

Markscheme

May 2026

Digital society

Higher level

Paper 3

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1. (a) State **two** ways in which data can be sanitized. [2]

Answers may include:

- (Deliberately) **destroying** the hard drive, e.g. Shredding.
- **Data erasure / Wiping data** (Using software to overwrite the data with new data).
- Encrypting the data (with a strong encryption key)
- Restoring to factory settings/System Reset
- Strong **magnet/degausser** for hard disk drives.
- **Data masking.**

Notes to examiners

*As the command term is 'state' only simple statements are required. These simple statements are shown by the **bold** text.*

If the response correctly lists wiping, destroying but incorrectly applies it e.g. destroying motherboard – BOD.

Do not accept:

Delete data as this is not permanent and can be restored easily

Replacing components as the data is still available.

Formatting a SSD or hard disk (as does not permanently remove the data)

Award [1] for stating each way data may be sanitized up to [2].

- (b) Identify **two** reasons why the data on digital devices must be sanitized before the devices are reused. [2]

Answers may include:

- Data privacy of the owner - may contain personal/sensitive information.
- The data subjects have not given permission for this data to be used by other parties.
- The data could be copied and sold, or otherwise used for illegal purposes.
- To ensure that viruses & malware or corrupt software are removed before passing on to next user
- To ensure legal compliance e.g. data protection laws
- To ensure the donating company is not violating software license agreements (often software is licensed to the company not the hardware)
- To protect corporate intellectual property of the donating company
- To protect the reputation of company should any of the points above happen

Note to examiners:

Do not accept these responses as they are not related to data (more to do with usability):

Freeing up space so that donated computers have maximum storage capacity

So that the donating computer appears new to the new owner

Award [1] for identifying each reason why data on the digital devices must be sanitised before they are reused up to [2].

2. (a) Explain how R2 certification could help Honshu Recycling reduce the impact of its e-waste on the environment.

[3]

Answers may include:

- The R2 certificate is a guarantee of sustainable and environmentally friendly practices.
 - This includes material recovery - components (like gold or copper) are recovered responsibly to prevent toxic materials from reaching landfills.
 - Resulting in less e-waste being disposed of.
-
- Any company with the R2 certificate will need to have met detailed requirements for the handling of laptop components.
 - This includes a requirement that the company must ensure that any outsourced recycling also adheres to certain standards.
 - Resulting in confidence that their actions will not lead to more e-waste in the environment being disposed of unethically by these companies.
-
- The R2 certificate is a guarantee of sustainable and environmentally friendly practices.
 - With the requirements of R2 certification ensuring the prevention /minimization of air and water pollution.
 - Resulting in less damage being done to the environment where the recycling takes place
-
- The R2 certificate is a guarantee of sustainable and environmentally friendly practices.
 - The requirements of R2 certification includes the handling of hazardous e-waste
 - Resulting in less hazardous and toxic elements entering the environment as part of the recycling process.
-
- Having the R2 certification will increase reputation of company to be trustworthy for recycling (note: this point is only valid if it leads to impact of e-waste on environment)
 - Leading to more of the community using their services
 - Resulting in more e-waste being disposed of responsibly rather than being dumped in landfill

Note to examiners:

Developments may include further explanations of the initial reason such as an impact/implication of e-waste on the environment

Award [1] for identifying how certification can help Honshu Recycling reduce the impact of its e-waste on the environment and [1] for each development of that point up to [3].

- (b) Seikan Finance ensured that its refurbished laptop computers had been sanitized before they were donated to an organization that supports local schools.

Explain **one** disadvantage for a student of using a refurbished laptop computer donated by Seikan Finance.

[3]

Answers may include:

- Older laptop computers may struggle to run some programs, online applications, or educational tools that are needed for schoolwork
- especially those requiring high processing power, like graphic design software
- meaning they will not be able to use the programs, online applications, or educational tools to their full potential to benefit their schoolwork.

