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# Digital society

## Higher level

### Paper 1

11 November 2025

Zone A afternoon | Zone B afternoon | Zone C afternoon

2 hours 15 minutes

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#### Instructions to candidates

- Do not open this examination paper until instructed to do so.
- Section A: answer two questions.
- Section B: answer one question.
- The maximum mark for this examination paper is **[52 marks]**.

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## Section A

Answer **two** questions from this section. Each question is worth [20 marks].

### 1. Virtual reality (VR) history tours used by universities

The History Faculty at Cuzco University in Peru has partnered with *EJC Technologies* to develop a series of virtual reality (VR) tours to support the university’s history course.

These tours, such as a VR tour of Machu Picchu, enable students to visit locations of historical importance without leaving the university building (see **Figure 1**).

**Figure 1: An image of Machu Picchu from the VR history tour**



The VR history tours are an example of digitization.

Rafael Quintero, the Head of the History Faculty, believes the use of VR technology can significantly enrich teaching and learning and is the future of education. “Imagine being able to visit ancient civilizations all around the world and feel like you’re there,” he said.

- (a) (i) Identify **two** characteristics of virtual reality (VR). [2]
- (ii) Describe **one** difference between virtual reality (VR) and augmented reality (AR). [2]
- (iii) Outline why a virtual reality (VR) history tour is an example of digitization. [2]
- (b) (i) Explain **two** ways in which the use of virtual reality (VR) could help with the preservation of sites like Machu Picchu. [4]
- (ii) Explain **one** technical concern that would be faced by *EJC Technologies* when creating the virtual reality (VR) history tour of Machu Picchu. [2]
- (c) To what extent can the use of virtual reality (VR) improve teaching and learning at Cuzco University? [8]

## 2. Voice authentication and deepfakes

*Banco de Cali*, an online bank in Colombia, has reported a new form of scamming\* in which artificial intelligence (AI) is used to clone someone’s voice and access their bank account (see **Figure 2**).

**Figure 2: An example of gaining unauthorized access to a bank account**



The scammers use social engineering to obtain information from existing bank customers that will allow them to answer the bank’s security questions. This, together with the deepfake of a customer’s voice, allows them to gain access to the customer’s accounts.

To reduce the likelihood of scammers gaining unauthorized access to customers’ accounts at *Banco de Cali*, the Vice President of Operations, Mario Rodríguez, has led a team to update the bank’s policies for the collection, storage, and sharing of customers’ data.

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\* scamming: attempting to deceive or defraud a person or group

**(This question continues on the following page)**

**(Question 2 continued)**

- (a) (i) Identify **two** types of artificial intelligence (AI). [2]
- (ii) Describe the difference between the identification of a customer and the authentication of a customer at *Banco de Cali*. [2]
- (iii) Identify **two** characteristics of a deepfake. [2]
- (b) (i) Explain **one** reason why it is important for *Banco de Cali* to have an appropriate policy for the **collection** of its customers' data. [2]
- (ii) Explain **one** reason why it is important for *Banco de Cali* to have an appropriate policy for the **storage** of its customers' data. [2]
- (iii) Explain **one** reason why it is important for *Banco de Cali* to have an appropriate policy for the **sharing** of its customers' data. [2]
- (c) Discuss the advantages **and** disadvantages of customers of *Banco de Cali* using voice identification to authenticate themselves. [8]

### 3. HoundBot

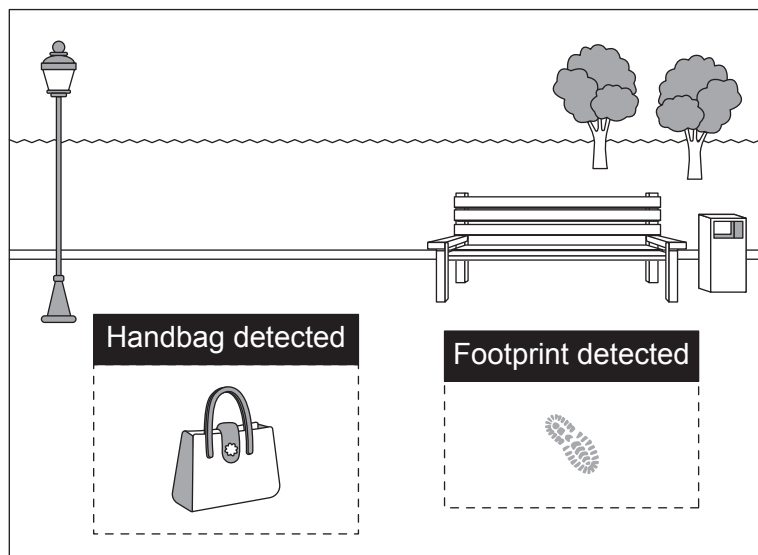
Madrid's police force has introduced a robot police dog called HoundBot to collect information from crime scenes (see **Figure 3**).

**Figure 3: HoundBot**



Amanda Aguiar, the Chief of Police in Madrid, explained that HoundBot will be used to collect evidence using sensors and cameras to create a three-dimensional (3D) image of the crime scene (see **Figure 4**).

