Cambridge Technicals Applied Science

Unit 22: Global scientific information

Level 3 Cambridge Technical in Applied Science
05874

Mark Scheme for January 2024

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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.

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 question
    Note: 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
BOD	Benefit of doubt given
CON	Contradiction
RE	Rounding error
SF	Error in number of significant figures
ECF	Error carried forward
L1	Level 1
L2	Level 2
L3	Level 3
NBOD	Benefit of doubt not given
SEEN	Noted but no credit given
I	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)			4 4x1.1	
	(b)	(i)	**Any one from:** different methods used to process samples equipment used to process samples preparation of reagents used to process samples ✓	1 1x1.2	
		(ii)	The Training Manual / Cartagena protocol / LMO records ✓	1 1x1.2	**ALLOW** any information that is provided by BCH / a specific example e.g. the records of country decisions / risk assessments / donor and recipient organisms / roster of biosafety experts / detection methods **IGNORE** BCH unqualified

Question			Answer	Marks	Guidance
(c)	(i)		**Purpose** (to provide a set of) **rules and procedures** (for the safe handling, transfer, and use of LMOs) ✓ **Phrase** (specifically focusing on) **transboundary movements** ✓	2 2x1.2	
	(ii)		**Any one from:** compatibility of IT networks/systems/software packages different languages / translation unreliable data storage lack of infrastructure ✓	1 1x1.4	**ALLOW** language barriers
			Total	9	

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Question			Answer	Marks	Guidance
2	**(a)**		**[Level 3]** Candidate shows a high level of understanding and makes relevant links from the case study to access, ownership **AND** promotion. *(5 – 6 marks)* **[Level 2]** Candidate shows an understanding and makes some relevant links from the case study to access and **EITHER** ownership **OR** promotion. *(3 – 4 marks)* **[Level 1]** Candidate shows a basic understanding and makes some relevant links to **EITHER** access **OR** ownership **OR** promotion.. *(1 – 2 marks)* **[Level 0]** Candidate includes **fewer than two** valid points.	**6** 6x1.3	**access** • Parties have access to LMO records / detection methods / databases / online libraries • Parties have access to the QA/QC requirements for accreditation • Records of country decisions… are cross-referenced in such a way as to facilitate data retrieval. **ownership** • Individual laboratories adopt QA/QC practices e.g. sample tracking / personnel training • adoption of maintenance log checklists • risk assessments • appointment of competent national authorities • changes to national laws **promotion** • achieving minimum performance criteria / gaining of accreditation • raised awareness of the standards required for detection and identification of LMOs • the Training Manual will promote the goals of The Convention on Biodiversity / The Rio Declaration / Earth Summit
	(b)		public (third box) ✓	**1** 1x2.1	
			Total	**7**	

Question			Answer	Marks	Guidance
3	(a)		scientific terminology ✓ words and phrases that are scientifically defined / have precise scientific meaning / special language used by scientists / specialist terms / terms that have commonly agreed meanings amongst scientists ✓ e.g. Living Modified Organism / LMO ✓	3 3x2.3.1c	**ALLOW** other appropriate example from the case study, e.g. QA/QC
	(b)		**Any six from:** • Name of the equipment • Location of the equipment in the lab • Name of the manufacturer / model/Serial No. • Name of associated software • Name of individual doing the equipment check • Name of last individual to use the equipment • Date of receipt of equipment in laboratory / date equipment was placed in service • Date of checks of equipment for compliance / calibration / test standard • Idea of frequency of equipment checks / intervals between equipment checks • Operating procedures for equipment • Calibration procedures for equipment • Safety procedures for operation of equipment • Details of maintenance / repairs carried out • Records of the subsequent performance check ✓✓✓✓✓✓	MAX 6 6x2.3.2d	**ALLOW** the (type of) equipment used / what it is used for **ALLOW** how long the equipment has been in service **ALLOW** how to use the equipment **ALLOW** maintenance procedures / verification procedures **ALLOW** e.g. idea of fault diagnosis **ALLOW** 2 marks for any basic references to date, time, name, procedures, repairs

Question			Answer	Marks	Guidance
	(c)		C ✓ A ✓ D ✓ E ✓ B ✓	**5** **5x2.3.3 a-d**	
			Total	**14**	

Question			Answer	Marks	Guidance
4	**(a)**	**(i)**	A ✓	**1** 3.1	
		(ii)	F ✓	**1** 3.1	
		(iii)	E ✓	**1** 3.1	
		(iv)	D ✓	**1** 3.1	
		(v)	F ✓	**1** 3.1	
		(vi)	A ✓	**1** 3.1	
		(vii)	B ✓	**1** 3.1	
		(viii)	C ✓	**1** 3.1	
	(b)		ICO / Information Commissioner's Office	**1** 3.1	
			Total	**9**	

Question			Answer	Marks	Guidance
5	**(a)**	**(i)**	United Nations Convention on the Rights of Persons with Disabilities ✓	**1** 1x3.2.3	**ALLOW** people = persons
		(ii)	it is a human right ✓	**1** 1x3.2.4	**ALLOW** idea that there should be no barriers to access
	(b)		C A B or C D B C ✓✓✓✓	**4** 2x3.2	All 6 correct = 4 marks 4 to 5 correct = 3 marks 2 to 3 correct = 2 marks 1 correct = 1 mark
			Total	**6**	

	Question		Answer	Marks	Guidance
6	**(a)**	**(i)**	diagnosis (of breast cancer) ✓	**2** 2x4.1	**ALLOW** idea of discovering early-stage breast cancer / signs of cancer at an earlier stage / no misdiagnosis
			to identify who doesn't need surgery ORA ✓		**ALLOW** to reduce the number of unnecessary operations / avoid overuse of invasive treatments
		(ii)	(by keeping it) accurate ✓	**3** 3x4.1	**ALLOW** idea that inaccurate or incorrect data is removed
			complete ✓		**ALLOW** idea that no information is held back
			up to date ✓		**ALLOW** idea that the data is subject to updates and additions
		(iii)	*idea that* the AI will learn from or is programmed by:	**3** 3x4.1	
			cases where a diagnosis is confirmed by the image ✓		**ALLOW** idea that AI finds similarities in images and notes
			so the accuracy of the diagnosis will improve ✓		**IGNORE** accuracy unqualified
			many different cases / different ethnicities ✓		**ALLOW** idea of more data / more examples of mammograms (from other patients)
	(b)		confidentiality ✓	**4** 3x4.1 1x2.1	Correct order only.
			authorised ✓		**ALLOW** approved / permitted / allowed
			data protection ✓		
			private ✓		**IGNORE** sensitive / confidential / personal
	(c)	**(i)**	**Any one from:**	**1** 1x4.2	
			slowing/repeat of research / loss of reputation ✓		
		(ii)	back-up files ✓	**2** 2x4.2	**ALLOW** make copies
			data retrieval systems ✓		
			Total	**15**	

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