- Older systems may not support the latest security updates,
- leaving the students vulnerable to cyber threats or require software updates
- which may have impacts on other aspects of their lives, such as potential for leaking of personal files – linked to cyberbullying or putting school networks at risk if brought to school; or may not meet the requirements to go on school network.

- Older laptop computers might have degraded batteries that require frequent charging
- this would limit their use in a classroom with limited power points
- impacting on completing assignments or assessment tasks/tests in class.

- Older laptop computers might not have features such as touchscreen or high-resolution displays, or connectivity points such as USB-C
- which may mean that certain software functionality may not be accessible.
- meaning the software cannot be used to its full potential or in the way intended that would benefit their schoolwork.

- Older laptop computers might have failing components that do not perform optimally
- this could mean that the laptop is not reliable
- impacting the student, they may not being able to complete their work, while the laptop is in repair

- Older laptop computers might have components that could become faulty
- this could create health and safety issues such as leaking of chemicals, acids
- for example – lithium batteries could cause burns, overheating of faulty components could create toxic gases that the student would inhale

- Older laptop computers may only last for a short period of time
- which may mean that the student has to change their laptop frequently throughout their school life
- meaning that they (the student) have (has) to spend more time setting up their laptop and transferring their school files

Note for examiners:

*For **[3]** marks the response needs to refer to how a student may use the laptop in context, not just a generic response*

*For generic responses – maximum marks awarded **[2]***

*Award **[1]** for one disadvantage for a student of using a refurbished laptop computer, and **[1]** for each development of that point up to **[3]**.*

3. Aoi Nakamura and Hina Ito disagree about which end-of-life management strategy would be most appropriate for the disposal of old digital devices by Seikan Finance.

Evaluate these different viewpoints.

[8]

Notes to examiners:

*Marks should be awarded based on the guidance below alongside the level descriptors in the markband. **The focus of the response needs to be about the different viewpoints and their appropriateness for the company; otherwise, the response becomes a repeat of Question 4.***

*The response should **consider the nature of the company/organisation**. For example, Seikan Finance is likely to take a more cost-based approach (i.e., the most economically appropriate option for a finance company) but could easily argue that recycling would benefit the organizations economically.*

*Note to examiners: **The conclusion to the discussion should be about the appropriateness of the different strategies for the company.** The conclusion should justify which strategy would benefit, or be more appropriate for, the company more than the other; and it could also justify that both be used – but the compromise does not need to be described in detail, only justified e.g. some of the best cared for machines can be sent for reuse and the others sent for recycling – this could be based on recommendations from the reuse and the recycling company. **Other conclusions should be accepted if justified.***

*A **compromise conclusion** could be that the finance and resources manager will be happy with the reuse company if the staff impact and other costs can be shown to be manageable, e.g. by the staff volunteering to be part of the process in their own time. The community contact manager could be happy with the recycle company if any payment for the machines is donated to the social programs of the company.*

Additional information

1–2 marks Limited – lists, ineffective, unstructured

Lacks understanding of the question, with **basic** statements about the two viewpoints. There are **no** conclusions.

A response that discusses the interventions and not the viewpoints is most likely to fall in this category as they will often repeat what they wrote for Q4 where they are awarded marks

3–4 marks Partial – descriptive, basic, brief

There is an **attempt (directly or structurally)** to compare **and/or** contrast the different viewpoints. A conclusion may be **stated** but has little support. There is **little or no context** for the comparisons/contrasts.

3 marks - A response that just rephrases the bullet points in source c and d and does not make a reference to the company in source A

4 marks – in addition some form of conclusion or attempt at comparing.

5–6 marks Adequate – Analytical, relevant, logical

There are **limited** comparisons **and/or** contrasts between the different viewpoints. Any conclusions go **beyond** unsubstantiated statements.

Implicit connections are made to the context in which this discussion is taking place (i.e., understands the nature of the company)

Implicit references are made to the sources **and/or** independent research.

