OCR
Oxford Cambridge and RSA

GCSE

Additional Applied Science

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

General Certificate of Secondary Education

Mark Scheme for June 2014

OCR (Oxford Cambridge and RSA) is a leading UK awarding body, providing a wide range of qualifications to meet the needs of candidates of all ages and abilities. OCR qualifications include AS/A Levels, Diplomas, GCSEs, Cambridge Nationals, Cambridge Technicals, Functional Skills, Key Skills, Entry Level qualifications, NVQs and vocational qualifications in areas such as IT, business, languages, teaching/training, administration and secretarial skills.

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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.

These are the annotations, (including abbreviations), including those used in scoris, which are used when marking

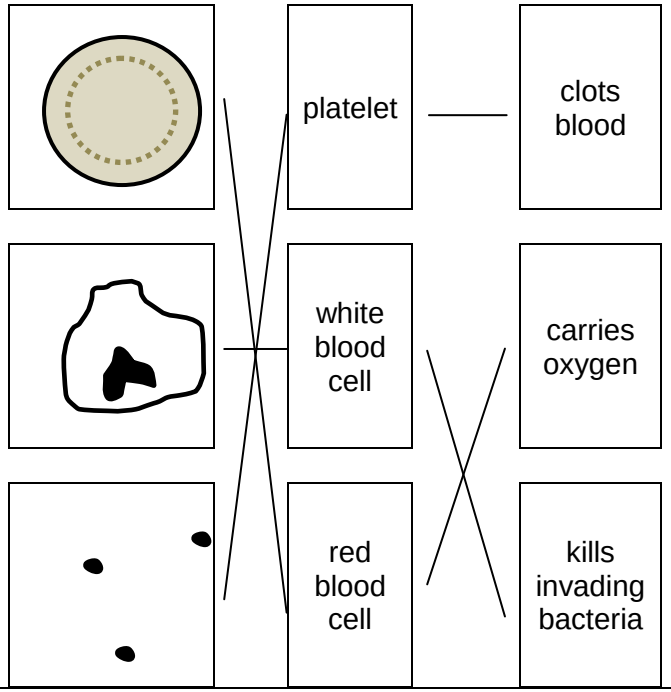
Used in the detailed Mark Scheme:

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 scoris to annotate scripts

	Blank Page – this annotation must be used on all blank pages within an answer booklet (structured or unstructured) and on each page of an additional object where there is no candidate response.
	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

NBOD	no benefit of doubt
R	reject
	correct response
	draw attention to particular part of candidate's response
^	information omitted

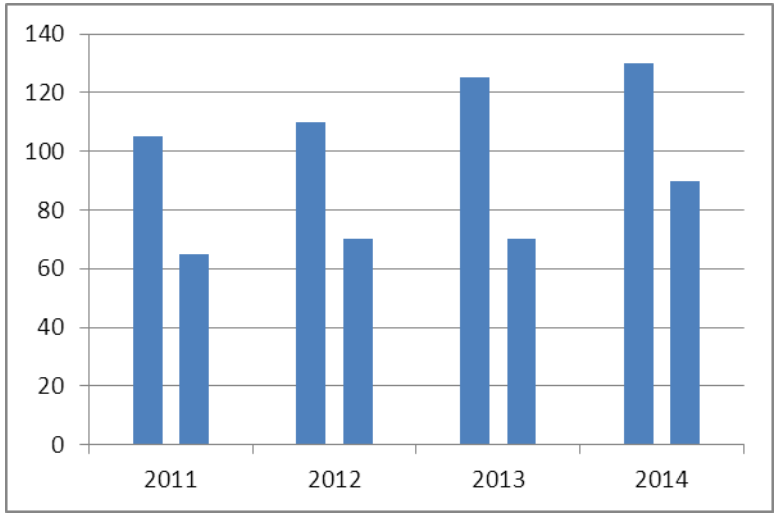
Question			Answer	Mark	Guidance
1	a			2	1 mark for LHS correct 1 mark for RHS correct
	b		Blood vessel / capillaries near skin surface dilate / vasodilation; More blood flows near skin surface; Heat lost from skin/from body/to surroundings;	3	**reject** movement of blood vessels / capillaries **ignore** cooling **ignore** hairs/shivering **allow max 2 for:** sweat; evaporate; latent heat; If the 2 methods are mixed then choose the scheme which gives more marks.

Question			Answer	Mark	Guidance
2			**[Level 3]** Most examples of what a fitness trainer does at each stage, including examples of good practice AND explanation why they are necessary Quality of written communication does not impede communication of the science at this level. (5 – 6 marks) **[Level 2]** Describes what a fitness trainer does at each stage of the process OR describes what a fitness trainer does at most stages of the process with some explanation of why they are necessary. Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks) **[Level 1]** Some examples of what a fitness trainer does. 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 A** **Examples of what a fitness trainer does may include:** • carry out risk assessment • check medical history • explain risk to Jethro • determine Jethro's initial fitness level • plan an exercise programme • train Jethro in use of equipment. • record performance / improvement **Explanations may include:** • to avoid injury • to avoid litigation • so that a base-line is known / initial fitness • so that the best exercises to promote fitness can be chosen • to check progress / to maximise improvement • so programme can be adapted **Good practice may include:** • develop detached but personal relationship with Jethro • reasons for detached and personal relationship • make judgements when Jethro's statements conflict with evidence • recognise the importance of team work – common aim for Jethro and trainer • consider the whole context e.g. person, family, workplace and community. • good communication skills to include listen / ask questions / explain so that Jethro understands what to do / trainer understands Jethro's aim • motivate Jethro so that he continues **Use the L1, L2, L3 annotations in Scoris; do not use ticks.**

