

**Cambridge Technicals  
Applied Science**

**Unit 22: Global Scientific Information**

Level 3 Cambridge Technical in Applied Science  
**05847 - 05849/05874/05879**

**Mark Scheme for January 2022**

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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 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

Question		Answer	Mark	Guidance
1	(a)	individual researcher ✓	1	<b>ALLOW</b> individual / researcher
	(b)	<b>Any three from:</b> developing country ✓ rural ✓ online library / cloud ✓ library ✓ workplace ✓	Max 3	<b>ALLOW</b> farm workers <b>ALLOW</b> online / internet
	(c)	<b>Way 1:</b> funding ✓ <b>Explanation 1:</b> donors give to/fund charities when they are aware of and support their projects/causes <b>or</b> maximise use of funds ✓  <b>Way 2:</b> promotion / publicity ✓ <b>Explanation 2:</b> charities raise awareness of important issues ✓  <b>Way 3:</b> sharing ✓ <b>Explanation 3:</b> the knowledge gained can be used to develop new products/processes <b>or</b> knowledge of the harm caused by the chemicals <b>or</b> cause changes in regulations <b>or</b> promote further research <b>or</b> support compensation claims ✓	Max 4	Explanations <u>must</u> be linked to corresponding reasons <b>Max 2 marks</b> for ways <b>Max 2 marks</b> for explanations  <b>ALLOW</b> Way: to improve reputation <b>ALLOW</b> Explanation: education  <b>ALLOW</b> Way: others can access the information / the information is spread
	(d)	<b>Stakeholders:</b> (farming) community / (charitable) organisation ✓ <b>Impacts:</b> knowledge of risks to health and safety / knowledge of harm caused by their products / reduction in use of harmful products / knowledge of improved practices / requirement to change farming practice / issuance of stricter guidelines on processes for use ✓	2	<b>ALLOW</b> farm workers / patients / Artimus Discovery
		<b>Total</b>	<b>10</b>	

Question		Answer	Mark	Guidance
2	(a)	<b>Any two from:</b> (personal) username / password ✓ one-time, tokens/passwords ✓ (file) encryption ✓ (file) closure systems ✓	Max 2	<b>ALLOW</b> tracking / audit logging  <b>ALLOW</b> e.g., timed automatic logout
	(b)	security fencing / door codes / locks / ID badges / ID swipe badges / keycards / biometric recognition technology ✓	1	
	(c) (i)	Computer Misuse Act 1990 ✓	1	>1 tick negates the mark
	(ii)	Unauthorised access to computer material ✓  Unauthorised access with intent to commit or facilitate a crime ✓  Unauthorised modification of computer material ✓  Making, supplying, or obtaining anything which can be used in computer misuse offences ✓	4	<b>ALLOW</b> AW for access e.g., hacking, distribution, sharing, leaking <b>ALLOW</b> data theft / installing malware/viruses  <b>ALLOW</b> destruction of/deletion of/tampering with data  <b>ALLOW</b> e.g. use of other people's data to commit fraud / impersonation
	(d)	users more easily identified ✓ deterrence from e.g., unauthorised access / intentional destruction of / tampering with data ✓	2	<b>ALLOW</b> prevention for deterrence <b>ALLOW</b> greater risk of being caught
<b>Total</b>			<b>10</b>	

Question			Answer	Mark	Guidance
3	(a)	(i)	a network of remote servers / global servers ✓	1	<b>ALLOW</b> (storage of data) online / on the Internet
		(ii)	(Cloud service provider also supports clients...) operating systems / application programs / Apps / software / web server / VPN communications ✓	1	<b>ALLOW</b> AVP relating to services other than storage of data
	(b)		1. D ✓ 2. E ✓ 3. A or C ✓ 4. B ✓	4	
	(c)		<b>Any two from:</b> depends on internet access ✓ costs associated with exceeding data limits ✓ <b>questionable</b> security / privacy ✓  complex legal and regulatory compliance issues ✓	Max 2	<b>ALLOW</b> could be hacked <b>IGNORE</b> not secure
	(d)		<b>Example:</b> hard (disk) drives / HDD / (magnetic) tape / floppy disk ✓ <b>Benefit:</b> very high storage capacity / uninterrupted data recording for long periods of time / inexpensive / can be reused repeatedly / portable / doesn't need internet access ✓	2	
			<b>Total</b>	<b>10</b>	

