

Markscheme

November 2023

**Information technology
in a global society**

Higher level

Paper 3

© International Baccalaureate Organization 2023

All rights reserved. No part of this product may be reproduced in any form or by any electronic or mechanical means, including information storage and retrieval systems, without the prior written permission from the IB. Additionally, the license tied with this product prohibits use of any selected files or extracts from this product. Use by third parties, including but not limited to publishers, private teachers, tutoring or study services, preparatory schools, vendors operating curriculum mapping services or teacher resource digital platforms and app developers, whether fee-covered or not, is prohibited and is a criminal offense.

More information on how to request written permission in the form of a license can be obtained from <https://ibo.org/become-an-ib-school/ib-publishing/licensing/applying-for-a-license/>.

© Organisation du Baccalauréat International 2023

Tous droits réservés. Aucune partie de ce produit ne peut être reproduite sous quelque forme ni par quelque moyen que ce soit, électronique ou mécanique, y compris des systèmes de stockage et de récupération d'informations, sans l'autorisation écrite préalable de l'IB. De plus, la licence associée à ce produit interdit toute utilisation de tout fichier ou extrait sélectionné dans ce produit. L'utilisation par des tiers, y compris, sans toutefois s'y limiter, des éditeurs, des professeurs particuliers, des services de tutorat ou d'aide aux études, des établissements de préparation à l'enseignement supérieur, des fournisseurs de services de planification des programmes d'études, des gestionnaires de plateformes pédagogiques en ligne, et des développeurs d'applications, moyennant paiement ou non, est interdite et constitue une infraction pénale.

Pour plus d'informations sur la procédure à suivre pour obtenir une autorisation écrite sous la forme d'une licence, rendez-vous à l'adresse <https://ibo.org/become-an-ib-school/ib-publishing/licensing/applying-for-a-license/>.

© Organización del Bachillerato Internacional, 2023

Todos los derechos reservados. No se podrá reproducir ninguna parte de este producto de ninguna forma ni por ningún medio electrónico o mecánico, incluidos los sistemas de almacenamiento y recuperación de información, sin la previa autorización por escrito del IB. Además, la licencia vinculada a este producto prohíbe el uso de todo archivo o fragmento seleccionado de este producto. El uso por parte de terceros —lo que incluye, a título enunciativo, editoriales, profesores particulares, servicios de apoyo académico o ayuda para el estudio, colegios preparatorios, desarrolladores de aplicaciones y entidades que presten servicios de planificación curricular u ofrezcan recursos para docentes mediante plataformas digitales—, ya sea incluido en tasas o no, está prohibido y constituye un delito.

En este enlace encontrará más información sobre cómo solicitar una autorización por escrito en forma de licencia: <https://ibo.org/become-an-ib-school/ib-publishing/licensing/applying-for-a-license/>.

Critical Thinking – explanation, analysis and evaluation

These trigger words often signal critical thinking. The bold words are the key terms in the various criteria.

Explanation – *Because, as a result of, due to, therefore, consequently, for example*

Analysis – *Furthermore, additionally, however, but, conversely, likewise, in addition, on the other hand, whereas*

Evaluation – *My opinion, overall, although, despite, on balance, weighing up*

Examiners should be aware that in some cases, candidates may take a different approach, which if appropriate should be rewarded. If in doubt, check with your Team Leader.

If candidates answer more than the prescribed number of questions:

- In the case of an “identify” question read all answers and mark positively up to the maximum marks. Disregard incorrect answers.
- In the case of a “describe” question, which asks for a certain number of facts *eg* “describe two kinds”, mark the **first two** correct answers. This could include two descriptions, one description and one identification, or two identifications.
- In the case of an “explain” question, which asks for a specified number of explanations *eg* “explain two reasons”, mark the **first two** correct answers. This could include two full explanations, one explanation, one partial explanation *etc.*

1. (a) Identify **two** items of data collected by the augmented reality mirrors in the Geneva *MCA Sports* store. [2]

Answers may include:

- Photo of the user.
- Time/Date of capture.
- Item selected to be 'worn'.
- Choice of options tried e.g., different colours / style / preferences.
- The person's size and shape.
- Persons feedback e.g., add to cart, like.
- Distance of person from the mirror.

Award [1] for each item of data collected by the augmented reality mirrors identified up to [2].

