

GCSE

Additional Applied Science

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

General Certificate of Secondary Education

Mark Scheme for June 2016

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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.

OCR will not enter into any discussion or correspondence in connection with this mark scheme.

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Additional Guidance within any mark scheme takes precedence over the following guidance.

1. Mark strictly to the mark scheme.
2. Make no deductions for wrong work after an acceptable answer unless the mark scheme says otherwise.
3. Accept any clear, unambiguous response which is correct, e.g. mis-spellings if phonetically correct (but check additional guidance).
4. Abbreviations, annotations and conventions used in the detailed mark scheme:
 - / = 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 = alternative wording
 - ORA = or reverse argument

E.g. mark scheme shows 'work done in lifting / (change in) gravitational potential energy' (1)

work done = 0 marks

work done lifting = 1 mark

change in potential energy = 0 marks

gravitational potential energy = 1 mark

5. Annotations:

The following annotations are available on RM ASSESSOR.

- ✓ = correct response
- ✗ = incorrect response
- bod = benefit of the doubt
- nbod = benefit of the doubt **not** given
- ECF = error carried forward
- ^ = information omitted
- I = ignore
- R = reject

6. If a candidate alters his/her response, examiners should accept the alteration.

7. 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 boxes 3 and 4 are required for the mark:

Put ticks (✓) in the two correct boxes. Put ticks (✓) in the two correct boxes. Put ticks (✓) in the two correct boxes.

✓
✗

This would be worth 0 marks.

✗
✗

This would be worth one mark.

✗
✗
✓
✓

This would be worth one mark.

8. 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.

9. Marking method for tick boxes:

Always check the additional guidance.

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. If there are no ticks, accept clear, unambiguous indications, e.g. shading or crosses.

Credit should be given for each box correctly ticked. 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 a city in England, then in the boxes

Edinburgh	
Manchester	
Paris	
Southampton	

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

Edinburgh			✓			✓	✓	✓	✓	
Manchester	✓	x	✓	✓	✓				✓	
Paris				✓	✓		✓	✓	✓	
Southampton	✓	x		✓		✓	✓		✓	
Score:	2	2	1	1	1	1	0	0	0	NR

Question			Expected Answers	Marks	Additional Guidance
1	a	i	<p><i>Any three from:</i></p> <p>Red blood cell carries oxygen;</p> <p>White blood cell fights disease;</p> <p>Platelets clot blood;</p> <p>Plasma carries dissolved substances;</p>	3	<p><u>MUST</u> have component AND its function</p> <p>Allow fights infection/destroys microbes / destroys pathogens destroys antigens /produces antibodies(OWTTE)</p> <p>Allow prevent infections from entering body / forms scabs</p> <p>Allow transports nutrients/carbon dioxide</p> <p>If no other marks awarded then allow 1 mark for THREE correct components</p>
		ii	<p><i>Any three from:</i></p> <p>Bone provides supports;</p> <p>Cartilage smooth's end of bone;</p> <p>Ligament joins bone to bone / holds joint together;</p> <p>Tendon joins muscle to bone;</p> <p>Muscle moves joint;</p> <p>Synovial fluid lubricates joint</p>	3	<p>MUST identify part of the joint AND state its function</p> <p>Ignore production of blood/stem cells</p> <p>Allow reduces friction / protects bone / shock absorbing</p> <p>Ignore stops joint rubbing</p> <p>Allow relaxes/contracts to move joint</p> <p>Allow reduces friction</p> <p>Ignore types of joint e.g. ball and socket</p> <p>If no other marks awarded then allow 1 mark for THREE correct parts of a joint</p>
		iii	<p>Heart to check if it is up to the job / pump blood;</p> <p>Lungs to make sure they can absorb oxygen;</p>	2	<p>Heart AND Lungs with no explanation scores 1 mark</p> <p>Allow check it is healthy/prevent heart attacks OWTTE</p> <p>Allow to make sure enough oxygen taken in/check for asthma etc</p> <p>Ignore other organs e.g. kidney</p>
	b		<p>100 / 5;</p> <p>20;</p>	2	<p>20 = 2 marks</p>

Question	Expected Answers	Marks	Additional Guidance
c	<p>[Level 3] Comments include references for physiotherapist and trainer and good practice. Quality of written communication does not impede communication of the science at this level. (5 – 6 marks)</p> <p>[Level 2] Comments include references to at least two of the three areas. OR A reference from all three areas. Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks)</p> <p>[Level 1] Comments include references to one of the three areas OR A reference to two of the three areas. Quality of written communication impedes communication of the science at this level. (1 – 2 marks)</p> <p>[Level 0] Insufficient or irrelevant science. Answer not worthy of credit. (0 marks)</p>	6	<p>This question is targeted at grades up to A</p> <p>Scientific points about job of a physiotherapist may include:</p> <ul style="list-style-type: none"> • Assess injury / cause of injury • (deal with) muscular – skeletal injury • devise exercises to aid recovery • graded exercises to improve strength / muscles • Massage • Use of ultra sound • Cortisone injections • (recommend) RICE <p>Scientific points about job of a fitness trainer may include:</p> <ul style="list-style-type: none"> • Baseline assessment / Par Q • Example of pre exercise tests e.g.risk assessment/ lifestyle /medical history/ pulse rate /body temperature/body weight etc. • Identify targets • Develop exercise programme/fitness plan • Example of type of exercise programme e.g. weight training etc • Monitor progress • First response to injury e.g. apply ice • Develop programme to aid recovery/prevent injury recurrence • Develop programme to take injury into account • Diet advice <p>Scientific descriptions about good practice may include:</p> <ul style="list-style-type: none"> • detached relationship / professional approach / don't get too close • personal relationship / knowledge of client • make judgement when client's statement and evidence conflicts • team work • consider whole person / family / work place • communication with client / listening / explaining • Communication between physio and trainer • Safety awareness <p>Use the L1, L2, L3 annotations in RM Assessor; do not use ticks.</p>
	Total	[16]	

