

**Cambridge Technicals
Applied Science**

Unit 22: Global scientific information

Level 3 Cambridge Technical in Applied Science
05874

Mark Scheme for January 2023

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.

It is also responsible for developing new specifications to meet national requirements and the needs of students and teachers. OCR is a not-for-profit organisation; any surplus made is invested back into the establishment to help towards the development of qualifications and support, which keep pace with the changing needs of today's society.

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 2023

MARKING INSTRUCTIONS

PREPARATION FOR MARKING

TRADITIONAL

Before the Standardisation meeting you must mark at least 10 scripts from several centres. For this preliminary marking you should use **pencil** and follow the **mark scheme**. Bring these **marked scripts** to the meeting.

MARKING

1. Mark strictly to the mark scheme.
2. Marks awarded must relate directly to the marking criteria.
3. The schedule of dates is very important. It is essential that you meet the traditional 40% Batch 1 and 100% Batch 2 deadlines. If you experience problems, you must contact your Team Leader (Supervisor) without delay.
4. If you are in any doubt about applying the mark scheme, consult your Team Leader by telephone or by email.
5. **Crossed Out Responses**
Where a candidate has crossed out a response and provided a clear alternative then the crossed out response is not marked. Where no alternative response has been provided, examiners may give candidates the benefit of the doubt and mark the crossed out response where legible.

Rubric Error Responses – Optional Questions

Where candidates have a choice of questions across a whole paper or a whole section and have provided more answers than required, then all responses are marked and the highest mark allowable within the rubric is given. Enter a mark for each question answered into RM assessor, which will select the highest mark from those awarded. (The underlying assumption is that the candidate has penalised themselves by attempting more questions than necessary in the time allowed.)

Multiple Choice Question Responses

When a multiple choice question has only a single, correct response and a candidate provides two responses (even if one of these responses is correct), then no mark should be awarded (as it is not possible to determine which was the first response selected by the candidate). When a question requires candidates to select more than one option/multiple options, then local marking arrangements need to ensure consistency of approach.

Contradictory Responses

When a candidate provides contradictory responses, then no mark should be awarded, even if one of the answers is correct.

Short Answer Questions (requiring only a list by way of a response, usually worth only **one mark per response**)

Where candidates are required to provide a set number of short answer responses then only the set number of responses should be marked. The response space should be marked from left to right on each line and then line by line until the required number of responses have been considered. The remaining responses should not then be marked. Examiners will have to apply judgement as to whether a 'second response' on a line is a development of the 'first response', rather than a separate, discrete response. (The underlying assumption is that the candidate is attempting to hedge their bets and therefore getting undue benefit rather than engaging with the question and giving the most relevant/correct responses.)

Short Answer Questions (requiring a more developed response, worth **two or more marks**)















If the candidates are required to provide a description of, say, three items or factors and four items or factors are provided, then mark on a similar basis – that is downwards (as it is unlikely in this situation that a candidate will provide more than one response in each section of the response space.)

Longer Answer Questions (requiring a developed response)

Where candidates have provided two (or more) responses to a medium or high tariff question which only required a single (developed) response and not crossed out the first response, then only the first response should be marked. Examiners will need to apply professional judgement as to whether the second (or a subsequent) response is a 'new start' or simply a poorly expressed continuation of the first response.

6. Always check the pages (and additional lined pages if present) at the end of the response in case any answers have been continued there. If the candidate has continued an answer there then add an annotation to confirm that the work has been seen.
7. There is a NR (No Response) option. Award NR (No Response)
 - if there is nothing written at all in the answer space
 - OR if there is a comment which does not in anyway relate to the question (e.g. 'can't do', 'don't know')
 - OR if there is a mark (e.g. a dash, a question mark) which isn't an attempt at the questionNote: Award 0 marks - for an attempt that earns no credit (including copying out the question)
8. Assistant Examiners will email a brief report on the performance of candidates to your Team Leader (Supervisor) by the end of the marking period. Your report should contain notes on particular strength displayed as well as common errors or weaknesses. Constructive criticism of the question paper/mark scheme is also appreciated.

9. Annotations available in RM Assessor

Annotation	Meaning
	Correct response
	Incorrect response
	Omission mark
	Benefit of doubt given
	Contradiction
	Rounding error
	Error in number of significant figures
	Error carried forward
	Level 1
	Level 2
	Level 3
	Benefit of doubt not given
	Noted but no credit given
	Ignore

10. Abbreviations, annotations and conventions used in the detailed Mark Scheme (to include abbreviations and subject-specific conventions).