- (b) Identify **two** benefits for staff at the Geneva *MCA Sports* store from the introduction of customer service robots. [2]

Answers may include:

- Staff will not spend time on simple inquiries that are repetitive.
- Staff do not need to spend time showing customers where items are.
- Staff will be engaged in more complex tasks which will make their work more interesting.
- Staff will not need to know all the different languages commonly spoken in Geneva.
- Staff can be replaced while they are taking a break.

Note to Examiners: It should be noted that this answer may implicitly refer to the staff of the Geneva MCA Sports store in the introduction of customer service robots.

Award [1] for each benefit for staff due to the introduction of the customer service robots identified up to [2].

2. Explain **three** concerns André has about integrating the new in-store technologies with the existing radio frequency identification (RFID) stock management system (lines 68–69). **[6]**

Answers may include:

Technological concerns

- Compatibility/interoperability/different protocols
- The new system may not be compatible with the existing systems and may not be able to effectively communicate with it.
- Hardware capacity
- Ensuring the existing hardware e.g., processing speed, storage can handle the additional technologies.
- Network capacity
- Ensuring the network can accommodate the increase in data that is being collected and shared between the different technologies.
- Adequate bandwidth
- Whether the bandwidth can cope with the amount of data collected by the AI and processed in the cloud
- Managing different suppliers
- Different products come from different suppliers - that may need to work together / different levels of support / installation.
- Data integrity
- if the robot/app is not updated they cannot be used effectively.
- Data Security
- Concern about the effective sharing of data between stock management system and the new technologies

Note to examiners:

Privacy is not a concern specific to the integration with the stock management system.

Staffing concerns

- IT support/maintenance
- IT support staff will need to be experts in each of the technologies. More staff may be required to support and maintain these new technologies in addition to the existing system.
- Time and expense of training for IT staff
- IT staff will need training in how to maintain each of the new technologies, which will take time and be costly.
- Time and expense of training for retail staff
- Retail staff will need training in how to use and interact with each of the new technologies, which will take time and be costly.
- Staff resistance to change
- Not all staff will embrace each of these technologies, depending on how the technology impacts their role in the company.

Note to examiners:

Privacy is not a concern specific to the integration with the stock management system.

*Award **[1]** for each concern Andre has about integrating the new in-store technologies with the existing radio frequency identification (RFID) stock management system and **[1]** for each development up to **[2]**.*

*Mark as **[2]** + **[2]** + **[2]**.*

3. The four new technologies implemented in the Geneva *MCA Sports* store have the potential to considerably increase the quantity of data collected from customers.

To what extent is the increased quantity of customer data beneficial for the managers of the Geneva store (lines 73–76)?

[8]

Answers may include:

How the data can be used by the managers

- Smart Shelves can gather information about customer behaviour, which can be used by the managers to optimize the layout of the store.
- Smart shelves can collect data about behaviour e.g., how long a user hovers at a place, can be used to help with pricing decisions which will increase sales.
- Augmented reality mirrors can collect information to determine which stock preferences are more popular e.g., choice of colours tried vs purchased can help guide what stocks to increase.
- Data can be used to help personalize a shopping experience e.g., customer service robot greeting the customer by name, making suggestions of alternative purchases and improving the reputation of the store and or encourage customers to return, hence increasing store profits.
- Data can be used to learn more about their customer, to improve the shopping experience regarding their likes and dislikes based on their behaviour in the store, which can attract more customers.

Concerns for the store manager due to the collecting of data

- The store manager will need to meet data protection regulations, which requires an expert to monitor and advise Madeleine.
- How will the store manager ensure the customers are aware of the data collected.
- How will the store manager obtain consent? Will the store allow customers to opt out? and if so, how does this impact the usefulness of the technologies?
- To be compliant with data protection, the store manager will need to justify the data stored is not too excessive and will not be kept longer than necessary.
- The store manager will need to work with IT staff on:
 - Managing storage requirements for the amount of data.
 - Security measures to protect the data.

Please see generic markband on page 8.

