



Oxford Cambridge and RSA

# Tuesday 17 January 2023 – Afternoon

## Level 3 Cambridge Technical in Applied Science

05874 Unit 22: Global scientific information

Time allowed: 1 hour 30 minutes

C343/2301



**You must have:**

- the Insert
- a ruler (cm/mm)

**You can use:**

- a scientific or graphical calculator
- an HB pencil



Please write clearly in black ink. **Do not write in the barcodes.**

Centre number

Candidate number

First name(s) \_\_\_\_\_

Last name \_\_\_\_\_

Date of birth

### INSTRUCTIONS

- Use black ink. You can use an HB pencil, but only for graphs and diagrams.
- Answer **all** the questions.
- Write your answer to each question in the space provided. If you need extra space use the lined pages at the end of this booklet. The question numbers must be clearly shown.
- Use the Insert to answer the questions in Section A.

### INFORMATION

- The total mark for this paper is **60**.
- The marks for each question are shown in brackets [ ].
- This document has **16** pages.

### ADVICE

- Read each question carefully before you start your answer.

Answer **all** the questions.

### Section A

**This section relates to the case study on The Transforming Farming Alliance (see Insert).**

- 1** Some information holders mentioned in the case study are shown on the left of the model below.

The boxes on the right of the model include some categories of information holder.

- (a)** Draw straight lines to connect each **information holder** to its **category**.

Information holder	Category
	Educational institution
Cloud Service Provider	Company research department
Farmer	Individual researcher
Manufacturer	International body
	Research group

**[3]**

**(b)** The Transforming Farming Alliance (TFA) is also an information holder.

Suggest **two** categories of information holder, from the list shown in the model in **1(a)**, to which the TFA belongs.

Give reasons for your answer.

1 .....

reason .....

.....

2 .....

reason .....

.....

**[2]**

**(c)** Access, funding, promotion and sharing are some of the possible reasons for the transfer of scientific information.

Explain each of these terms and support each explanation with an example from the case study.

Access .....

.....

.....

Funding .....

.....

.....

Promotion .....

.....

.....

Sharing .....

.....

.....

**[8]**



3 In his seminars Azmi explains that the data that are generated and transferred using the device are exempt from any restrictions regulating the transfer of data across borders.

(a) Suggest **two** regions in the world that have legislation regulating the use of scientific information which is different to the UK.

1 .....

2 .....

[2]

(b) Data generated by the device are about the quality of grain.

This type of information is classified as 'non-sensitive' because sensitive information is not transferred.

(i) Give **two** examples of sensitive data.

1 .....

2 .....

[2]

(ii) Identify **one** other relevant classification for sensitive data.

Draw a **ring** around the correct classification.

**Completely-anonymised**

**Confidential**

**Public**

[1]

(c) The data that are generated and transferred using the device are exempt from any restrictions regulating the transfer of data across borders between countries.

Suggest **six** reasons why the data are exempt from these restrictions.

Use ideas about:

- information security and risk
- the impact on stakeholders.

1 .....

.....

2 .....

.....

3 .....

.....

4 .....

.....

5 .....

.....

6 .....

.....

[6]

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**PLEASE DO NOT WRITE ON THIS PAGE**

**Turn over for the next question**

## Section B

**You do not need the case study to answer these questions.**

- 4** Different forms of legislation, regulations and regulators govern the storage, use and access to information in the UK.

A – Data Protection Act

B – Protection of Freedoms Act

C – Freedom of Information Act

D – Computer Misuse Act

E – Information Commissioner’s Office

F – Copyright, Designs and Patents Act

G – Equality Act

H – UNCRPD (United Nations Convention on the Rights of Persons with Disabilities)

Use the letters **A** to **H** to identify where each of the following statements are found.

Each letter may be used once, more than once, or not at all.

