

Thursday 16 January 2020 – Afternoon

Level 3 Cambridge Technical in Applied Science

05874 Unit 22: Global scientific information

Time allowed: 1 hour 30 minutes

C343/2001



You must have:

- a ruler (cm/mm)
- a clean copy of the Pre-release (inside this document)

You can use:

- a scientific or graphical calculator

Please write clearly in black ink.

Centre number

Candidate number

First name(s) _____

Last name _____

Date of birth

INSTRUCTIONS

- Use black ink.
- 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.

INFORMATION

- The total mark for this paper is **60**.
- The marks for each question are shown in brackets [].
- This document has **20** pages.

ADVICE

- Read each question carefully before you start your answer.

FOR EXAMINER USE ONLY	
Question No	Mark
Section A: 1	/10
2	/11
3	/10
Section B: 4	/17
5	/6
6	/6
Total	/60

Answer **all** the questions.

Section A

This section relates to the case study on TriboCeram (see Insert).

1 TriboCeram supports R&D projects in several UK universities.

A university is an example of an information holder.

(a) What category of information holder is TriboCeram?

.....[1]

(b) Identify **two** locations of scientific information from which TriboCeram gathers data.

Put ticks (✓) next to the **two** correct answers.

rural	<input type="checkbox"/>
workplace	<input type="checkbox"/>
public library	<input type="checkbox"/>
online	<input type="checkbox"/>
home	<input type="checkbox"/>

[2]

(c) Ceramic surface coatings, such as those used by TriboCeram, are produced by a process called Physical Vapour Deposition (PVD).

A ceramic coating is a compound formed from a metal and a gas deposited on the surface of another metal.

The process and the compounds it produces could be protected by legislation. In practice it is very difficult to protect this type of intellectual property.

(i) State the name of the legislation that protects intellectual property rights in the UK.

.....[1]

(ii) TriboCeram operates worldwide.

Suggest **two** reasons why it is difficult for the company to protect its intellectual property outside the UK.

1

2

[2]

(iii) Suggest **four** other reasons why it is difficult to use legislation to protect knowledge of the processes and the compounds developed by companies such as TriboCeram.

1

2

3

4

[4]

(b) Information on standard quality assurance (QA) tests in procedures is classified as public information.

(i) Suggest why the public has access to information about QA testing procedures.

.....

.....

.....

.....

.....

.....

.....

.....[3]

(ii) Identify **one** appropriate classification for the data relating to the deterioration of replacement joints.

Draw a **circle** round the correct classification.

non-sensitive confidential public classified

Explain your answer.

.....

.....

.....[2]

3 TriboCeram receives different components from its customers.

Each component is given a code number. For example:

MUN-1015-SC101

The code number indicates:

- the name of the customer
- a description of the component
- the treatment process.

(a) Suggest how the code number supports quality management of scientific information in terms of **accuracy**, **accessibility** and **reassurance**.

accuracy

.....

accessibility

.....

reassurance

.....

[3]

- (b) If the use of the code number leads to a **poor** quality of information, TriboCeram may damage its reputation with customers.

Draw a straight line to link four **other consequences** of poor quality of information to the correct **explanation**.

consequence	explanation
misinformation	TriboCeram management team consider that the management of information is effective.
emotional stress	TreboCeram may treat the wrong component in error.
bad decision-making	TreboCeram customer team receive a number of complaints from dissatisfied customers.
delusion	The name of one of the customers is incorrect.

[4]

- (c) One principle of information security is confidentiality.

Describe **three** design features of an information system that ensure confidentiality.

1.....
.....

2.....
.....

3.....
.....

[3]

Section B

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

- 4 Diagnosing disease is costly and time-consuming, especially in developing countries with limited resources.

Betty is a healthcare visitor for an international medical organisation.

She takes test samples from female patients to assess their risk of developing cervical cancer.

Betty inserts the samples into a device that clips on to a smartphone camera. It detects the presence of markers that indicate the risk of cancer and produces images of the test samples.



The images are sent to a computer which analyses them, assesses for the risk of cancer, and returns the images to the smartphone together with the results.

- (a) What type of information storage is used in a smartphone?

Put a tick (✓) in the box next to the correct answer.

magnetic media

optical media

paper

solid-state media

[1]

(b) Identify **one** main advantage and **one** main disadvantage of using a smartphone to collect this test data.

advantage

.....

disadvantage

.....

