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MARKSCHEME

Specimen

INFORMATION TECHNOLOGY IN A GLOBAL SOCIETY

Standard Level

Paper 1

SECTION A

1. **(a)** **Use the chart to identify the *two* most common types of credit card fraud.** *[1 mark]*

   Award [1 mark] only if both types are stated.

   - use of counterfeit cards
   - use of stolen cards.

   (b) **Describe *one* way that a criminal can use IT to commit "no-card" fraud.** *[2 marks]*

   Award up to [2 marks] for a full description of any method. Award only [1 mark] for a partial description. Reward any suitable answer. Answers may include:

   - obtain details illegally using telemarketing/Web
   - obtain details illegally, then misuse.

   (c) **Describe *one* way that a criminal can use IT to create a counterfeit card.** *[2 marks]*

   Award up to [2 marks] for a full description of any method. Award only [1 mark] for a partial description. Reward any suitable answer. Answers may include:

   - use illegal swipe machine (band reader) to take details off magnetic strip.

(d)   **Describe *two* ways (which use IT) of preventing counterfeit card fraud, and compare the likely effectiveness of these two ways.**   *[5 marks]*

Reward any suitable answer. Award [1 mark] for a description of each method, up to a maximum of [2 marks]. Answers may include:

- use cards containing a chip (smart cards) rather than a magnetic stripe.
- insist on the use of a pin-number that is not stored on the card, but is part of the online check before authorisation.

An example of the type of discussion on effectiveness is outlined below:

First should prevent existing misuse, but criminals will come up with a new method! Second does not work over the Web or phone, but will prevent misuse of cards in physical purchasing.

Award [1 mark] for a discussion of the effectiveness of each method. Award a further [1 mark] for a comparison of the two. The maximum for part (d) is [5 marks].

2.   (a)   **Identify *two* ways in which a company wishing to send you "mail" by post can obtain your name and address.**   *[2 marks]*

Answers may include:

- buying the details from an authority using the electoral register
- buying the details from another organization from which you have brought goods or services
- compiling a database of details obtained illegally (*e.g.* from a hacker)

Reward any suitable answer. Award [1 mark] for each method identified, up to a maximum of [2 marks].

(b)   **Identify *two* ways in which a company may obtain your e-mail address by electronic means.**   *[2 marks]*

Award [1 mark] for each method identified, up to a maximum of [2 marks]. Reward any suitable answer. Answers may include:

- buying the details from another organization from which you have bought goods or services online
- compiling a database of details obtained illegally (*e.g.* from a hacker)

(c) **Identify *two* reasons why a person would want to receive unsolicited e-mail.**   *[2 marks]*

Reward any suitable answer. Award [1 mark] for each method identified up to a maximum of [2 marks].

- the recipient has an interest in buying goods advertised
- the message may contain news of an event about which the recipient would not hear any other way.

(d) **Some countries have legislation that limits the sending of "mail" from organizations trying to sell goods. Many users would like to see similar legislation introduced to prevent unsolicited e-mail messages.**

Consider *one* way in which such legislation might be introduced, and evaluate its probable effectiveness.   *[4 marks]*

Reward any suitable answer. Award up to [2 marks] if the legislation is described. Award only [1 mark] if it is only stated. Award up to a further [2 marks] if the probable effectiveness of the legislation is evaluated. Maximum [4 marks]. Answers may include:

- an extension of existing Data Protection/Privacy legislation to cover the use of personal details to send unsolicited mailshots
- licensing organizations who wish to send mail shots electronically in order to control the practice. This could be administered through a regulator, to whom those in receipt of unsolicited mail may complain, resulting in a possible loss of the licence.

The problem with both of these methods is the unregulated nature of the Internet. Either could work quite well in controlling unsolicited mail within the country of legislation, but the Internet functions in a global society, and regulation across boundaries is extremely difficult. Organizations within Europe, say, who wished to ignore regulations could use a mailing organization outside the EU.

3. **(a)** **Identify *two* features of a *graphical user interface* which are not present with a *command-driven interface*.**   *[2 marks]*

Award [1 mark] for each feature stated, up to a maximum of [2 marks].