Statement	Letter
“A person guilty of an offence under this section shall be liable on conviction on indictment, to imprisonment for a term not exceeding ten years or to a fine or to both.”	
“Accepting and facilitating the use of sign languages, Braille, augmentative and alternative communication, and all other accessible means.”	
“Identifiable living individual means a living individual who can be identified, directly or indirectly, in particular by reference to an identifier such as a name, an identification number, location data or an online identifier.”	
“Moral rights subsist in favour of the author, director or commissioner of the work.”	
“If we decide that there has been a serious failure to comply with the law, we will provide advice and instruction to help ensure the organisation gets it right in future.”	
“Processing, in relation to information, means an operation or set of operations which is performed on information, or on sets of information, such as collection, recording, organisation, structuring or storage.”	
“To provide training for stakeholders on accessibility issues facing persons with disabilities.”	

[7]



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**Turn over for the next question**

- 5 Nina is a Technical Sales Manager for a company that sells specialist microscopes from several different manufacturers to customers in industry.

Nina is preparing a brochure to advertise her company's products and services.

Nina writes an article about a technique called Flow Imaging Microscopy (FIM). She includes an instruction to the promotions team to insert an image of an FIM. This is her article:

A flow imaging microscope (FIM) performs three functions:

- it examines a fluid **as it flows** under a microscope
- it takes magnified digital images of **particles** in the fluid stream
- it uses a **variety of measurements** to identify and characterise the particles.

INSERT AN IMAGE  
OF A FLOW  
IMAGING  
MICROSCOPE HERE

FIM combines the benefits of manual microscopy with those of accurate volume measurement (volumetric techniques).

- Microscopic particle measurements are taken from images so quickly that the results are statistically significant.
- Multiple measurements are taken from each particle to provide the detailed information needed for analysis.
- Measurements include:
  - equivalent spherical diameter (ESD)
  - aspect ratio
  - transparency.

Our specialist software will process your measurements to give you an in-depth analysis of your sample and a better understanding of your data. This software also allows you to build a library of digital images using a visual spreadsheet. It allows you to monitor, in real time, how changing the variables in a process affect the outcome of the process.

Our FIM technology counts and characterises particles in the range from 300 nanometres to 5 millimetres. The settings on the instrument can be adjusted and different optical lenses can be selected for the different types of particles you are analysing.

(a) The characteristics of the quality management of scientific information are:

- accuracy
- accessibility
- scientific terminology.

(i) Identify **three** ways in which the **accuracy** of the microscope is described in Nina's article.

1 .....

2 .....

3 .....

[3]

(ii) Identify **three** ways in which the **accessibility** of the data is described in Nina's article.

1 .....

2 .....

3 .....

[3]

(iii) Give **two** examples of scientific terms in Nina's article.

Explain why Nina uses these terms.

**Examples**

1 .....

2 .....

**Explanation** .....

.....

.....

.....

[3]



6 Layla is a lab technician. She works for a company that processes and stores stem cells. Stem cells can be used to treat and cure many life-threatening diseases. Layla specialises in storing the cells in highly sterilised conditions.

The cells are stored in bags inside a metal canister. This is placed inside a storage tank at  $-190^{\circ}\text{C}$  along with thousands of other canisters.



(a) Thousands of patient records must be stored, possibly for many decades.

(i) Which type of information storage media is suitable for these patient records?

Choose **one** from:

- paper
- optical media
- magnetic media
- solid state media.

Justify your choice.

Type of media .....

Justification .....

..... **[2]**

(ii) One risk of the long-term storage of these records is unreadability.

Suggest why the data may become unreadable.

.....  
..... **[1]**

- (b) (i) Layla attaches a unique bar code to each storage bag and the same unique bar code to the storage canister. She scans both bar codes before placing the canister in the storage tank.



Suggest how this process reduces some risks associated with storing data.

.....  
.....  
.....  
..... [2]

- (ii) Describe **one** other way of reducing the risks associated with storing data.

.....  
..... [1]

- (iii) Describe **two** impacts on the company if the storage and handling of data is negligent.

1 .....  
.....  
2 .....  
..... [2]

**END OF QUESTION PAPER**

**ADDITIONAL ANSWER SPACE**

If additional answer space is required, you should use the following lined pages. The question numbers must be clearly shown in the margins – for example, 2 or 5(b).

A vertical line on the left side of the page is followed by 25 horizontal dotted lines, providing a ruled area for writing answers.



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