



MARKSCHEME

May 2013

INFORMATION TECHNOLOGY IN A GLOBAL SOCIETY

Standard Level

Paper 1

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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 all other cases where a question asks for a certain number of facts *eg* “describe two kinds”, mark the **first two** correct answers. This could include two descriptions, one description and one identification, or two identifications.

It should be recognized that, given time constraints, answers for part (c) questions are likely to include a much narrower range of issues and concepts than identified in the markband. There is no “correct” answer. Examiners must be prepared to award full marks to answers which synthesize and evaluate even if they do not examine all the stimulus material.

1. Bank offers online services to customers

(a) (i) In the URL <http://www.myfastmoney.com/index.html> identify the following:

- **protocol**
- **domain name.**

[2 marks]

Answers may include:

Protocol

- http
- hypertext transfer protocol.

Award [1 mark] for any of the points identified above.

Domain name

- www.myfastmoney.com
- myfastmoney.com

N.B. Do not accept myfastmoney.

Award [1 mark] for the point identified above.

(ii) The bank has added a link at the bottom of the bank web page that says “Privacy policy”. Identify *four* statements that could be included in this policy.

[4 marks]

Answers may include:

- details of personal information collected by the bank website
- information about cookies/access details (eg IP address) collected by the bank website
- details of how personal information is used
- details of specific situations in which personal information may be disclosed to third parties
- information about extra-EEA transfers of personal data
- information about data security
- information about keeping personal data accurate
- customer’s rights to access their personal data
- bank reminds customers not to share account information
- bank indicates the extent to which the bank is responsible if account information is shared by the customer (eg phishing)
- any change in bank privacy policy will be sent to customers by email
- the bank will not be held responsible for any problems caused by customers accessing their accounts from locations where security is a problem (eg internet cafe, public WiFi network)
- the bank reserves the right to freeze any account where is evidence of suspicious activity.

[Source: <http://www.website-law.co.uk/privacypolicy.html>]

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

- (b) To enable EFT to take place the customer must log in to a secure environment using a username and password. However, many banks now use additional security measures. Analyse two possible additional security measures.

[6 marks]

This question can be interpreted in two ways:

1. Analyze the security relating to the measure.
2. Analyze any aspect of the specific “security measure” (eg cost of implementation, ease of use).

The following list identifies the security measure. The candidate must analyze the security measures.

Additional security measures may include:

- asking personal security questions to recover forgotten password
- movable on-screen keypad
- variable password characters (not full password)
- “2nd Factor Authentication” (eg additional pin number / national identification number such as CPR in Denmark / code card reader / DNI card reader)
- biometric recognition (eg fingerprint, retinal/iris scan, face scan, voice recognition, palm scan)
- virtual keypad
- password generators
- captcha
- SMS security – codes sent by SMS to confirm payment details are correct and the transaction is verified
- data encryption / Secure Socket Layer (SSL)
- limit set on the amount of money that can be transferred using EFT
- firewall
- security token (USB token, key fob) used by the customer.

[Source: <http://www.website-law.co.uk/privacypolicy.html>]

[1–2 marks]

A limited response that demonstrates minimal knowledge and understanding of two additional security measures that can be applied to online bank accounts, using little or no appropriate ITGS terminology.

[3–4 marks]

A partial analysis, either lacking detail or balance, that demonstrates some knowledge and understanding of two additional security measures that can be applied to online bank accounts. Some relevant examples are used within the response. There is some use of appropriate ITGS terminology in the response.

[5–6 marks]

A balanced and detailed analysis demonstrating a thorough knowledge and understanding of two additional security measures that can be applied to online bank accounts. Relevant examples are used throughout the response. There is appropriate ITGS terminology throughout the response.

- (c) **Discuss the implications for the bank of the implementation of these new online services.** [8 marks]

Answers may include:

- less bank branches will be needed
- bank branches will need fewer employees
- may attract customers from all over the world
- will need to train employees
- may need to meet the IT requirements (hardware/software/network services)
- may need to hire additional IT staff
- may lose face-to-face contact with customers
- will have a better service at the bank as there will be fewer queues
- bank services are available 24/7
- banks have to be aware that customers may suffer phishing attacks and should warn them
- hackers may attack the bank's EFT systems, – additional security measures will be needed.
- cost implications for the bank (*eg* training, cost of IT systems required)
- banks may need to make adjustments to the new online services during the implementation phase
- bank will be able to collect data regarding transactions from the website
- bank will no longer need to print bank statements.

N.B. Implications must be for the bank, not the customer.

Please see generic markband information sheet on page 20.

2. Patient monitoring

- (a) (i) State *two* vital signs, other than body temperature, that can be monitored using IT systems to inform doctors of the condition of a patient undergoing surgery. [2 marks]**

Answers may include:

- heart rate
- pulse
- oxygen in blood
- breathing rate
- blood pressure.

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

- (ii) Identify the steps taken by an IT monitoring system to detect when a sign or condition is abnormal and the patient requires special attention. [4 marks]**

Answers may include:

- enter limits
- enter acceptable limits for the condition in the IT monitoring system
- sensor measures the required condition
- measurement is sent to IT monitoring system software
- analogue measurements are converted to a digital format
- the patient's current condition is compared with acceptable limits stored in the IT system
- if outside limit, an alert message appears.

N.B. The focus is on the IT monitoring system. Do not consider attaching the sensors.