Annotation	Meaning
/	alternative and acceptable answers for the same marking point
DO NOT ALLOW	Answers which are not worthy of credit
IGNORE	Statements which are irrelevant
ALLOW	Answers that can be accepted
()	Words which are not essential to gain credit
—	Underlined words must be present in answer to score a mark
ECF	Error carried forward
AW	Alternative wording
ORA	Or reverse argument

Question		Answer	Marks	Guidance
1	(a)	<p>information holder</p> <p>category</p> <p>✓✓✓</p>	3	
1	(b)	<p>Any two from:</p> <p>research group reason – gathering/analysing/sharing data / providing information ✓</p> <p>international body reason - active in more than one country ✓</p> <p>educational institution reason – providing training / educates farmers on how to use the device ✓</p>	2	<p>ALLOW – two correct categories but with no or only one reason = 1 max.</p> <p>DO NOT ACCEPT company research group</p>

Question		Answer	Marks	Guidance
1	(c)	<p>(access) to software/ smartphone app ✓ to record/analyse data about nutrients/named nutrients in grains ✓</p> <p>(funding) money / subsidy / (service) charge ✓ (to pay for) the device / (grain sampling) equipment or storage/analysis of data ✓</p> <p>(promotion) raising awareness/ providing seminars / reaching a larger audience / promoting the use of the device / the TFA ✓ to further aims of sustainable / profitable farming / improved farming ✓</p> <p>(sharing) data/measurements/information with stakeholders / TFA / manufacturers / other farmers ✓ to inform decisions about the grain / when to harvest ✓</p>	8	<p>IGNORE generic responses e.g. access to the service / access to new technology</p> <p>IGNORE generic responses e.g. funding for research</p> <p>IGNORE generic responses e.g. services / technology</p> <p>IGNORE generic responses e.g. promoting a product / promoting the research</p> <p>IGNORE generic responses e.g. other organisations</p> <p>IGNORE generic responses e.g. sharing knowledge</p>
		Total	13	

Question	Answer	Marks	Guidance
2	<p>[Level 3] Candidate shows a high level of understanding and gives a thorough explanation using at least one example from each of the three principles of confidentiality, integrity or accessibility. The candidate links most of these ideas to the correct principles. The explanation follows a clear logical order.</p> <p style="text-align: right;"><i>(5 – 6 marks)</i></p> <p>[Level 2] Candidate shows an understanding and uses examples from at least two of the principles of confidentiality, integrity or availability. The candidate links some of these ideas to the correct principle. The explanation follows some logical order.</p> <p style="text-align: right;"><i>(3 – 4 marks)</i></p> <p>[Level 1] Candidate shows a basic understanding and uses examples from either confidentiality, integrity or availability. With little evidence of a logical order.</p> <p style="text-align: right;"><i>(1 – 2 marks)</i></p> <p>[Level 0] Candidate includes fewer than two valid points.</p>	6	<p>Valid points to include:</p> <p>confidentiality</p> <ul style="list-style-type: none"> • personal data must be subject to appropriate safeguards / security • purpose of collection and disclosure must be specified / agreed <p>integrity</p> <ul style="list-style-type: none"> • collection of personal data must be limited, lawful and fair • personal data must be relevant, accurate and up to date • people must be able to correct their personal data • use of data must be limited to specific purposes / must not be used for anything other than the agreed purpose / not shared with other organisations • data controllers must comply with data protection principles / sanctions to enforce compliance <p>availability</p> <ul style="list-style-type: none"> • organisations must be open about personal data practices • policies / terms and conditions must be produced/shared • people must be able to access their personal data
	Total	6	

Question			Answer	Marks	Guidance
3	(a)		<p>Any two from: USA ✓ Africa / ✓ Far East ✓</p>	2	<p>ALLOW America / South America ALLOW Sub-Saharan / South Africa ALLOW Asia / China / India / Russia IGNORE Europe / named European countries</p>
3	(b)	(i)	<p>Any two from: passwords ✓ health data ✓ medical data/records ✓ biometric data ✓ sexual orientation ✓ financial data ✓</p>	2	<p>ALLOW weight</p> <p>ALLOW any of the recognised protected characteristics. racial or ethnic origin / political opinions / religious / philosophical beliefs /trade union membership</p>
3	(b)	(ii)	confidential ✓	1	
3	(c)		<p>Any six from:</p> <p>information security and risk no risk to privacy / personal data ✓</p> <p>no/limited risk of unauthorised access / (cloud services use) encryption ✓</p> <p>no/limited risk of loss/corruption of data ✓</p>	6	<p>ALLOW no risk to national security / the type of data transferred is not high risk / is not a threat to security</p> <p>ALLOW idea that it promotes harmonisation of regulations or exemption due to similar / harmonised regulations / compliance with GDPR</p>

Question	Answer	Marks	Guidance
	<p>impact on stakeholders</p> <p>economic reasons e.g. sales / trade / funding / the data has value / stakeholders profit ✓</p> <p>idea that there is a contract between parties ✓</p> <p>idea that it will result in positive impacts on:</p> <ul style="list-style-type: none"> • knowledge e.g. reference to use of grain with different nutritional composition ✓ • products e.g. reference to crops / crop production ✓ • processes e.g. reference to when to harvest ✓ 		<p>ALLOW reverse arguments i.e. if the data are not exempt e.g. contracts could be lost / restrictions result in loss of trade/loss of funding</p> <p>IGNORE generic negative impacts e.g. poor decision making / loss of reputation / slowing/repeating research</p>
	Total	11	

