OCR
Oxford Cambridge and RSA

GCSE

Additional Applied Science

Unit **A192/01:** Science of Materials and Production
(Foundation 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.

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	alternative wording
ORA	or reverse argument

Available in RM Assessor to annotate scripts

	indicate uncertainty or ambiguity
	benefit of doubt
	contradiction
	incorrect response
	error carried forward
	draw attention to particular part of candidate's response
	draw attention to particular part of candidate's response
	draw attention to particular part of candidate's response
	no benefit of doubt

R	reject
	correct response
	draw attention to particular part of candidate's response
^	information omitted

Subject-specific Marking Instructions

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

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 boxes 3 and 4 are required for the mark:

Put ticks (✓) in the two correct boxes.

This would be worth 1 mark.

Put ticks (✓) in the two correct boxes.

This would be worth 0 marks.

Put ticks (✓) in the two correct boxes.

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, 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 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

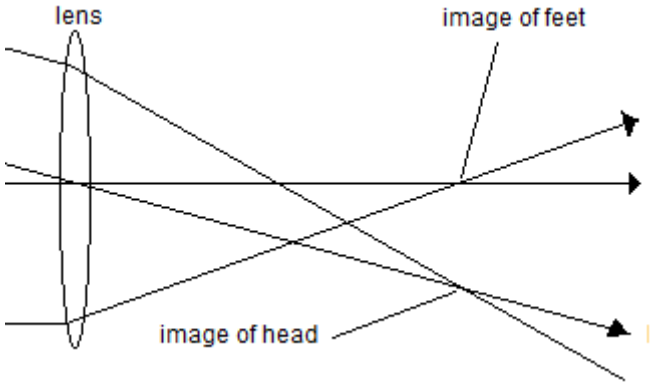
Edinburgh	
Manchester	
Paris	
Southampton	

the second and fourth boxes should have ticks (or other clear indication of choice) and the first and third <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**

MARK SCHEME:

Question			Answer	Mark	Guidance
1	a		ruler / tape measure	1	
	b		15; 30;	1 1	 ECF for MP2
	c		25 N gives extension of 0.075 m; energy = 0.5 x 25 x 0.075 (= 0.94)	1 1	Allow use of 0.074-0.076 second mark is for method (area of a triangle)

Question			Answer	Mark	Guidance
2	a		lens - transparent; body - opaque;	1 1	
	b		any of the following, [1] each: • improves safety/comfort of subject; • filter absorbs / blocks some radiation; • absorbed (radiation) is infrared; • which would heat the subject;	2	**accept** "does not transmit" for "absorbs" **accept** IR as infrared
	c	i		2	straight line from top of lens to meet other ray from head directly below "image of feet" for [1] point where two rays from head intersect labelled "image of head" for [1]
		ii	focal plane	1	

Question			Answer	Mark	Guidance
3	a		switch power supply variable resistor lamp	2	all four correct for [2] any three or two correct for [1]
	b		uses switch to turn lamp on and off; uses variable resistor to control brightness of lamp;	1 1	 accept dimmer for variable resistor
	c	i	(500 x 30) + (100 x 750) = 90 000 W	2	left-hand side correct [1] right-hand side correct [1] allow ECF
		ii	theatre warms up	1	

Question			Answer	Mark	Guidance
4			**[Level 3]** Describes some aspects from each of the stages. Quality of written communication does not impede communication of the science at this level. (5 – 6 marks) **[Level 2]** EITHER describes an aspect from each of the stages OR describes some aspects from some of the stages. Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks) **[Level 1]** Describes a couple of aspects. Quality of written communication impedes communication of the science at this level. (1 – 2 marks) **[Level 0]** Insufficient or irrelevant science. Answer not worthy of credit. (0 marks)	6	**This question is targeted at grades up to E.** **Indicative science points may include these stages:** **preparation** • ploughing • fertilizing • watering • sowing /planting • Test pH **growing** • controlling weeds • controlling pests • fertilizing • watering / rain • light / sunshine **harvesting** • gathering • separation of grain from plant • drying • storing

Question			Answer	Mark	Guidance
5			**[Level 3]** Describes some aspects of all stages. Stages presented in the correct order. Quality of written communication does not impede communication of the science at this level. (5 – 6 marks) **[Level 2]** EITHER describes an aspect of all stages or describes aspects of some stages. Stages presented in the correct order. Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks) **[Level 1]** Describes some aspect of the process. Quality of written communication impedes communication of the science at this level. (1 – 2 marks) **[Level 0]** Insufficient or irrelevant science. Answer not worthy of credit. (0 marks)	6	**This question is targeted at grades up to E** **Indicative science points may include these stages:** **measuring** • place beaker on scales • tare scales • add / measure (58.5 g of) salt • add / measure (1 litre of) water in beaker **dissolving** • mix salt and water • stir until all salt dissolves • warm to speed up the process **precision** • place funnel on (volumetric) flask • pour solution into flask • rinse out beaker with water • pour rinse water into flask • add water to flask to almost 1 litre mark • remove the funnel • use a dropper to add water to the mark • stopper the flask • turn upside down / swill a few times to mix well

Question			Answer	Mark	Guidance
6	a		Their raw materials are in plentiful supply; They can be used to make lots of useful chemicals.	1 1	
	b		air; sulfur; sodium chloride;	2	all three correct for [2] any two correct for [1]
	c		ammonium sulfate; water	1 1	in any order

Question			Answer	Mark	Guidance
7			**[Level 3]** Describes a procedure which would work AND explains each step of the procedure AND names a food product. Quality of written communication does not impede communication of the science at this level. (5 – 6 marks) **[Level 2]** Describes and explains part of a procedure which would work AND names a food product. Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks) **[Level 1]** Describes part of a procedure which would work AND names a food product. Quality of written communication impedes communication of the science at this level. (1 – 2 marks) **[Level 0]** Insufficient or irrelevant science. Answer not worthy of credit. (0 marks)	6	**This question is targeted at grades up to C.** **Indicative science points may include:** **food products** • cheese • yogurt **explained steps in production** • heating of (milk to sterilise it) • addition of culture to introduce bacteria / micro-organisms • keeping milk warm for bacterial growth • cover milk to keep out other bacteria • bacteria feed on lactose / sugar in milk • by anaerobic respiration to make lactic acid • waste products thicken/clot milk

Question			Answer	Mark	Guidance
8	a		Any two sensible reasons in context of tennis racket; (Stiff) so that it doesn't bend / change shape (low density) so that it is easy to carry (strong) so that it does not break	2	Allow suitable explanations of relevant properties
	b		any three of the following points, [1] each: aluminium is • almost / not the stiffest; • almost / not the strongest; • but the heaviest / most dense; carbon fibre is • best / better choice than aluminium • the stiffest • the strongest • less dense / lighter than aluminium	3	no mark for an unjustified yes/no Nothing for repeating data from table without comparison.
	c		low thermal conductivity; slows down heat flow from hand to frame;	1 1	

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