Question			Answer	Mark	Guidance
3	a	i	Actual score is 6; Baby score 2 for grimace	2	allow (cried and) pulled away
		ii	Needs careful monitoring	1	**allow** ecf from ai
	b		2 weeks - weight (well) below average/underweight; comparison between 2 and 22 weeks;	2	**allow** improving/still below average/still underweight **ignore** idea of getting heavier **allow** moves from 2nd / 9th to 25th percentile for 1 mark

Question			Answer	Mark	Guidance
4			**[Level 3]** Give most advantages and disadvantages, including the use of some of the terms resolution, magnification, and depth of field AND some explanation linked to advantage/disadvantage. Quality of written communication does not impede communication of the science at this level. (5 – 6 marks) **[Level 2]** Give most advantages and disadvantages, using at least one of the terms resolution, magnification and depth of field. Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks) **[Level 1]** Give one advantage and one disadvantage of both types with comparison. May use less scientific language. 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 A*** **Advantages / disadvantages of light microscope may include:** • easy to use • magnifies up to 1200 x • quick to use • relatively cheap • can look at living material • coloured image • magnification limited / low zoom • resolution limited / less detailed • limited depth of field / in 2D **Advantages / disadvantages of electron microscope may include:** • very high magnification and resolution • good depth of field • hard to use • expensive • cannot look at living material • difficult to prepare specimens • not coloured **Further detail may include:** • explanation of depth of field (idea of front and back focus) • explanation of magnification (idea of bigger image) • explanation of resolution (distinguishes between 2 close points) • explanation why not used for living specimens (vacuum, gold etc) **Use the L1, L2, L3 annotations in Scoris; do not use ticks.**

Question			Answer	Mark	Guidance
5	a	i	Jane	1	
		ii	Rafi	1	
		iii	Stella	1	
		iv	Peter	1	
	b		Idea that measurements not accurate; These errors were then multiplied together	2	**allow** measurements wrong **ignore** measurements uncertain
	c		Systematic – the string was not exactly 1 m long; Random – Wendy will make errors in her measurement	2	**allow** any idea that error caused by string **allow** meanings for both random and systematic without reference to Wendy's method for 1 mark

6	a		Normal	1	
	b			2	1 mark for each correct bar First bar less than halfway between 120 and 140 Second bar less than halfway between 80 and 100 If you need to consider carefully whether it is below half way then do not award the mark.
	c		It has been increasing (each year)/highest ever; Now nearly in high blood pressure range	2	**ignore** up and down **ignore** consequences of high blood pressure

Question			Answer	Mark	Guidance
7			**[Level 3]** A detailed description of a method that would work to identify a substance AND an explanation of how the unknown substance would be identified AND dots above the water level made explicit. Quality of written communication does not impede communication of the science at this level. (5 – 6 marks) **[Level 2]** A description of a method that would work to identify an unknown substance. Use idea of dots above or below water level for 3 or 4 marks. Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks) **[Level 1]** General explanation of an incomplete method. Ignore dots and water level. 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** **Points may include:** • draw start line • spot known substances onto start line. • spot unknown substance onto start line • place solvent in tank • place paper in solvent with start line above solvent. • leave to develop • stop when solvent front is near to top of paper • dry / develop chromatogram • Calculate Rf value • compare colour of substances to spot known / unknown with same Rf value • identify unknown • possibly rerun with different solvent or use 2-way chromatography to confirm **Look at both text and / or diagram when allocating levels.** **Dripping water onto dye on filter paper = max L1** **Descriptions of other testing methods such as litmus, BDH universal, colorimetry etc. do not score** **Use the L1, L2, L3 annotations in Scoris; do not use ticks.**

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Mark</th><th>Guidance</th></tr>
<tr><td>8</td><td>a</td><td></td><td>Any four from:
Calibrate colorimeter with (pure) water;
set to zero;
use range of concentrations of same dye;
measure absorbance / transmission;
produce graph of results;
test unknown concentration to find absorbance;
use graph to find concentration of unknown</td><td>4</td><td>allow idea that it is the amount of light passing through that is significant</td></tr>
<tr><td></td><td>b</td><td></td><td><table><tr><td>qualitative</td><td></td></tr><tr><td>semi - qualitative</td><td></td></tr><tr><td>quantitative</td><td>✓</td></tr><tr><td>semi-quantitative</td><td></td></tr></table></td><td>1</td><td></td></tr>
<tr><td>9</td><td>a</td><td></td><td>nucleus;
chloroplasts;</td><td>2</td><td></td></tr>
<tr><td></td><td>b</td><td></td><td>x1;
Both same size</td><td>2</td><td>allow 1:1</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td></tr>
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