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INFORMATION TECHNOLOGY IN A GLOBAL SOCIETY
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PAPER 2

Thursday 17 May 2007 (morning)

2 hours

INSTRUCTIONS TO CANDIDATES

- Do not open this examination paper until instructed to do so.
- Answer three questions.

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*Answer **three** questions.*

Area of Impact: Business and Employment

1. Biometric authentication of customers is now being used by many retail stores. Customers register in a store, bringing proof of identity, and then have a finger scanned. When they go shopping at a later date, customers pay for their goods by touching the scanner with a finger and then selecting their preferred method of payment, for example a credit card, the details of which were given at registration.

(a) Identify **two** other physical characteristics, other than fingerprints, that are currently used in biometric systems. *[2 marks]*

(b) With reference to the information technology (IT) that underpins biometrics, describe the process of biometric authentication. *[4 marks]*

(c) Explain why biometric options for payments at retail stores could be considered better than credit card signatures when authenticating the user. *[4 marks]*

(d) Discuss the concerns that people might have with the widespread use of biometric technology by several retail stores and different institutions. *[10 marks]*

Area of Impact: Arts, Entertainment and Leisure

2. Digital audio players such as iRiver and iPod, shown below, have given individuals access to huge amounts of data storage, which is both affordable and portable. Using these digital audio players, people are able to download MP3 files from the Internet. These files are generally encoded at a bit rate of 128 Kbit/s – which is regarded as "good enough". Digital jukebox software, such as iTunes, then allows users to manage their files on these storage devices.

iRiver

Source: *"iRiver"* (online image) 2005, http://www.microsoft.com [24 July 2005].

iPod

Source: *"iPod"* (online image) 2005, http://www.amazon.co.jp [24 July 2005].

(a) Define the term *MP3*. *[2 marks]*

(b) Describe **two** tasks a user can perform with digital jukebox software. *[4 marks]*

(c) Explain the implication of bit rate when downloading music. *[4 marks]*

(d) Evaluate the impact digital audio players have had on the music industry. *[10 marks]*

Area of Impact: Education/Science and the Environment

3. Some students in a school felt that their study was being regularly disrupted by excessive noise. This noise came from other students playing sports, excessive talking in the library and traffic on a busy road nearby. Students wanted to collect evidence that the noise was indeed excessive, especially in certain rooms and at certain times of the day.

They set up a data logging experiment by placing sound sensors around the school, which were able to transmit data via wireless links to a network server. The data logging software was set to sample the sounds at regular intervals.

(a) Define the term *data logging*. *[2 marks]*

(b) Describe **two** items of hardware needed to implement this data logging investigation, apart from the sensors and the server. *[4 marks]*

(c) Explain **two** reasons why in this case, data logging is a better way to conduct the investigation than taking measurements manually. *[4 marks]*

(d) Discuss how the school could make use of other sensors and other data logging investigations to improve its working environment. *[10 marks]*

Area of Impact: Health/Politics and Government

4. The National Health Service in Britain is planning to make patients' health records more easily accessible using a network of integrated databases. This is intended to improve the quality of care and efficiency, reduce paperwork and sometimes even save lives. However, easier access to medical data from a single resource shared by everyone, also makes some patients feel vulnerable. Many people are worried about issues such as network failure, data integrity and data security. The government is currently considering three possible scenarios.

(i) Impose the shared electronic records service with the details of everyone automatically included.

(ii) All citizens, by default, will be included in the new electronic records service with the possibility to "opt out" if they wish.

(iii) People will be asked to "opt in" if they want to.

(a) Define the terms *data integrity* and *data security*. *[2 marks]*

(b) Describe how an integrated/centralized medical database system improves the integrity **and** security of data compared with distributed independent databases. *[4 marks]*

(c) Explain how the integrated database system could make use of private key/public key encryption in order to safeguard patients' data. *[4 marks]*

(d) Discuss the possible issues to be considered by patients when they decide to "opt in" or "opt out" of the electronic records service proposed by the National Health Service. *[10 marks]*