[2]

(c) Identify the main access issue when using a smartphone in remote locations.

.....[1]

(d) Betty accesses her smartphone using her fingerprint.

A fingerprint is an example of biometric information. Legislation covers the use of biometric information.

(i) Name the UK legislation which covers the use of biometric information.

.....[1]

(ii) Describe **two** key features of the legislation and how it relates to biometric information.

1

.....

2

.....

[2]

(iii) Suggest **one** other source of biometric information.

.....[1]

(e) Copies of the images and the test results obtained by Betty are stored in files on the computer.

The file names are anonymised so that they cannot be linked directly to individual patients.

(i) Explain why images and test results are stored on the computer.

.....
.....
.....
.....
.....[3]

(ii) Draw a **circle** round **two** words in the list below that best explain why file names are anonymised.

availability confidentiality encryption integrity protocol reputation

[2]

(iii) Suggest how completely anonymised files may be linked to individual patients.

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

(f) The test results are transmitted to the international medical organisation headquarters.

Suggest **one** way in which the medical organisation makes use of the test results.

Give an explanation for your suggestion.

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

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Turn over for the next question

5 Heidi is an Information Security Officer at Ramsbrook University.

Part of her role is personnel training.

She uses **Fig. 5.1** to illustrate the relationships between different security concepts.

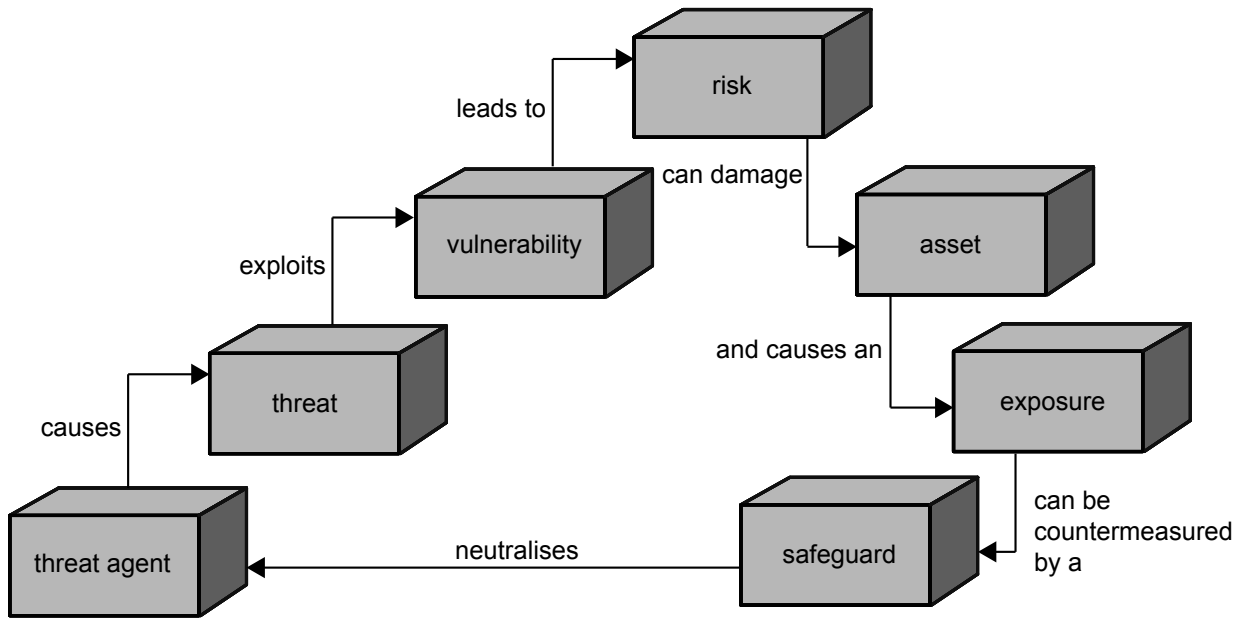


Fig 5.1

(a) Heidi uses examples to explain the security concepts in her diagram.

Draw one line from each **security concept** to one correct **example of the concept**.

security concept	example of concept
	personnel not trained to use security protocols
threat agent	anti-virus software
vulnerability	data
asset	system malfunction
	hacker

[3]

(b) Some software applications automatically install updates. Sometimes these updates contain 'patches' to address security concerns.