For this markband, we are looking for **relevant & analytical** - the response must implicitly be linked to the company in Source A, there is some explanation of why the viewpoints are different in their perspectives, acknowledging the role of Aoi and Hin and how/why they might be different. This response may also make links to the pros and cons of the interventions as support or links to Source B.

7–8 marks In depth – evaluative, insightful, coherent

There are **direct** comparisons **and** contrasts between the different viewpoints. Any evaluations/conclusions are **substantiated**.

Explicit connections are made to the context in which this discussion is taking place (i.e., understands the nature of the company)

Explicit references are made to the sources **and** independent research.

For this mark band, we are looking for **insightful, evaluative & coherent**: the quality of the conclusion comparing the usefulness and relevance of the different viewpoints for the company, and arguments being made and there may be more explicit linking to the sources and nature of the company. There may be some insights about the relevance of the viewpoints by the staff in Source C & Source D.

Answers may include:

Differences:

Aoi's viewpoint

- Takes a more pragmatic / narrow / transactional approach.
- The bottom line is more important than the ethics.
- Concerned about the time spent on this task by the IT department.
- To some extent, the updating process is a necessary evil.
- There is an opportunity to save money.
- Is only focused on the impacts to his company.

Hina's viewpoint

- Sees the process as part of a bigger picture.
- The ethical end of life disposal is more than just the financial cost.
- Wants to build relationships between the company and the community it serves.
- Wants to position the company at the forefront of the environmental and ethical disposal/reuse of digital devices.
- Based on sustainable practices (triple bottom line – for people, profits and planet).

Similarities – concerns and wants that may be common

- Want to do the right thing by not dumping their old digital devices in landfill, which would lead to pollution of the environment.
- Have concerns about the recycling company disposing of the laptops without recycling all the components.
- Have concerns about the distance travelled by the laptops to complete the process.
- Want to ensure the process aligns with the green credentials of the company.
- Want more information about what the reuse company will do with the SSDD/hard drives on the laptops (disposal or wipe).
- Want guarantees about the data sanitization process.
- Require certification to ensure that the laptops are suitable for reuse (if this is the chosen option).
- Want to consider the implications of this process for the ethical and corporate social responsibility credentials of the company.

Conclusion points:

- The reuse of the devices still ultimately leads to the need for recycling
- The corporate social responsibility benefit of recycling is largely equivalent to that obtained by reuse
- The different viewpoints are competing with different priorities, and the company will need to decide which to prioritise

Cs	Guide, pre-release or keywords	Suggestions of what we are looking for in the response
Context	Environment	The extent to which e-waste can be minimised
Content	Reuse Recycling Data sanitization	The technology that underpins recycling and reuse includes: SSDD/Hard drives, computer hardware, Policies: Green computing, planned obsolescence, approaches to sustainability, corporate social responsibility, extension strategies, product life cycle Triple bottom line, circular economy
Concepts	change, spaces, systems, values, ethics	Change: new approaches to end-of-life management for laptops Spaces: what is the size of the ‘space’ in which these processes occur, how far do components travel in each process? Systems: digital devices as part of an IT system or as part of a distributed cloud-based network. Value and ethics: privacy & security concerns from the potential access to, use of and sharing of sensitive data, How can the potential for data leaks be minimised? Keywords that may be used – privacy, security, anonymity, responsibility, accountability, certification, sustainability

Keywords: change, spaces, systems, values, ethics, data, privacy, security, anonymity, responsibility, accountability, certification, sustainability, corporate social responsibility.

Please use the markbands on page 11.

The following markband should be used with responses to question 3.