- windows
- icons
- pull-down menus
- pointers

(b) **Identify *two* groups of people, other than the physically disabled, who find a command-driven interface difficult to use and describe how each would benefit from the use of a GUI.**   *[4 marks]*

Award [1 mark] for each distinct group of people stated, up to a maximum of [2 marks]. Accept any reasonable answer. Do not accept any physical disability.

groups -
• people whose language is not the same as that of the software
• very young children

description -
• no need to have an understanding of language, image describes function
• images easier to understand than language

(c) **Outline *two* ways in which a standard computer interface can be adapted for the use of people with physical disabilities, and explain how these adaptations can help.**   *[4 marks]*

Award [1 mark] for each adaptation identified up to a maximum of [2 marks]. Award [1 mark] for a description of how each can help a physically disabled person, up to a maximum of [2 marks].

• voice input system
• concept keyboard
• touch sensitive screen

4. (a) **Describe *one* task that can be done effectively by telecommuting.**   *[2 marks]*

Award up to [2 marks] for a full description of the task. Award only [1 mark] for a partial description. Reward any suitable answer.

• data entry into a database
• research using company database
• research using online databases/Internet
• report writing

(b)   Describe *one* advantage to the telecommuter of this method of working.   *[2 marks]*

Award up to [2 marks] for a full description. Award only [1 mark] for a partial description. Reward any suitable answer.

- no need for child care for young children
- reduced travelling time adds to quality of life
- allows more flexible working hours

(c)   Describe *one* advantage to the employer of this method of working.   *[2 marks]*

Award up to [2 marks] for a full description. Award only [1 mark] for a partial description. Reward any suitable answer.

- increased satisfaction for employee often leads to increased productivity
- easier to recruit and retain quality staff

(d)   Describe *two* issues raised by telecommuting which affect people other than the telecommuter and/or the employer. Do not repeat answers from parts (b) or (c).   *[4 marks]*

Award up to [2 marks] for a full description of each issue, up to a maximum of [4 marks]. Award only 1 mark for a partial description. Issues mentioned in part (b) or (c) may NOT be rewarded again.

- people from other companies or other offices may find difficulty making contact
- extra contact time with family will change family life (some positive aspects, but could be negative)

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Paper 2

SECTION A

Area of Impact: Business and Employment

1.   (a)   **Identify *two* sensitive fields, other than those containing personal information, in a customer record which could possibly be viewed due to this security error.**   *[2 marks]*

Award [1 mark] for each sensitive field identified up to a maximum of [2 marks].

- credit card details (credit card number, authorization number of the credit card)
- details of the items ordered (type of item, total of the order)

Reward other acceptable answers. Do not award any marks for field containing personal information.

   (b)   **Explain *two* ways in which such a security error could occur.**   *[4 marks]*

Award up to [2 marks] for each way fully explained up to a maximum of [4 marks]. Award only [1 mark] for a partial explanation.

- the firewall allows access to the customer database without any security method being required
- the program which manages the e-commerce site contains a programming bug
- the database managing the online sales was mistakenly installed without the appropriate request for passwords or other security method

Reward other acceptable answers.

   (c)   **Explain *two* reasons why large retail stores are diversifying into e-commerce.**   *[4 marks]*

Award up to [2 marks] for each reason fully explained up to a maximum of [4 marks].
Award only [1 mark] for a partial explanation.

- retail stores can maintain less stock in the inventory
- fewer employees are required to sell and deliver goods
- the need to compete with other companies with online e-commerce sites
- reduction in publicity costs due to online advertising
- retail stores can reach a worldwide audience
- the most recent offerings of goods can be made available to customers online

Reward other acceptable answers.

(d)   **Discuss *three* reasons why many online companies have failed.**   *[10 marks]*

Award up to [4 marks] for each reason fully discussed up to a maximum of [10 marks] for this question.
Award [1 mark] for each reason if it is only stated.

- lack of customer confidence in submitting information (personal information, payment details)
- customer fear of receiving incorrect goods (fraud)
- customers fear that they will not receive adequate customer service and support
- online companies do not have a solid infrastructure to support e-commerce (orders, delivery, service)

Reward other acceptable answers.