(i) Which concept in **Fig. 5.1** relates to the term 'patch'?

Put a tick (✓) in the box next to the correct answer.

- exposure
- risk
- safeguard
- threat

[1]

(ii) Suggest how a patch improves information security.

.....

.....

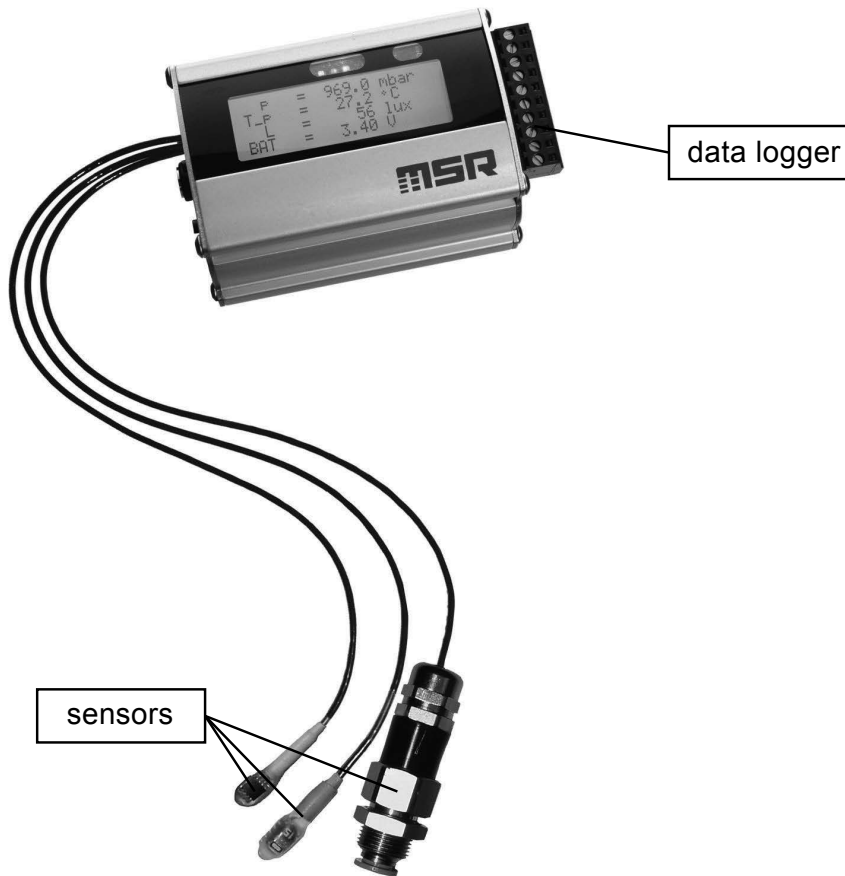
.....

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

6 Kareem is a marine conservationist. He has been invited to participate in a research project to assess the impact of climate change on commercial fisheries.

The information will be used to inform government decisions on whether to grant or withdraw fishing licences to private companies.

Kareem proposes to monitor changes to water temperature, salinity and dissolved oxygen concentration. He intends to use a range of sensors attached to a data logger.



The product specification of the data logger states:

The data logger has USB, WiFi and Bluetooth options. The software, which is downloaded from the manufacturer’s website, is available for PC Windows, Mac OS, iPad iOS, Android & Chromebook.

Kareem will analyse the data he collects using his laptop.

(a) Kareem is concerned about compatibility.

State what is meant by compatibility and explain how Kareem can avoid the issue.

.....

.....

.....

.....

[2]

(b) Kareem must comply with the Information Commissioner’s Office Code of Practice on the regulation of environmental information.

(i) Suggest **two** reasons why it is important that data is kept confidential.

1.....
.....
2.....
.....

[2]

(ii) Suggest why some people think that data should **not** be treated as confidential but should be publicly available.

.....
.....

[1]

(c) Another part of the data logger product specification states:

10/100 Mbps Ethernet interface

(Mbps = Megabits per second)

Suggest why this product specification is an advantage.

.....
.....

[1]

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 1(a) or 2(b)(i).

A large vertical rectangular area containing 25 horizontal dotted lines for writing answers.

A series of horizontal dotted lines for writing, spanning the width of the page.

A series of horizontal dotted lines for writing, spanning the width of the page.

A series of horizontal dotted lines for writing, spanning the width of the page.



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