Question			Expected Answers	Marks	Additional Guidance
2	a	i	Pink / normal all over; Less than 100; No response when stimulated; Regular breathing;	4	Ignore added detail unless something described as pale Accept 1-99 Accept no grimace/ no cry Accept normal / strong breathing
		ii	1;	1	
	b		<p>[Level 3] Comments include points from all three areas. Quality of written communication does not impede communication of the science at this level. (5 – 6 marks)</p> <p>[Level 2] Comments include points from two of the three areas OR makes a comment on all three areas. Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks)</p> <p>[Level 1] Comments include points from one of the three areas OR makes a comment on two of the three areas Quality of written communication impedes communication of the science at this level. (1 – 2 marks)</p> <p>[Level 0] Insufficient or irrelevant science. Answer not worthy of credit. (0 marks)</p>	6	<p>This question is targeted at grades up to A</p> <p>Scientific points regarding the use of the chart:</p> <ul style="list-style-type: none"> • get baby's age • get baby's weight • Plot points on grid • Repeat at regular intervals/regular check ups <p>Scientific points regarding (per)centiles:</p> <ul style="list-style-type: none"> • identify curves/lines as (per)centiles • reference to a (per)centile eg 50th percentile • explanation eg 50th (per)centile means half of babies weigh more, half weigh less. • the higher the (per)centile the bigger the baby <p>Scientific points regarding the health of the baby:</p> <ul style="list-style-type: none"> • look at changes over time/keep track of growth • states that (per)centile/ position in chart relates to health • If the (per)centile is going up the baby might be overfed • If the (per)centile is going down the baby might be malnourished or ill <p>Use the L1, L2, L3 annotations in RM Assessor; do not use ticks.</p>
			Total	[11]	

Question		Expected Answers	Marks	Additional Guidance	
3	a		3	4 correct = 3 marks 3 or 2 correct = 2 marks 1 correct = 1 mark	
	b	i	15 x 9; 135;	2	135 scores 2 marks Calculation 1 mark
		ii	Idea of error in measurement; Idea of error in calculation;	2	Accept two different examples of error in measurement for 2 marks. Ignore reliability
Total			[7]		

Question	Expected Answers	Marks	Additional Guidance
4 a	<p>[Level 3] Comments include points from both rivers and a correct conclusion. Quality of written communication does not impede communication of the science at this level. (5 – 6 marks)</p> <p>[Level 2] Comments include points from both rivers. Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks)</p> <p>[Level 1] Comments include points from one river. Quality of written communication impedes communication of the science at this level. (1 – 2 marks)</p> <p>[Level 0] Insufficient or irrelevant science. Answer not worthy of credit. (0 marks)</p>	6	<p>This question is targeted at grades up to C</p> <p>Scientific points regarding RIVER A may refer to:</p> <ul style="list-style-type: none"> • reference to turbidity/ quantity of suspended material • water is (slightly) alkaline • blood worm found • no other organism found • only one type of organism found • Water contains low levels of oxygen <p>Scientific points regarding RIVER B may include:</p> <ul style="list-style-type: none"> • reference to clear water / no turbidity • water is acidic • blood worms not found • named other organisms found • more organisms found • high oxygen content to support variety of organisms living in river <p>Conclusion:</p> <ul style="list-style-type: none"> • River A is polluted / not clean / dirty Accept any idea of A being worse (than B) • River B is not polluted / clean / healthy Do not accept clear Accept any idea of B being better (than A) • If comparison, both rivers required for two conclusions e.g. River B is cleaner than A = 2 conclusions <p>Use the L1, L2, L3 annotations in RM Assessor; do not use ticks.</p>

Question		Expected Answers	Marks	Additional Guidance	
	b	i	Any two from: Idea of inaccuracy of measuring equipment; Idea of not possible for person to measure same way every time; Idea of samples from different parts of the river/flow of river;	2	
		ii	Idea that repeatability is same person using same equipment; Idea that reproducibility is different people doing same test;	2	
Total			[10]		

Question		Expected Answers	Marks	Additional Guidance										
5	a	Yes, C and D; Because both contain banned dye;	2	BOTH required Accept spot for C and D are level with banned dye										
	b	Identifies BOTH 7.5 and 10; $7.5 / 10 = 0.75$;	2	$0.75 = 2$ marks 1 mark for $7.5/10$ or 7.5×10 or $10/7.5$ 1 mark for ecf from error in distance spot moved e.g. $7.2-7.8/10 = 0.72 - 0.78$										
	c	Different dye;	1	Reject reference to mixture										
	d	<table border="1" style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td style="text-align: center;">solvent</td> <td style="width: 20px;"></td> </tr> <tr> <td style="text-align: center;">aqueous</td> <td></td> </tr> <tr> <td style="text-align: center;">stationary phase</td> <td style="text-align: center;">✓</td> </tr> <tr> <td style="text-align: center;">substance</td> <td></td> </tr> <tr> <td style="text-align: center;">mobile phase</td> <td></td> </tr> </tbody> </table>	solvent		aqueous		stationary phase	✓	substance		mobile phase		1	
solvent														
aqueous														
stationary phase	✓													
substance														
mobile phase														
Total			[6]											
Paper total			50											

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