MARKSCHEME

May 2008

INFORMATION TECHNOLOGY IN A GLOBAL SOCIETY

Higher and Standard Level

Paper 1

Examiners should be aware that in some cases, candidates may take a different approach, which if appropriate should be rewarded. If in doubt check with your Team Leader.

In the case of an "identify" question read all answers and mark positively up to the maximum marks. Disregard incorrect answers. In the case of a "describe" question, which asks for a certain number of facts *e.g.* "describe two kinds", mark the **first two** correct answers. This could include two descriptions, one description and one identification, or two identifications.

1.   **(a)   Define the term *operating system*.**   *[2 marks]*

Answers may include:
- correct reference to software
- manages the hardware and software resources of the system
- manages the memory – optimises use of RAM
- file management – locates files and programs requested
- provides the user interface
- provides a (software) platform on top of which other programs (applications) can run.

[1 mark] for any two of the above points up to a maximum of [2 marks].

(b)   Describe *two* utilities provided by an operating system that would be helpful in enabling the author to use his computer effectively despite his injury.   *[4 marks]*

Answers may include:
- sticky keys – for accessing capital letters, control sequences *etc.*
- voice input – alternative to typing
- filter keys – to ignore accidental repetition of keystrokes
- mouse keys – control mouse with keyboard
- onscreen keyboard – to provide an alternative to a physical keyboard (as long as it is clear that it is provided by the operating system).

Allow other utilities if they are reasonable and related to an arm injury and clearly provided by the operating system.

[1 mark] for each feature identified up to [2 marks], and an additional [1 mark] each for the relevant description up to [2 marks].

(c) **Explain how developments in software applications have made computers more accessible to people with disabilities.** *[4 marks]*

Answers may include:
- voice recognition technology – allows the user to use speech to input commands and data
- applications have the ability to choose large icons/text – allows visually impaired users to interact with the software
- text to speech – allows visually impaired people to hear the data on the screen
- web pages that show alternative text instead of graphics – which can be read aloud by the computer to visually impaired users
- gesture recognition software – detects human motions of paralysed/speech impaired users (*e.g.* detects sign language, lip/facial movements, eye movements)
- software that shows words instead of sounds – allows hearing impaired users to interact with the computer.

[1 mark]
A limited response that indicates very little understanding of the topic.

[2-3 marks]
A detailed explanation of one issue or a reasonable explanation of two issues, although the answer may lack appropriate reasoning at the bottom end of the band.

[4 marks]
A clear, detailed explanation of at least two of the issues with reasons.

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

- Repetition or **unnecessary** duplication of data.
- Some consequence linked to the initial idea, such as taking up unnecessary file space with information that is already in the database or inconsistent data.

[1 mark] for each of the above points up to a maximum of [2 marks].

Example answer for reference:
Data redundancy is the unnecessary duplication of data in a database. It can lead to inconsistencies between different copies of the same data item.

(b)   Describe how a relational database can reduce the problem of data redundancy.   *[4 marks]*

Answers may include:
- data stored once only
- data stored in tables
- tables are based on entities
- only one copy of the data needs to be updated
- the one copy will always be up to date
- related data is obtained from linked tables.

[1 mark] each for any of the above points up to a maximum of [4 marks].

Example answer for reference:
In a relational database, the data is organized into tables. Each table is based on a real-life entity such as a customer or an order and contains only data about that entity. This means that each data item is stored once only. There is no danger that different copies of the same data item will be updated separately. Links are created between the tables based on key fields and this allows queries to extract data from whichever tables are required.

(c) **The employees will not be familiar with using the new database. Explain how the company can assist employees to adapt to it.** *[4 marks]*

The company can institute a training programme. This can be customized to suit individuals, taking into account their past experience. The training can be conducted in various ways such as on/off site, with live trainer, online or CD based. The company can provide time out for training. The employees can be guided through the new system as they work on it. A help line can be provided.

[1 mark]
A limited response that indicates very little understanding of the topic.

[2-3 marks]
A reasonable explanation, although the answer may lack appropriate reasoning at the bottom end of the band.

[4 marks]
A clear, detailed explanation of the issue with reasons.

3. **(a)** **(i)** **Identify the *type* of software that is being used to access and display this forum.** *[1 mark]*

- (Web) browser.

[1 mark]

(ii) **Identify the protocol being used to transmit this web-based forum.** *[1 mark]*

- http/hypertext transfer protocol.
- TCP or IP (or expansion).

[1 mark]

(b) **Describe *two* ways in which a user of this web-based discussion forum could quickly locate a discussion topic of particular interest.** *[4 marks]*

- Type in a key word (and click search) – using the search box at the top of the web page.
- Choose a forum – by clicking the arrow on the drop down box.
- Clicking on topic – using the hyperlink listed at the left hand side.
- Add to hotlist description – such as maintaining a list of interesting topics.
- Use an external search engine – this can take user straight to the sub-topic required.

[1 mark] for each feature identified up to [2 marks], and an additional [1 mark] each for the relevant description (a dot point) up to [2 marks].

(c)   These types of web-based discussion forum are sometimes abused by users. Explain how abuse of this facility may be minimised by the site's owners.   *[4 marks]*

Answers may include:
- employing a moderator to remove inappropriate material
- providing users with an email address to report abuse to web owner
- making postings appear with user's email details so that abuse can be tracked
- using filters to block certain inappropriate words
- the rules of use are published
- reporting abuse by members or moderators
- members must agree to a contract before being allowed to participate.

[1 mark]
A limited response that indicates very little understanding of the topic.

[2-3 marks]
A detailed explanation of one issue or a reasonable explanation of two issues, although the answer may lack appropriate reasoning at the bottom end of the band.

[4 marks]
A clear, detailed explanation of at least two of the issues with reasons.

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

- Computer controlled/programmed machine.
- Performs (specific) manual/mechanical tasks.
- Automated.

Comments that just refer to a machine or device with no mention that it is either computer-controlled or programmed should not be accepted.

[1 mark] for any two of the above points up to a maximum of [2 marks].

(b)   **Describe** *two* **output devices that are necessary in a robot used for the manufacture of cars.**   *[4 marks]*

Answers may include:
- claws/grab/gripper – for holding/manipulating object
- arm – for moving gripper to position
- wheels – for moving robot along track
- motor – any suitable use such as driving a part of the robot
- spray gun – for painting the bodywork
- monitor – in order to adjust the settings.

N.B. Do not accept any answers that relate to input devices.

[1 mark] for each feature identified up to [2 marks], and an additional [1 mark] each for the relevant description (a dot point) up to [2 marks].

(c)   **Explain why robots are often used in place of humans in the manufacture of cars.**   *[4 marks]*

- More reliable than humans – don't get tired/ill.
- More consistent than humans – machines more predictable.
- More accurate than humans – unless programmed incorrectly do not make mistakes.
- Cheaper (in the long run) than humans – cheaper to reprogram robot than retrain human.
- Can work 24 hours a day – whereas humans need to rest.
- Work quickly – humans are limited in speed.
- Used in hazardous environments – can be used where the safety of a human would be compromised.

[1 mark]
A limited response that indicates very little understanding of the topic.

[2-3 marks]
A reasonable description, although the answer may be unbalanced and lack appropriate reasoning at the bottom end of the band.

[4 marks]
A clear, detailed and balanced description of the issue.