22105515

INFORMATION TECHNOLOGY IN A GLOBAL SOCIETY
STANDARD LEVEL
PAPER 2

Friday 21 May 2010 (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.

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SECTION A

*Answer **all** parts of the question.*

Area of impact: Business and employment

1.   Visits to the bank are becoming less frequent as more customers use ATMs (automated teller machines) to carry out banking transactions such as withdrawal of funds or deposit of money. Some people, however, are concerned that their accounts may not be safe due to fraud involving ATM cards and ATM machines.

Many banks also offer online services. These services include the ability to check your bank balance, transfer money, pay bills and receive alerts.

[Source: adapted from fraud www.snopes.com/fraud/atm/atmcamera.asp and
mobile banking www.anz.co.nz/promo/anzmobilebanking/default.asp, 25 August 2008]

(a)   Identify **two** output devices on an ATM.   *[2 marks]*

(b)   Describe **one** example of fraud involving an ATM card and **one** possible
solution to this crime.   *[4 marks]*

(c)   Explain **two** validation processes that take place when you use the ATM to
withdraw money from your bank account.   *[4 marks]*

(d)   To what extent does the improved customer service offered by online banking
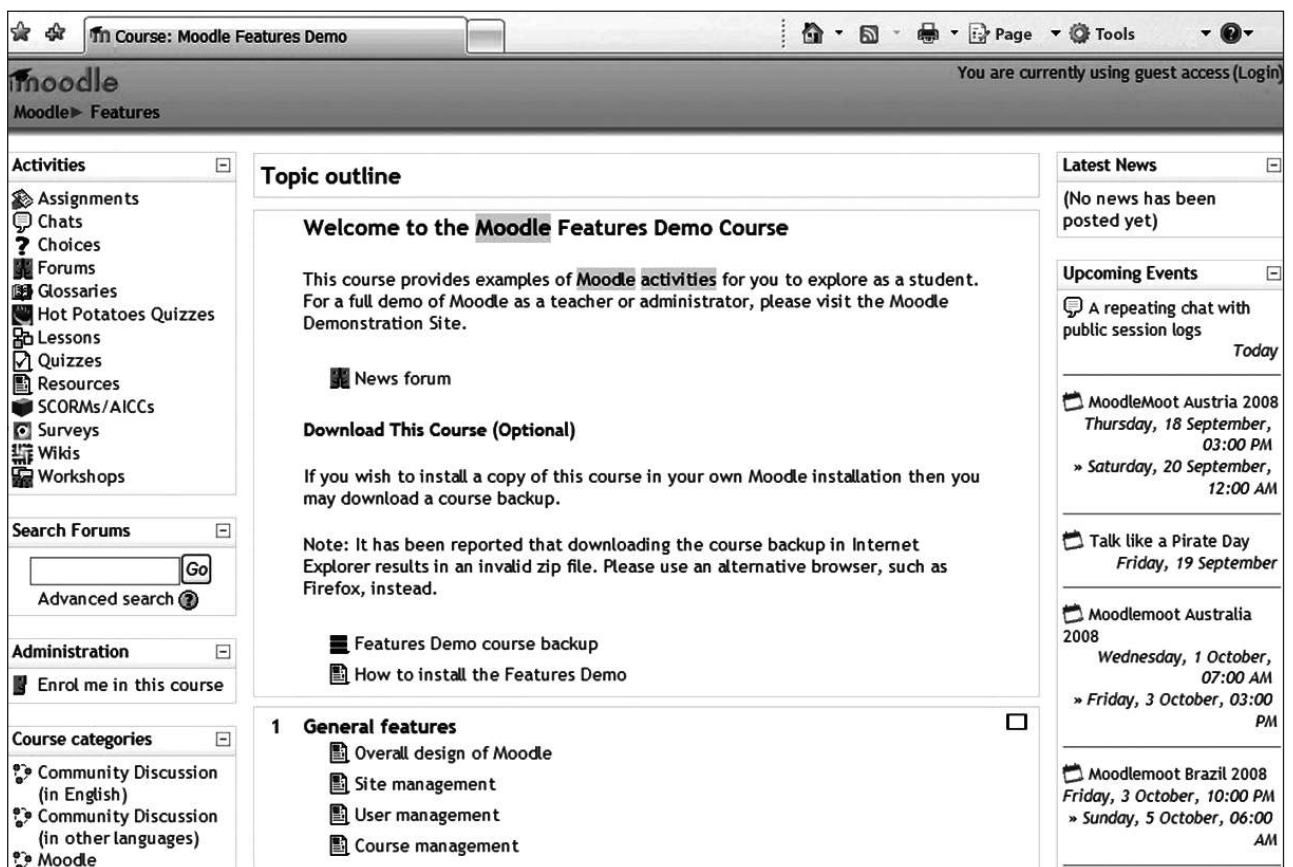outweigh the possible disadvantages for customers?   *[10 marks]*

SECTION B

*Answer **two** questions.*

Area of impact: Education

2. Copacabana Academy is a school for the children of Navy personnel. When a Navy parent is moved to a different city or country, the whole family is relocated together. In the past, students were required to attend the local school.