**Figure 4: A 3D image of a crime scene**



(This question continues on the following page)

**(Question 3 continued)**

- (a) (i) Identify **two** characteristics of a robot. [2]
- (ii) Outline **one** benefit of HoundBot creating a 3D image of a crime scene. [2]
- (iii) Outline **one** disadvantage of using the 3D image of a crime scene created by HoundBot. [2]
- (b) (i) Explain **one** advantage of using supervised learning to train HoundBot. [2]
- (ii) Explain **one** way in which bias could be introduced by the artificial intelligence (AI) algorithms used to analyse crime scenes. [2]
- (iii) Explain **one** reason why the use of a small set of training data may lead to inaccurate predictions in crime scene analysis. [2]
- (c) To what extent should the police rely on the evidence collected by autonomous robots such as HoundBot? [8]

## Section B

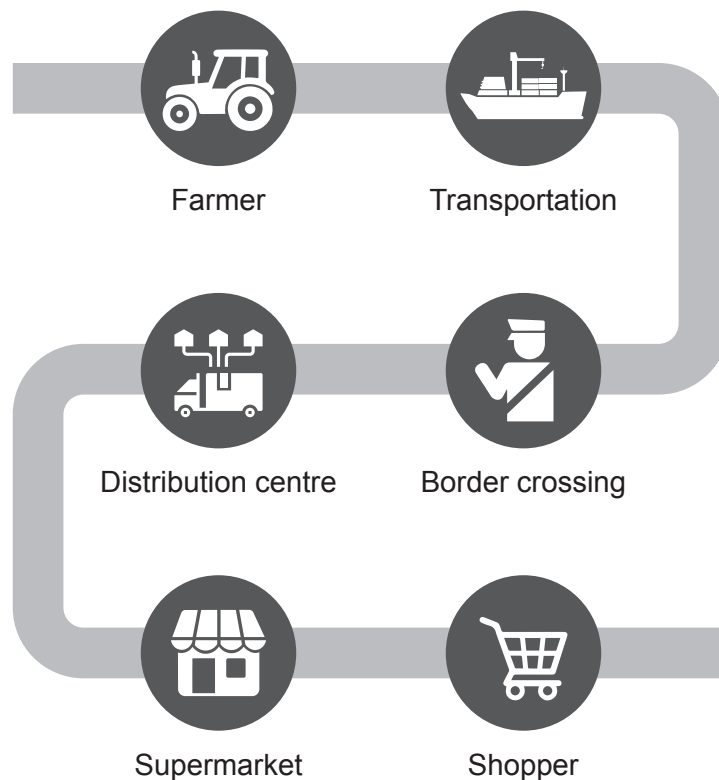
Answer **one** question from this section. Each question is worth [12 marks].

### 4. Reducing food waste with data analytics

Research by *AlimentosFood*, a supermarket chain, revealed that its customers want:

- low food costs
- the minimization of food waste
- food that can be tracked from the farm to the restaurant (see **Figure 5**).

**Figure 5: The supply chain for *AlimentosFood***



*AlimentosFood* is concerned about food waste and is considering a digital intervention.

The Chief Executive Officer (CEO) claims that data analytics can reduce food waste by determining customer preferences, which would improve the efficiency of the supply chain and lower costs.

To what extent do you agree with this claim?

[12]

## 5. Monitoring global warming

In 2023, the global mean temperatures had increased by 1.48 °C above pre-industrial levels.

This has resulted in a global challenge. Concerns have been raised about the impact on sea levels, agriculture, and the ability of humans to tolerate the increasing number of heatwaves.

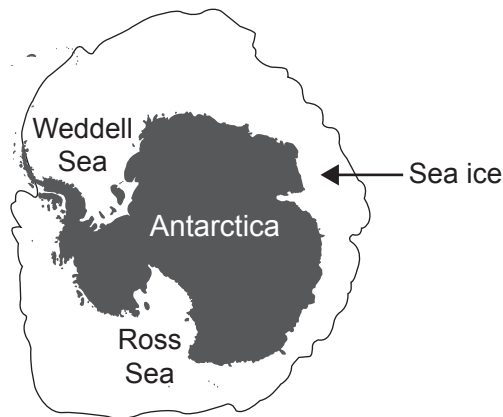
One intervention that could address this problem is the monitoring of polar regions using autonomous drones (see **Figure 6**).

**Figure 6: Example of a drone**



Scientists are using drones to gather information about the Antarctic ice sheet, such as how far it extends into the Southern Ocean during the winter or how thick the ice sheet is (see **Figure 7**).

**Figure 7: Maximum extent of Antarctic sea ice, 2022**



It is claimed that this intervention will enable climate scientists to accurately predict the impact of changes in sea ice on global climate change.

To what extent do you agree with this claim?

[12]

*Companies, products, or individuals named in the stimulus are fictitious and any similarities with actual entities are purely coincidental.*

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**References:**

- Figure 1** SCStock, 2018. *Machu Picchu, Peru - stock photo*. [image online] Available at: <https://www.gettyimages.co.uk/detail/photo/machu-picchu-peru-royalty-free-image/930824730> [Accessed 9 September 2024]. Source adapted.
- Figure 2** ArtemisDiana, 2022. *Conversational AI Concept - Natural Language Processing - NLP - Computational Linguistics Concept - stock illustration*. [image online] Available at: <https://www.gettyimages.co.uk/detail/illustration/conversational-ai-concept-natural-language-royalty-free-illustration/1367728606> [Accessed 9 September 2024]. Source adapted.
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- Figure 3** iLexx, 2019. *Robot dog stands on a gray background - stock photo* [image online] Available at: <https://www.gettyimages.co.uk/detail/photo/robot-dog-stands-on-a-gray-background-royalty-free-image/1143731884> [Accessed 14 October 2024]. Source adapted.
- Figure 6** aapsky, 2018. *Unmanned military drone on patrol air territory at high altitude. - stock photo*. [image online] Available at: <https://www.gettyimages.co.uk/detail/photo/unmanned-military-drone-on-patrol-air-territory-at-royalty-free-image/951069666> [Accessed 13 September 2024]. Source adapted.
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- Figure 7** Antarctic sea ice concentration in September 2022. National Oceanic and Atmospheric Administration (NOAA). <https://www.climate.gov/news-features/understanding-climate/understanding-climate-antarctic-sea-ice-extent> [Accessed 13 September 2024]. Public domain. Source adapted.