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SECTION B

Area of Impact: Education

2.   (a)   **Describe *two* online services that must be provided for the student.**   *[4 marks]*

Award up to [2 marks] for each online service fully described up to a maximum of [4 marks]. Award only [1 mark] for a partial description.

- student-to-student communication through chatrooms
- student-to-teacher communication through email and bulletin boards
- online syllabus and lessons for each course
- online library of resources
- online assessment
- administrative management of online enrolment and degree details

Reward other acceptable answers.

(b)   **Describe *three* different types of process which a university may use to authenticate the identity of the student at specific stages in a course of study.**   *[6 marks]*

Award up to [2 marks] for each type of process fully described up to a maximum of [6 marks]. Award only [1 mark] for a partial description.

- Use biometrics security systems (fingerprints, face scan, iris scan) to authenticate the identity when a student logs onto the site to submit assignments.
- Take some or all of the tests in person at one of the accepted testing sites with the appropriate personal identification.
- Use a local authorized person who meets periodically with the soldiers in the course to check their progress in the eArmyU program.

Reward other acceptable answers.

(c) **Discuss** *three* **social consequences of soldiers being able to gain credits towards their college degree through eArmyU.**   *[10 marks]*

Award up to [4 marks] for each social consequence fully discussed up to a maximum of [10 marks]. Award only [1 mark] for a partial description.

- Soldiers can study in their native language anywhere in the world.
- Soldiers can simultaneously be in the army and study towards a university degree.
- Soldiers can keep academic contact with students and teachers while performing army duties.
- It is less expensive for universities to offer e–learning courses to students rather than having the students physically attend classes on campus.
- Universities in the eArmyU program can collaborate to offer an academic degree program over great distances and reach a wider audience.

Reward other acceptable answers

Area of Impact: Health

3. **(a)** **Identify** *two* **fields that would be included in a Web medical database.**   *[2 marks]*

Award [1 mark] for each field identified up to a maximum of [2 marks].

- type of illness
- symptoms of the illness
- treatments for the illness

Reward other acceptable answers.

(b) **Describe** *two* **social advantages which Web medical databases provide for young people.**   *[4 marks]*

Award up to [2 marks] for each social advantage fully described up to a maximum of [4 marks]. Award only [1 mark] for a partial description.

- Young people can maintain their privacy in obtaining information.
- Young people can obtain information about sensitive diseases which may not be otherwise available to them.
- Young people can find out first–hand information about diseases in chatrooms and bulletin boards from people who actually have the disease.
- It may be easier to find information about rare diseases online than in medical books which may not be available.

Reward other acceptable answers.

(c) **You have a friend who has diabetes. Describe how you would search the Web in order to understand the illness and also research the treatment which the doctor has advised.** *[4 marks]*

Award up to [2 marks] for each search fully discussed up to a maximum of [4 marks]. Award only [1 mark] for a partial discussion.

Understanding the illness
- Go to a search engine and enter diabetes.
- Press the go button or equivalent button to begin the search.
- A list of web addresses will appear which contain the illness as a keyword.
- Go to a specific online medical database and enter diabetes in the search window.
- Click the go button or other means of searching the database.
- Information relating to diabetes will appear.

Research the treatment advised by the doctor
- Go to a search engine, enter the illness (diabetes) and the name of the medicine which has been prescribed in the search window.
- Click the go button or equivalent button to begin the search.
- A list of web addresses will appear which contain the illness (diabetes) and the generic word treatment.
- Go to a specific online medical database and enter the illness (diabetes) and the generic word treatment.
- Click the go button or equivalent button to begin the search.
- A list of web addresses will appear which contain the illness and treatment as keywords.

Reward other acceptable answers.

(d) **Discuss the issue of the validity of the information contained in Web medical databases and any *two* other ethical issues.** *[10 marks]*

Award up to [4 marks] for each issue fully discussed up to a maximum of [10 marks] for this question. Award only [1 mark] for each social consequence if it is only stated.

Validity
- Who is responsible for the validity of information on the web site?
- There is no assurance that the information contained on any web site is completely accurate.