HL Paper 3, question 3	
Marks	Level descriptor
0	The work does not reach a standard described by the descriptors below.
1–2	• The response shows a limited understanding of the demands of the question. • The response is of limited relevance. The response is descriptive and consists mostly of unsupported generalizations. • The response has limited organization.
3–4	• The response shows some understanding of the demands of the question. • The response is primarily descriptive with some evaluation demonstrated but this is not sustained or fully supported. • The response is partially organized.
5–6	• The response shows adequate understanding of the demands of the question. • The response demonstrates adequate evaluation that is relevant and supported. • The response is adequately organized.
7–8	• The response is focused and shows an in-depth understanding of the demands of the question. • The response demonstrates sustained evaluation that is relevant and well-supported throughout. • The response is well-structured and effectively organized.

4. Seikan Finance has investigated two interventions for the end-of-life management of its digital devices:
- Reuse
 - Recycle

Recommend which of the interventions should be chosen.

[12]

The response should make reference to the pre-release, the sources and independent research (IR) into these two interventions.

Notes to examiners:

The following are indicative of good practice (for the 7-9; 10-12 markband)

- The response should **explicitly** evaluate the interventions using the **appropriate** HL intervention evaluation framework criteria: **ethics, feasibility, cost, innovation, acceptability, equity**. The points below have the specific criteria attached to them. Note – it is not a requirement that all evaluation criteria are met but candidates should select those that are most relevant.
- The higher-level descriptors need to have an **explicit trade-off for the pros and cons**. Lower-level descriptors will present the points but not compare and contrast them. Also, higher-level descriptors need to have the **trade-offs used to support the recommendations**.
- To reach the higher-level descriptors the nature of the company needs to be considered. The response should be **framed within their context**.

The following are indicative of poor practice

- Generic or pre-rehearsed responses that are **context independent** are unlikely to exceed six marks.
- Unbalanced responses – candidates may select only one intervention to evaluate and only discuss the positive aspects – this will probably cap the response to 6 marks
- Generic responses that make statements that contradict the sources – do not award marks for these comments – e.g. costs – a generic response may state that it is cost effective to donate – yet source B states that they prefer companies to drop off devices which can be a cost and source C states that IT need to get devices ready which can be a cost
- **Accept a compromise recommendation**, e.g. using both methods, but needs some explanation of how it would work for the higher-level descriptors.
- **Independent research**, examples e.g. naming brands e.g. Samsung, Apple with a generic response may be considered implicit IR, details of how they are used and applied to the argument would make them explicit.

There may be responses that are a combination of pre-rehearsed and generic comments (which appear plausible and relevant) but bear little resemblance to Seikan Finance and/or do not use the evaluation framework. It will be necessary to look for a best fit between these different requirements when awarding a mark.

Only the positive aspects of each intervention are included in the list below. The negative aspects are in many cases the opposite and can be inferred.

Answers may include:

About reuse:

From pre-release and intervention inquiries:

- Reuse does not lead to the destruction of the laptop (acceptability, cost).
- Is likely to lead to less e-waste (acceptability)
- Provides a more ethical / altruistic approach (values, ethics).
- May lead to less transporting of the laptops, especially if the laptops are donated to the local community (feasibility, cost)
- May not lead to inadvertent or deliberate dumping of e-waste (values, ethics)
- May be more transparent as recycled laptop parts may go to multiple locations (acceptability).
- Computers can be reused by a variety of individuals in different places (acceptability, feasibility)
- May lead to increased awareness of the problems associated with e-waste (acceptability)
- May be part of a triple bottom line (3Ps) strategy – improvements for people, planet and profit (ethics)
- **But** reuse means that the information on the laptops needs to be permanently deleted before reuse which may not happen (cost, feasibility, ethics)

From sources:

Source A:

- Aligns with the ethos of the company (values, ethics).
- Aligns with the needs of the company (cost, feasibility).

Source B(b):

- Aligns with the ethos of the company (values, ethics).
- Addresses the digital divide (change, equity, ethics innovation).
- Builds community links (equity, acceptability).
- **But** all the old laptops may not be reused and become e-waste (cost, acceptability, feasibility, ethics).

