			Total	**6**	

Question			Answer	Marks	Guidance
8	(a)		C; 1;	2	
	(b)	(i)	3 circles in correct position and labelled;	1	
		(ii)	different dyes have the same Rf value; use a different solvent / two way chromatography;	2	
			Total	**5**	
			Paper Total	**50**	

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