Information on web sites cannot be validated because there is no known cure and user groups may be the best source of information.

Other ethical issues
- Who is responsible if a young person takes action based on medical information obtained online and it is the inappropriate action?
- What policies exist from recognized medical associations regarding this issue?
- Are there any laws regarding the posting of medical information on the Internet?
- To what extent can an ISP be held accountable for the information which is hosted?

Reward other acceptable answers.

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Area of Impact: Arts, Entertainment and Leisure

4. **(a)** **Describe** *two* **IT processes which are used to create Vactors.** *[4 marks]*

Award up to [2 marks] for each IT process fully described up to a maximum of [4 marks]. Award only [1 mark] for a partial description.

- 3D modelling software is used by graphic designers to create the VActors.
- Animation software is used to create movements for the VActors.
- Rendering software is also used to add surface textures and effects to the VActors.
- A wire–frame view of the actors is used to provide physical appearance of the VActors.
- Sensors are attached to real humans and the movements of the images is stored for the characters in the computer.

Reward other acceptable answers.

(b) **Explain** *three* **economic issues related to the use of Vactors.** *[6 marks]*

Award up to [2 marks] for each economic issue fully explained up to a maximum of [6 marks]. Award [1 mark] for each partial explanation.

- The hardware (including fast processing speed, RAM and huge storage) used to produce VActors is an expensive investment for the film studio.
- The software used to produce VActors is specialized and consequently expensive for the film studio to purchase and upgrade.
- The computer specialists who create VActors are expensive to employ because they have highly trained skills and expertise.
- Creating VActors requires a considerable amount of time which results in significant salaries being paid to computer specialists.
- Specialized computer technicians must be hired to maintain systems which create VActors.
- Long–term, film studios can save money because scenes requiring lots of people can be done on the computer rather than hiring real actors.

Reward other acceptable answers.

(c) **Discuss *three* non–economic issues which emerge from the use of VActors. Use specific examples in your discussion.**   *[10 marks]*

Award up to [4 marks] for each issue fully discussed up to a maximum of [10 marks] for each question. Award only [1 mark] for each social consequence if it is only stated.

- VActors can cause the unemployment of real actors such as in the scenes in a movie which require a large number of actors.
- VActors can cause the unemployment of real actors because movies such as "Final Fantasy" have been created with no real actors.
- Impossible scenes can be created with VActors leading people to believe that they are possible such as in the movie "Titanic" when the ship is sinking.
- VActors do not have problems with shooting a film which can emerge with real actors: VActors never get sick and do not have bad acting days.
- VActors can act at any time of the day or night.
- Scenes using a VActor can be reconstructed on a computer, while scenes involving real actors would require reshooting (which would mean time loss and expense).

Reward other acceptable answers.

Area of Impact: Science and the Environment

5. (a) **Identify a specific type of robot and outline *two* IT tools which help the robot to function.**   *[3 marks]*

Award [1 mark] for the specific type of robot identified up to a maximum of [1 mark]. Award [1 mark] for the IT tools outlined up to a maximum of [2 marks]. Award up to a maximum of [3 marks].

- A robot which explores the ocean depths is equipped with a camera and a movable arm for picking up objects.
- A robot which explores for landmines is equipped with sensors and a signalling device.

A robot which explores the land surface of the moon or a planet is equipped with a camera and movable arm for picking up rocks and other objects.

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(b) Robots are often used to aid people with disabilities. Identify an example of a disability, the robotic device which may help and how it may help.   *[3 marks]*

Award [1 mark] for the identification of the disability, the robotic device and how it may help up to a maximum of [3 marks].

- If a disabled person has lost a hand or leg, the disabled person is equipped with a robotic hand or leg. This robotic hand or leg allows the person to learn how to use this hand or leg just like a real hand.
- A severely disabled person who still has limited motion in one finger can use PHANToM robot to perform functions by controlling robotic motions with a finger placed in a finger-like device.
- A person who is completely disabled except for eye movements can use sensors which receive eye movements from the patient to control robotic hands and other human–like devices: this enables a completely disabled person to be able to perform some fundamental tasks such as reading.
- Stroke patients who have lost the use of arms and wrists are able to use robots to assist in the rehabilitation process.