Question		Answer	Marks	Guidance
4	(a)	D ✓	1	
4	(b)	H or G ✓	1	
4	(c)	A or E ✓	1	
4	(d)	F ✓	1	
4	(e)	E ✓	1	
4	(f)	A ✓	1	
4	(g)	H ✓	1	
		Total	7	

Question			Answer	Marks	Guidance
5	(a)	(i)	<p>Any three from:</p> <p>the limits/range of the technique are described / 300nm to 5mm ✓</p> <p>the data/measurements are 'statistically significant' ✓</p> <p>settings can be adjusted (for the sample) ✓</p> <p>lenses can be selected ✓</p> <p>various / multiple measurements are taken ✓</p>	3	IGNORE software
5	(a)	(ii)	<p>the data/measurements are processed by (specialist) software ✓</p> <p>a library of images can be built/analysed ✓</p> <p>data can be accessed/monitored 'in real time' ✓</p>	3	
5	(a)	(iii)	<p>Any two from:</p> <p>manual microscopy / volumetric techniques / equivalent spherical diameter / aspect ratio / transparency / optical lens / statistically significant / nanometre / imaging / variables ✓✓</p> <p>AND</p> <p>Any one from:</p> <p>the terminology will be understood by a specialist/scientist OR does not need to be explained to a scientist OR they/terms have a precise scientific meaning ✓</p>	3	ALLOW a correct term used in a sentence
5	(b)		<p>Any two from:</p> <p>copyright ✓</p> <p>Copyright, designs and patents Act (1988) ✓</p> <p>manufacturer has ownership / she does not own the image ✓</p>	2	MP2 gains 1 mark only

Question		Answer	Marks	Guidance
5	(c)	<p>it/the software is not a new/original technology/invention OR it is existing technology OR software is publicly/freely available ✓</p> <p>AND</p> <p>Any three from:</p> <p>it uses mathematical processes / makes calculations ✓</p> <p>it stores/displays images (electronically) ✓</p> <p>it records measurements ✓</p> <p>it stores/displays/modifies/changes data/tables/graphs ✓</p> <p>it is written in computer code ✓</p> <p>AVP ✓</p>	4	ALLOW the software/product has already been designed/made by another person/organisation.
		Total	15	

Question			Answer	Marks	Guidance
6	(a)	(i)	optical media ✓ idea that the data are preserved for the longest time OR data can be retrieved using a computer ✓	2	
6	(a)	(ii)	Any one from: data corruption ✓ software changes ✓ hardware changes ✓ AVP ✓	1	ALLOW ecf from (a)(i) e.g. paper deteriorates
6	(b)	(i)	encryption (of data) ✓ retrieval (of data) ✓	2	ALLOW confidentiality of data ALLOW ease of locating data
6	(b)	(ii)	Any one from: use back-up files ✓ file closure systems ✓ access via password / biometrics / keycard / two-stage authorisation ✓ training of personnel to use security protocols ✓	1	ALLOW encryption if this is not awarded in 6bi ALLOW use the cloud
6	(b)	(iii)	loss of contracts / business ✓ loss of reputation OWTTE ✓	2	ALLOW they may have to pay compensation / legal action ALLOW emotional distress IGNORE non-relevant negative impacts e.g. repeat of research / loss of funding
Total				8	

Need to get in touch?

If you ever have any questions about OCR qualifications or services (including administration, logistics and teaching) please feel free to get in touch with our customer support centre.

Call us on

01223 553998

Alternatively, you can email us on

support@ocr.org.uk

For more information visit

 ocr.org.uk/qualifications/resource-finder

 ocr.org.uk

 [Twitter/ocrexams](https://twitter.com/ocrexams)

 [/ocrexams](https://twitter.com/ocrexams)

 [/company/ocr](https://www.linkedin.com/company/ocr)

 [/ocrexams](https://www.youtube.com/ocrexams)



OCR is part of Cambridge University Press & Assessment, a department of the University of Cambridge.

For staff training purposes and as part of our quality assurance programme your call may be recorded or monitored. © OCR 2022 Oxford Cambridge and RSA Examinations is a Company Limited by Guarantee. Registered in England. Registered office The Triangle Building, Shaftesbury Road, Cambridge, CB2 8EA.

Registered company number 3484466. OCR is an exempt charity.

OCR operates academic and vocational qualifications regulated by Ofqual, Qualifications Wales and CCEA as listed in their qualifications registers including A Levels, GCSEs, Cambridge Technicals and Cambridge Nationals.

OCR provides resources to help you deliver our qualifications. These resources do not represent any particular teaching method we expect you to use. We update our resources regularly and aim to make sure content is accurate but please check the OCR website so that you have the most up-to-date version. OCR cannot be held responsible for any errors or omissions in these resources.

Though we make every effort to check our resources, there may be contradictions between published support and the specification, so it is important that you always use information in the latest specification. We indicate any specification changes within the document itself, change the version number and provide a summary of the changes. If you do notice a discrepancy between the specification and a resource, please [contact us](#).

Whether you already offer OCR qualifications, are new to OCR or are thinking about switching, you can request more information using our [Expression of Interest form](#).

Please [get in touch](#) if you want to discuss the accessibility of resources we offer to support you in delivering our qualifications.