Question		Answer	Mark	Guidance
4	(a)	<p><b>Any four from:</b>            durability / long shelf life ✓            reliability / less likely to lose data ✓            backup / creates a spare copy of the data ✓            portability / easy to transport ✓            stores large volume of data ✓</p>	Max 4	ALLOW cheap / easily available
	(b)	(i)	1	ALLOW Copyright and Patents Act / Copyright Act
		(ii)	Max 5	<p>ALLOW may only be copied with permission            ALLOW control over who is allowed to use the software</p>
	(c)	(i)	1	
		(ii)	Max 4	<p>IGNORE less equipment/resources            ALLOW difficulty of enforcement / prosecution less likely</p>
<b>Total</b>			<b>15</b>	

Question		Answer	Mark	Guidance
5	(a)	<p>technical control</p> <p>example</p> <p>control of network traffic</p> <p>access control</p> <p>data is converted using an algorithm</p> <p>encryption</p> <p>personal identification number</p> <p>firewall</p> <p>closed-circuit television CCTV ✓✓</p> <p>✓</p>	3	One mark for each correct line.
	(b)	<p>To address public concerns regarding the use of surveillance cameras ✓</p> <p>To explain the legal requirements to operators ✓</p>	2	
	(c)	<p><b>Administrative control:</b> Personnel control / Supervision/management structure / security awareness / testing ✓</p> <p><b>AND any one from (examples):</b></p> <p>training of personnel ✓</p> <p>security protocols (held online)</p> <p>staff handbook ✓</p> <p>written procedures ✓</p>	2	<p><b>ALLOW</b> e.g., management policy / documentation</p> <p><b>ALLOW</b> e.g., access requires a password / permissions</p>
<b>Total</b>			<b>7</b>	



Question			Answer	Mark	Guidance
6	(a)	(i)	public ✓	1	
		(ii)	the information can be accessed using the Freedom of Information Act ✓	1	<b>ALLOW</b> the information is <b>not</b> prejudicial to the financial or national security interests of the UK or would endanger the health and safety of individuals <b>or</b> the public have the right to know about community facilities <b>or</b> the public are funding the work
	(b)		<p><b>[Level 3]</b> Candidate shows a high level of understanding of a characteristic with some explanation <b>AND</b> a benefit with some explanation. The explanation follows a clear logical order. (5 – 6 marks)</p> <p><b>[Level 2]</b> Candidate shows an understanding of a characteristic <b>AND</b> a benefit with some explanation of either the benefit or the characteristic. The explanation follows some logical order. (3 – 4 marks)</p> <p><b>[Level 1]</b> Candidate shows a basic understanding of a characteristic <b>OR</b> a benefit. With little evidence of a logical order. (1 – 2 marks)</p> <p><b>[Level 0]</b> Candidate includes <b>fewer than two</b> valid points.</p>	6	<p>Valid points:</p> <p><b>Characteristics</b> of quality management of scientific information</p> <ul style="list-style-type: none"> <li>• accuracy <ul style="list-style-type: none"> <li>• enables risk assessment.</li> <li>• contaminants in soil are correctly identified</li> <li>• poor accuracy means risk is either overestimated resulting in unnecessary high cost or underestimated resulting in risk to health and safety</li> </ul> </li> <li>• accessibility <ul style="list-style-type: none"> <li>• information is made available in a format that the public can locate and comprehend easily</li> </ul> </li> <li>• scientific terminology <ul style="list-style-type: none"> <li>• terminology is used with precision and is explained</li> </ul> </li> </ul> <p><b>Benefits</b> of good quality information on stakeholders</p> <ul style="list-style-type: none"> <li>• knowledge <ul style="list-style-type: none"> <li>• decontamination processes are understood</li> </ul> </li> <li>• reassurance <ul style="list-style-type: none"> <li>• costs of remediation are justified</li> </ul> </li> <li>• reputation <ul style="list-style-type: none"> <li>• success/failure has economic/professional consequences</li> <li>• health and safety consequences</li> </ul> </li> <li>• sound basis for further investigation <ul style="list-style-type: none"> <li>• decisions based on reliable evidence</li> </ul> </li> </ul>
			<b>Total</b>	<b>8</b>	

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