    The recently introduced Virtual Learning Environment (VLE) at Copacabana Academy allows these students to remain enrolled and continue with their lessons and assessments remotely from their new location.

[Source: http://moodle.org/course/view.php?id=34, 5 September 2008]

This VLE consists of a password protected web site environment. Teachers upload different types of resources that will appear according to a calendar incorporated in the environment, schedule online meeting times and provide a forum for discussion. Students have access to the resources and may also be tested online.

(This question continues on the following page)

(Question 2 continued)

(a) Identify **two** types of software, other than an Internet browser, that must be available on a student's computer to make use of this learning environment. *[2 marks]*

(b) Describe **two** ways in which teachers may solve students' problems and provide feedback using this web site. *[4 marks]*

(c) Explain how the VLE will allow each student access to the area of the web site which has the appropriate content of the subject they are requesting. *[4 marks]*

(d) Evaluate the implications of the introduction of the VLE for the school **and** for the students. *[10 marks]*

Area of impact: Arts, entertainment and leisure

3. Soon, many television stations will change from broadcasting on analogue airwaves to begin broadcasting only in digital. Digital broadcasting will allow stations to offer high resolution pictures and better sound quality as well as additional channels.

With digital TV, sounds and pictures from the broadcaster are converted into binary digits (bits) and sent through an aerial, satellite, telephone line or cable. This digital signal is then turned back into sounds and pictures by a digital box or a digital TV set.

Some digital boxes have special access features such as subtitles, signing and audio description for people with hearing or sight problems.

However, recent improvements in Internet bandwidth and the increased availability of video through web sites such as *YouTube*, have led to questions being raised about the need for additional digital channels.

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

(b) Digital TV broadcasters are able to provide interactive services. Describe **two** interactive services that could be provided with digital TV. *[4 marks]*

(c) Explain **two** ways in which a domestic installation such as a digital TV can communicate with the digital provider. *[4 marks]*

(d) To what extent is the growth of video clips on the Internet overtaking the need for digital TV? *[10 marks]*

Area of impact: Health

4. A biotechnology company has been commissioned to develop a database to store genetic data on all citizens in Iceland for the purpose of medical research. The country was chosen because of its isolation and small population resulting in a small gene pool[1].

Citizens are required to give a blood sample which is processed to provide a genetic profile[2]. This profile can then be matched with details such as age, weight, and medical history to predict potential future health issues that may be linked to the genetic backgrounds of individuals.

Data is made anonymous by replacing personal details with an ID number. This is used as a key field in the database. Some citizens have expressed concern about the collection of this data and have challenged its legality in court.

[Source: adapted from http://news.bbc.co.uk/1/hi/sci/tech/630961.stm, 17 August 2008 and www.motherjones.com/news/special_reports/1998/05/marshall.html, 17 August 2008]

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[1] gene pool: total number of genes in a population
[2] genetic profile: the information about a person's genes

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

(b) Describe the process used to create a query which would produce an alphabetical list of all the citizens who have suffered from diabetes, were born after 1990 and do not smoke. *[4 marks]*

(c) Explain the difference between data matching and data mining with reference to the Icelandic database. *[4 marks]*

(d) To what extent do the advantages to medical research outweigh the concerns of some Icelandic citizens about storage of their genetic data? *[10 marks]*

