Diploma Programme
Programme du diplôme
Programa del Diploma

Digital society
Standard level
Paper 1

11 November 2025

Zone A afternoon | **Zone B** afternoon | **Zone C** afternoon

1 hour 30 minutes

Instructions to candidates

- Do not open this examination paper until instructed to do so.
- Answer two questions.
- The maximum mark for this examination paper is **[40 marks]**.

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Answer **two** questions. 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]

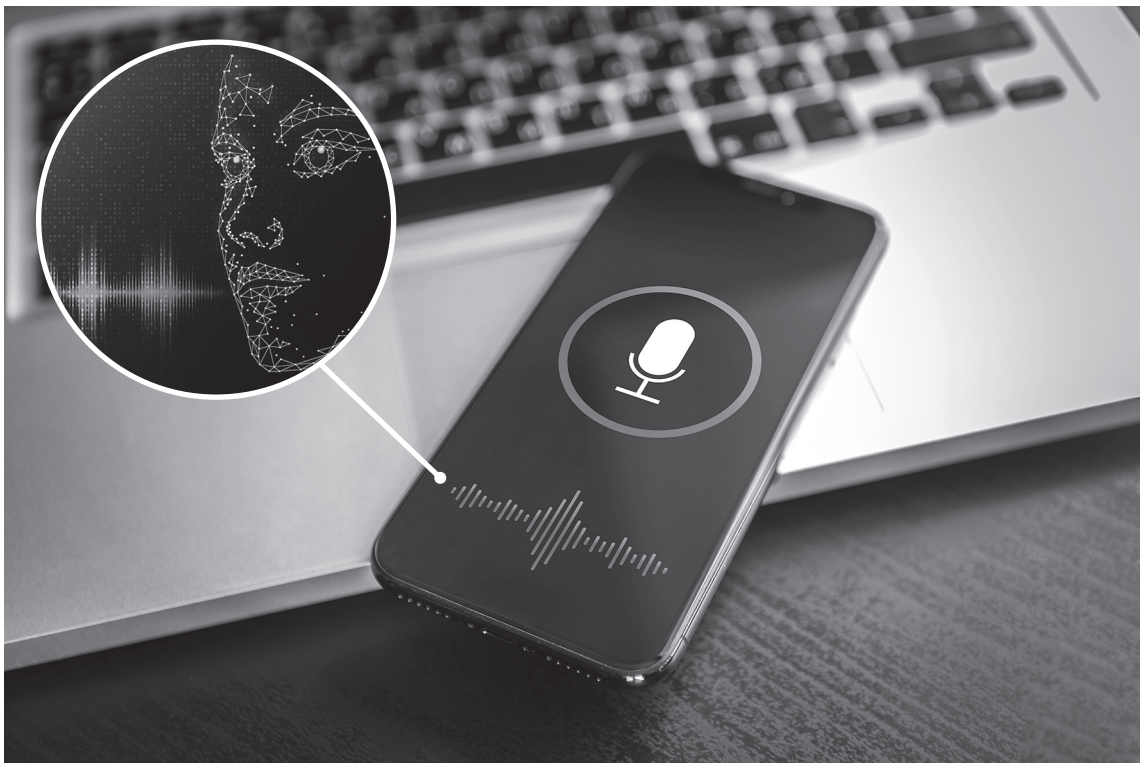
(ii) Explain **one** technical concern that would be faced by *EJC Technologies* when creating the virtual reality (VR) history tour of Machu Picchu. [2]

(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

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(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]

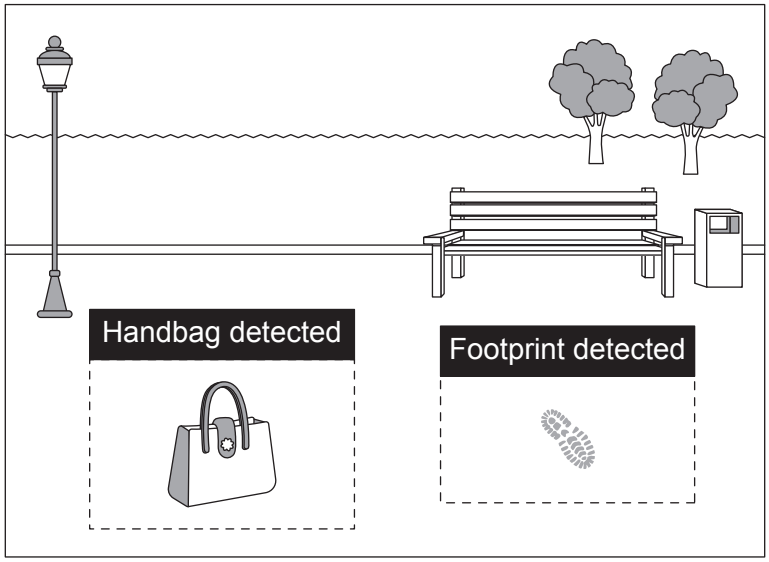
3. HoundBot

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



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(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]

4. Efficiently delivering products

ValVal is a delivery company that is used by online retailers that are part of the gig economy. Valerio, the Chief Executive Officer (CEO), has found that a significant increase in online shopping has led to the need for many new delivery drivers.

ValVal is planning to introduce a digital route optimization system* in early 2026 (see **Figure 5**). The route optimization system uses data from traffic models of the city and route-finding algorithms.

Figure 5: A route optimization system on a mobile phone (cell phone)

While the new delivery drivers have welcomed the introduction of a digital route optimization system, some experienced drivers would prefer to use the knowledge they have acquired over many years.

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* route-optimization systems: the process of determining the most cost-effective route for the delivery drivers

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(Question 4 continued)

(a) (i) Identify **two** characteristics of the gig economy. [2]

(ii) Identify **two** variables that could be included in the route optimization system. [2]

(iii) Identify **two** characteristics of an algorithm. [2]

(b) (i) Explain **two** advantages for a customer of purchasing goods online. [4]

(ii) Explain **one** disadvantage for a customer of purchasing goods online. [2]

(c) Discuss the advantages **and** disadvantages of *ValVal* using route-finding algorithms for its deliveries. [8]

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.

BestForBest, 2020. *Voice assistant siri concept on smartphone screen. Voice recognition mobile technology and smart talk virtual AI assistance app. - stock photo*. [image online] Available at: https://www.gettyimages.co.uk/detail/photo/voice-assistant-siri-concept-on-smartphone-screen-royalty-free-image/1202226393 [Accessed 9 September 2024].

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 5 SeventyFour, 2021. *Smartphone App in Car - stock photo*. [image online] Available at: https://www.gettyimages.co.uk/detail/photo/smartphone-app-in-car-royalty-free-image/1330909594 [Accessed 13 September 2024]. Source adapted.