Reward other acceptable answers.

(c) Describe how a robot may be used in each of the following situations:

    (i) for a repetitive task

    (ii) in a dangerous situation.

Do not include any of the answers given in part (a).   *[4 marks]*

Award up to [2 marks] for the specific type of robot identified up to a maximum of [4 marks]. Award only [1 mark] for a partial description.

Repetitive task
- assembly line in a manufacturing industry (assembling automobiles)
- the Japanese piano–playing robot never tiring of playing the same selection of music

Dangerous situation
- diffusing a bomb
- searching for missing people in a collapsed building
- retrieving black boxes from aircraft which have sunk to the ocean floor
- robots (such as Jason) searching for artifacts from ancient sunken ships

Reward other acceptable answers.

(d) **Discuss** *three* **issues which medical experts must consider before implementing new robotic processes in surgery**. *[10 marks]*

Award up to [4 marks] for each issue fully discussed up to a maximum of [10 marks] for this question. Award only [1 mark] for each social consequence if it is only stated.

- Who will be responsible for testing that the robotic system functions properly?
- Who will be responsible for ensuring that the robotic surgery system is used as it was intended?
- Who will be held accountable when something goes wrong?
- Are there any existing laws which govern the circumstances under which robots can be used in surgery?
- Who will be responsible for verifying that the doctors using the robotic surgery system are properly qualified?

Reward other acceptable answers.

Area of Impact: Politics and Government

6.   (a)   **Identify *two* IT components used in a Global Positioning System and describe how a GPS operates.**   *[4 marks]*

Award [1 mark] for each IT component identified up to a maximum of [2 marks].

IT components in a Global Positioning System
- satellites which circle the earth so that they can pinpoint any location on earth
- a computer, an atomic clock and radio located in satellites
- a receiver on the ground which receives signals from the satellite
- handheld GPS receivers including display locations, maps, directions on their screens
- receivers embedded in automobile navigation systems
- Senders which send the geographical position of the sender and other important data. (In the case of soldiers a special GPS sending device in a vest sends position and the body functions of the soldier.)

Reward other acceptable answers.

Award [1 mark] for each part of the description up to a maximum of [2 marks]. How a GPS sender operates (sender, satellite and receiver) must be included.

A sender on a person or object or in a location sends both 3 dimensional coordinates of a location and the time. This information is received by satellites. The receiver on the ground calculates the position of the sender from the information received by the satellites.

Reward other acceptable answers.

(b) Describe *one* **civilian use,** *one* **military government use and** *one* **non–military government use for GPS.**   *[6 marks]*

Award up to [2 marks] for each use fully described up to a maximum of [6 marks]. Award only [1 mark] for each partial description.

Civilian use
- navigational systems in automobiles
- senders attached to children and pets to determine their location (especially in instances of kidnapping)
- mountain rescue of missing persons
- use in downhill ski tournaments to determine speed of skiers
- use by a New Zealand fish company to locate fishing areas and avoid international boundaries
- tracking the flow of the Mt. Everest Khumbu glacier

Military government use
- location of soldiers in war zones
- tracking the movements of military devices and vehicles

Non-military government use
- use in Chicago to direct the nearest ambulance to an accident
- use in Italy to create location points for a nationwide surveying project
- tracking the location of official cars

Reward other acceptable answers.

(c) **Discuss *three* issues involved in the control of this important tool by any single country.** *[10 marks]*

Award up to [4 marks] for each issue fully discussed up to a maximum of [10 marks]. Award only [1 mark] for each social consequence if it is only stated.

- The government of the country can determine at any moment which other country can have access to GPS and which cannot.
- The government can jam the access by any country whenever it decides to do so.
- No alternatives to the GPS exist for other nations.
- The standards which are used in the system are controlled by one country.
- The decisions about the capabilities the GPS are determined by one country.
- Countries could build their own technologies based on the system and then not have access.
- The country may decide to charge for the GPS after a period of time.

Reward other acceptable answers.