Source C: basically, against reuse on practical grounds

- Satisfies the needs of the company (cost, feasibility).
- **But** will require delivery of the computers to the reuse company (cost, feasibility, acceptability).
- **But** will require the IT department to be involved with the reuse, taking time (cost, feasibility, acceptability).
- The fact that there is no mention of data sanitization should be a concern for the finance manager.

Source D: basically, for reuse on values and ethical grounds

- The company is seen as socially responsible (acceptability).
- Doing the “right thing” is more important than the bottom line / financial costs (acceptability).
- Allows the IT department to be involved with the community through helping and supporting with the reuse (acceptability, values, ethics).
- Is a way of creating a positive relationship with our community. (acceptability, systems, values, ethics).

About recycling:

Note to examiners: Do not award marks where the candidate states the advantages of recycling compared to disposing of the laptop in landfill. The question is based on the advantages of recycling compared to reuse.

From pre-release and intervention inquiries:

- Ensures that there is no chance of customers’ data being shared as SSDD / hard drive is completely destroyed (systems, ethics).
- Can be more straight forward for the company (feasibility, cost).
- The company may get paid for the old devices as the recycling company will sell the parts (cost).

From the sources:

Source A:

- Can be more straightforward for the company (feasibility, cost).
- Aligns with the needs of the company (cost, feasibility).

Source B(a):

- This company collects the old laptops – no need to drop off (cost feasibility).
- Provides certification to prove the destruction of the laptop (acceptability, ethics)
- Sensitive data is protected during collection (acceptability ethics).
- Ensures the e-waste is disposed of in an environmentally friendly way (acceptability).
- Allows for the reuse of rare-earth metals, gold, etc (acceptability).
- **But** there may be parts that cannot be recycled and will become e-waste (acceptability).
- **But** the transparency of the process is lacking, so the company does not know what happens to the computers, even with the certificate of destruction (acceptability, feasibility, ethics).

Source C: basically, for recycling on practical grounds

- Will be quicker and easier to implement than reuse (feasibility, cost).
- Will not involve the IT department as much as reuse (feasibility, cost).
- Recycling companies may buy the laptops to recycle them as they make money from recycling (cost).
- Guarantee of effective and efficient recycling (cost, feasibility).

Source D: basically, against recycling on ethical and values grounds

- Can be seen as a way to demonstrate the company's green credentials (acceptability, values, ethics).
- **But** is a form of green-washing and not taking responsibility for the end-of-life laptops (values, ethics, acceptability).
- **But** misses out on opportunities to be involved with the community, which could have other benefits (values, ethics, acceptability).
- **But** putting profit ahead of being a good digital citizen, as the cost to be involved is not large, considering the other benefits (ethics, values, feasibility, acceptability).
- **However**, some laptops could be reused and some recycled to get the benefits of both methods (acceptability, values, feasibility).

Keywords: privacy, anonymity, security, authentication, e-waste, trust, green computing, digital divide, accountability, change, power, systems, values, ethics, transparency, equity, cost, feasibility.

Please refer to the markband on page 16.

The following markband should be used with responses to question 4.

HL Paper 3, question 4	
Marks	Level descriptor
0	The work does not reach a standard described by the descriptors below.
1–3	- The response shows a limited understanding of the demands of the question. - The response consists mostly of unsupported generalizations with limited relevant knowledge. - No recommendations are presented or those that are presented have only limited support. - The response has limited organization.
4–6	- The response shows some understanding of the demands of the question. - The response demonstrates some knowledge, but this is not always relevant or accurate and may not be used appropriately or effectively. - Recommendations are presented with some support although this is not sustained and only partially effective. - The response is partially organized.
7–9	- The response shows adequate understanding of the demands of the question. - The response is adequately supported with relevant and accurate knowledge. - Recommendations are presented and effectively supported. - The response is adequately organized.
10–12	- The response is focused and shows an in-depth understanding of the demands of the question. - The response is well-supported throughout with relevant and accurate knowledge. - Recommendations are presented and well-supported with a clear consideration of possible trade-offs and implications. - The response is well-structured and effectively organized.