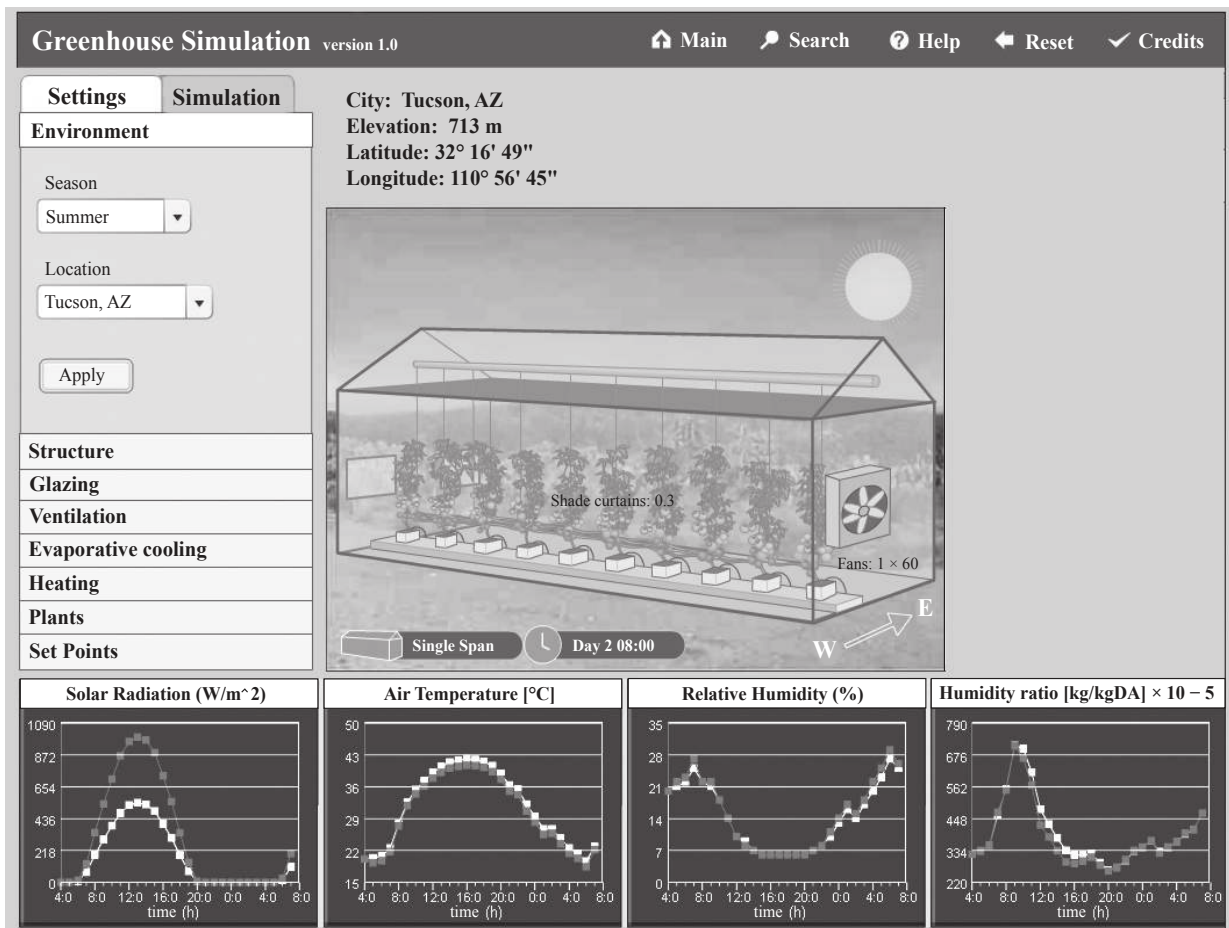**Area of impact: Science and the environment**

5. With the potential increases in the cost of energy, many farmers in North America are concerned about the efficiency of their greenhouses. One possible solution is to use a greenhouse simulator to experiment with the different designs and materials in the construction of their greenhouses.

In a simulation, users can vary inputs and when the simulation is run the results are displayed (see Diagram).

By using the results from a simulator to plan the building of greenhouses, farmers can produce crops more efficiently and reduce their energy bills.

Many teachers find it useful to use simulations such as these in agricultural science classes.

Diagram

Reprinted with permission from Worldwide Greenhouse Education.

(This question continues on the following page)

(Question 5 continued)

    (a)   From the simulation shown in the Diagram on the previous page,

        (i)   identify **one** input   *[1 mark]*

        (ii)   identify **one** output.   *[1 mark]*

    (b)   Describe **two** tasks which must be performed in the development of simulation software like that used in the Diagram on the previous page.   *[4 marks]*

    (c)   Explain **two** advantages of using simulations to design products such as greenhouses.   *[4 marks]*

    (d)   To what extent are simulations such as this useful in enhancing the teaching and learning of a science subject?   *[10 marks]*

Area of impact: Politics and government

6. Some governments in the world are planning to legislate to prevent the intellectual property theft that sometimes occurs during the use of file sharing sites. Internet Service Providers (ISPs) have been asked by the government to send warning letters to customers who are suspected of sharing copyrighted material.

[Source: adapted from www.zdnet.com.au/news/communications/soa/UK-ISPs-lockstep-on-P2P/0,130061791, 339290843,00.htm?feed=pt_legislation, August 2008]

This legislation will centre mainly on the use of peer-to-peer (P2P) technology, an application that allows Internet users to exchange files with each other directly or through a mediating server.

[Source: adapted from http://news.bbc.co.uk/2/hi/technology/7059881.stm, August 2008]

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

(b) Describe **two** services an ISP provides to Internet users. *[4 marks]*

(c) Explain **two** ways a home computer network could be adversely affected by the use of file sharing services. *[4 marks]*

(d) Discuss the implications for the music industry of governments regulating the use of P2P sites for file sharing. *[10 marks]*