



**INFORMATION TECHNOLOGY IN A GLOBAL SOCIETY
STANDARD LEVEL
PAPER 2**

Thursday 17 May 2007 (morning)

2 hours

INSTRUCTIONS TO CANDIDATES

- Do not open this examination paper until instructed to do so.
- Section A: answer all parts of the question.
- Section B: answer two questions.

SECTION A

Answer **all** parts of the question.

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]*

SECTION B

Answer **two** questions.

Area of Impact: Education

2. English speaking students who are learning another language can read news stories from different countries by looking up local newspaper web sites. Passages can then be pasted into one of many web based utilities that can translate passages of text from one language into another. The screen shot below shows the result of translating a passage written in Spanish (shown in the lower text box) into English. The English translation is shown in the upper text box.



Source: <http://babelfish.altavista.com/tr>

- (a) One Spanish newspaper site has the following URL:

<http://www.thelocalnews.es/>

- (i) Identify the part of this URL that indicates the country where the web site is located. [1 mark]
- (ii) Identify the domain name of this web site. [1 mark]
- (b) Describe **two** ways in which a search engine can be used to locate a source of Spanish text. [4 marks]
- (c) The web based translator shown in the screen shot has translated the Spanish passage into rather peculiar English. Explain why computer based translators often perform translations rather badly. [4 marks]
- (d) Evaluate the use of web based-translators and other IT resources to help a student learn a new language. [10 marks]

Area of Impact: Health

3. People with disabilities can benefit greatly from a wide variety of IT resources. For example, a person who has been injured can still make use of a computer by using voice input.

There is software available that allows a user to control a computer by means of spoken commands. It is also possible to dictate material which can then be saved as a word processed or text file. Such voice recognition software has much potential for helping students and others to perform their tasks.

Before voice activated software can be used, the user must first “train” the system.

One voice activated control system states in its documentation that it must be run on a computer with a processor of at least 1 GHz.

- (a) (i) Define the term *GHz*. *[1 mark]*
- (ii) Identify the component of the processor to which 1 GHz refers. *[1 mark]*
- (b) Describe **two** other hardware features that would be necessary for voice activated input. *[4 marks]*
- (c) Explain why the voice activated system must be trained before it can be used. *[4 marks]*
- (d) Discuss how voice activated systems and other IT resources can be of benefit to disabled people. *[10 marks]*

Area of Impact: Arts, Entertainment and Leisure

4. 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: Science and the Environment

5. Active traffic management is a new pilot motorway scheme that has been put in place on the M42 near Birmingham, UK. The scheme combines a number of new technologies and existing motorway features to provide:

- reliable journey times
- reduced congestion
- enhanced information to drivers
- quicker responses to incidents.



Source: <http://www.roadtraffic-technology.com/projects/m42/m423.html>

Sensors in the road surface detect traffic and alert the control centre to increases in traffic volume. If the system detects congestion, it calculates the best speed limit to keep traffic flowing and displays this on signs above the road.

Speed limits are enforced by digital cameras photographing the registration numbers of any vehicles which exceed the current speed limit. Drivers who exceed the limit are sent a penalty notice requiring them to pay a fine.

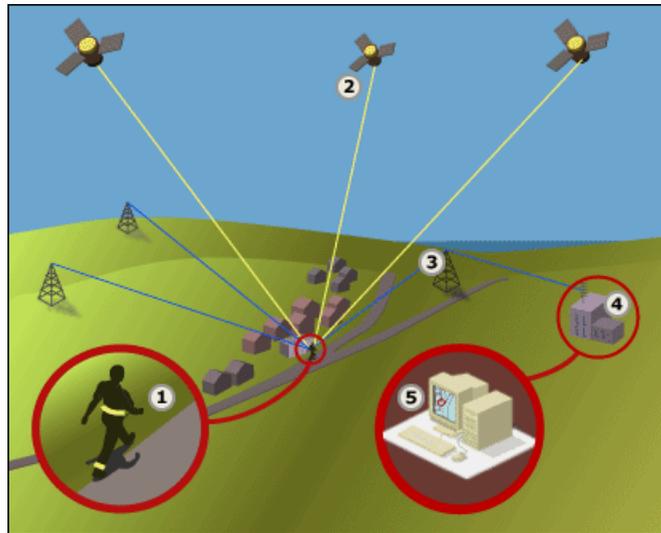
- (a) Identify **two** possible ways that the road sensors can detect the passing of a vehicle. *[2 marks]*
- (b) Describe **two** ways in which the active traffic management system could help to decrease journey times. *[4 marks]*
- (c) Explain how the images from the digital speed cameras can be used to send penalty notices to speeding drivers automatically. *[4 marks]*
- (d) Discuss how the active traffic management system could be abused by the authorities. *[10 marks]*

Reference:

[http://www.highways.gov.uk/knowledge/documents/atm_start\(1\).swf](http://www.highways.gov.uk/knowledge/documents/atm_start(1).swf).

Area of Impact: Politics and Government

6. In Britain, convicted criminals will be fitted with a tracking belt and electronic transmitter on their ankles (item 1 in the picture). The Government officials at the control centre (item 4 in the picture) are able to pinpoint their exact position using a computer (item 5 in the picture) at any time. These devices enable criminals to live in the community rather than being kept in prison.



Source: BBC News, 2004, "Satellite tracking for criminals." <http://news.bbc.co.uk/1/hi/uk/3620024.stm> [24 July 2005].

- (a) Identify **two** software items needed in the government computer (item 5 in the picture) to be able to pinpoint the location of the offender. [2 marks]
- (b) Describe **two** other uses of tracking devices apart from tracking the location of criminals. [4 marks]
- (c) Explain the relationship between items 2, 3 and 4 in the picture. [4 marks]
- (d) Evaluate the use of electronic tagging as a method of monitoring the location of convicted criminals. [10 marks]

References:

BBC News, 2004, "Q&A: Electronic tagging." <http://news.bbc.co.uk/1/hi/uk/3397113.stm> [24 July 2005].