SL and HL paper 1 part (c) and HL paper 3 question 3 markband

Marks	Level descriptor
No marks	<ul style="list-style-type: none"> • A response with no knowledge or understanding of the relevant ITGS issues and concepts. • A response that includes no appropriate ITGS terminology.
Basic 1–2 marks	<ul style="list-style-type: none"> • A response with minimal knowledge and understanding of the relevant ITGS issues and concepts. • A response that includes minimal use of appropriate ITGS terminology. • A response that has no evidence of judgments and/or conclusions. • No reference is made to the scenario in the stimulus material in the response. • The response may be no more than a list.
Adequate 3–4 marks	<ul style="list-style-type: none"> • A descriptive response with limited knowledge and/or understanding of the relevant ITGS issues and/or concepts. • A response that includes limited use of appropriate ITGS terminology. • A response that has evidence of conclusions and/or judgments that are no more than unsubstantiated statements. The analysis underpinning them may also be partial or unbalanced. • Implicit references are made to the scenario in the stimulus material in the response.
Competent 5–6 marks	<ul style="list-style-type: none"> • A response with knowledge and understanding of the relevant ITGS issues and/or concepts. • A response that uses ITGS terminology appropriately in places. • A response that includes conclusions and/or judgments that have limited support and are underpinned by a balanced analysis. • Explicit references to the scenario in the stimulus material are made at places in the response.
Proficient 7–8 marks	<ul style="list-style-type: none"> • A response with a detailed knowledge and understanding of the relevant ITGS issues and/or concepts. • A response that uses ITGS terminology appropriately throughout. • A response that includes conclusions and/or judgments that are well supported and underpinned by a balanced analysis. • Explicit references are made appropriately to the scenario in the stimulus material throughout the response.

4. Madeleine believes the four new technologies being implemented in the Geneva *MCA Sports* store will bring people back into the physical stores. Carol disagrees and believes that the solution is to provide a unique in-store experience for the customers through high-quality customer service.

To what extent do you agree with Madeleine?

[12]

Answers may include:

Reasons why technology will bring people into the store

- The technology can help enrich customers' knowledge about what they are purchasing using the in-store app.
- The technologies can be fun and a novelty, providing an enjoyable experience for reluctant shoppers.
- Easier ability to try clothes on using the augmented reality mirrors.
- Increased efficiency of smart shelves means that the store is better stocked.
- Robots are able to address customers in a range of languages.
- No need to try on clothes (faster, more hygienic, correct sizing)
- Better service tailored to customer needs due to stored customer preferences.

Reasons why technology might not bring people into the store

- The novelty of the store will not be long term.
- Not all customers will want to interact with the technologies.
- Natural language processing may not be sufficiently developed for all nationalities.
- The level of AI in the technologies may still not be sophisticated enough to provide expert advice.
- Who has access to their data (shopping preferences, clothes size, personal details), how is their data secured, if they no longer wish to shop at MCA is their data deleted?

Reasons why customer service will bring people to the store

- Service staff can provide a more personal touch for the customers, perhaps knowing them by name and remembering conversations from past purchases.
- Service staff can be knowledgeable about the products and share this in an appropriate manner e.g., at the right level depending on the customers age, race, gender.

Reasons why customer service will not bring people to the store

- Not all customers want to be helped when shopping, especially if they know what they want to buy.
- There may not be enough shop floor staff with the right level of knowledge to help.
- Customers may still prefer the online experience as they don't need to physically visit the store and items can be delivered.

Please see generic markscheme on page 10.

HL paper 3 question 4 markband

Marks	Level descriptor
No marks	<ul style="list-style-type: none"> • A response with no knowledge or understanding of the relevant ITGS issues and concepts. • A response that includes no appropriate ITGS terminology.
Basic 1–3 marks	<ul style="list-style-type: none"> • A response with minimal knowledge and understanding of the relevant ITGS issues and concepts. • A response that includes minimal use of appropriate ITGS terminology. • A response that has no evidence of judgments, conclusions or future strategies. • No reference is made to the information in the case study or independent research in the response. • The response may be no more than a list.
Adequate 4–6 marks	<ul style="list-style-type: none"> • A descriptive response with limited knowledge and/or understanding of the relevant ITGS issues and/or concepts. • A response that includes limited use of appropriate ITGS terminology. • A response that has evidence of conclusions, judgments or future strategies that are no more than unsubstantiated statements. The analysis underpinning them may also be partial or unbalanced. • Implicit references are made to the information in the case study or independent research in the response.
Competent 7–9 marks	<ul style="list-style-type: none"> • A response with knowledge and understanding of the relevant ITGS issues and/or concepts. • A response that uses ITGS terminology appropriately in places. • A response that includes conclusions and/or judgments that have limited support and are underpinned by a balanced analysis. • Explicit references to the information in the case study or independent research are made at places in the response.
Proficient 10–12 marks	<ul style="list-style-type: none"> • A response with a detailed knowledge and understanding of the relevant ITGS issues and/or concepts. • A response that uses ITGS terminology appropriately throughout. • A response that includes conclusions, judgments or future strategies that are well supported and underpinned by a balanced analysis. • Explicit references are made appropriately to the information in the case study and independent research throughout the response.