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

- (b) **Analyse the implications for doctors when the hospital implements new patient monitoring equipment for health care.** [6 marks]

Answers may include:

- doctors can choose to directly receive patient data/alerts when conditions change
- continuous medical information of patients will be available to the doctor
- the warning signs of the IT monitoring system may alert doctors to conditions that they were not aware of
- doctors may need to carry an alert device
- doctors may have access to better results (*ie* additional analysis, more reports)
- doctors will need to be trained to use the new equipment
- new patient monitoring system may save the doctor time allow them to see more patients
- doctor may be assigned more patients under the assumption that they need to physically visit and check each patient less often with a IT monitoring system
- issues of liability for the doctor if something goes wrong (*eg* if a doctor fails to receive an alert and a patient dies ...)
- doctor can experience technical difficulties when the new patient monitoring equipment is implemented that hinders their work
- doctor can better determine which patients require immediate medical care.

N.B. Only award marks for the implications for doctors.

Do not accept personal considerations for doctors such as stress, distrust of equipment.

[1–2 marks]

A limited response that demonstrates minimal knowledge and understanding of the topic and uses little or no appropriate ITGS terminology.

[3–4 marks]

A partial analysis, either lacking detail or balance, that demonstrates some knowledge and understanding of the topic. Some relevant examples are used within the response. There is some use of appropriate ITGS terminology in the response.

[5–6 marks]

A balanced and detailed analysis of the issue which demonstrates thorough knowledge and understanding of the topic. Relevant examples are used throughout the response. There is appropriate ITGS terminology throughout the response.

- (c) **Training will be provided by the hospital for staff to use the new IT patient monitoring system. It was decided to use a combination of online training and practical hands-on training. Justify this decision.** *[8 marks]*

Use the follow tables to award marks using the generic markband. The response must justify a combination of both online training and practical hands-on training. These two must be used in combination with one another and not just compared.

N.B. If a response addresses online training and hands-on training independently, award a maximum of [6 marks]. For [7–8 marks], a combination of both online training and hands-on training must be justified.

Online training

Advantages	Disadvantages of online training addressed by hands-on training
<ul style="list-style-type: none"> • can be done anytime anywhere by trainees • trainers will not need to be on site • may be repeated (if a tutorial) as many times as needed by trainees • consistent training is delivered to all trainees • certain monitoring processes may be simulated. 	<ul style="list-style-type: none"> • no personal guidance may be provided (like “place hand on this handle and move like this”) • does not provide practical hands-on experience with the IT monitoring system • cost of implementing/creating programs to do the online training (<i>ie</i> hands-on training and training materials may be less expensive to provide) • possible access failure (<i>eg</i> hardware failure, problems with Internet access).

continued ...

Question 2 (c) continued

Hands-on training

Advantages	Disadvantages of hands-on training addressed by online training
<ul style="list-style-type: none"> • trainees will experience the real feel when using the IT monitoring system • trainees may ask questions as difficulties emerge • trainers can get an overview of the difficulties that trainees experience when using the IT monitoring system • training is delivered at scheduled time and place so that there are no interruptions. 	<ul style="list-style-type: none"> • real equipment is needed for some aspects of the training sessions • trainer needs to be at the site (hospital) • training needs to be booked for a specific time • if there are too many trainees then several sessions may need to be programmed • cost of training sessions and use of equipment for training may be high (pay a trainer, room for training) and equipment might need to be renewed after each use.

***N.B.** Do not accept travel costs for hand-on training. Accept cost of IT equipment for online training.*

Please see generic markband information sheet on page 20.

3. Libraries and e-book loans

- (a) (i) Identify the steps a new library user must follow to log in to the library and “borrow” an e-book. [4 marks]**

Answers may include:

- register at the library as a new user or go to the webpage
- receive new username and password
- enter username and password
- search for e-book (by category, by author, *etc*)
- select book and check for availability
- if the book is available, select it for download
- select the file type for the e-book
- download the selected book to the user’s device
- if not available, make a reservation / be placed on a waiting list for the book.

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

- (ii) When e-books are purchased by the library it needs to record information about them in the relational database. All books require ISBN, publisher information, author and title. State *two* pieces of additional information that a library would need to record about an e-book. [2 marks]**

Answers may include:

- type of license, for example multi-user, site license
- file format of the e-book
- file size of the e-book
- year of publication
- edition of the book
- genre (type of book)
- number of pages
- book summary
- book review.

N.B. Do not accept any information about the person borrowing the book.

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

- (b) (i) **Some e-book readers use a proprietary file format, others use generic file formats. Explain *one* advantage for the company who produces and sells the e-books of using a proprietary format.** [2 marks]

Answers may include:

- proprietary formats provides a format that allows improvements/special functionality for the e-book
- the company’s e-books may only be used on their specific e-book reader (*ie* may not be downloaded into other readers, will increase sales of their own readers)
- some proprietary formats do not allow sharing, for example copying, printing or side-load (move between reader devices).

N.B. *The advantage must be for the company.*

Award [1 mark] for identifying an advantage.

Award an additional [1 mark] for an explanation of the advantage up to a maximum of [2 marks].

- (ii) **Explain why a relational database has been chosen as the basis of the lending system.** [4 marks]

Answers may include:

- relational database avoids data redundancy, duplication of data – data will be saved once in a record and information tables is linked
- avoiding errors in data entry – information will only be entered and saved once
- less storage space needed – duplication of data would mean additional storage space would be required.

[1 mark]

A limited response that indicates very little understanding of the topic or the reason is not clear.

[2–3 marks]

A reasonable description of why a relational database has been chosen with reference to the lending system. The answer may be unbalanced and lack appropriate reasoning at the lower end of the band.

[4 marks]

A clear, detailed and balanced explanation of why a relational database has been chosen with explicit reference to the lending system.

N.B. *Maximum of [1 mark] for no reference to the lending system.*

- (c) **A school library has introduced the loan of e-books. Discuss the impact on the students.** **[8 marks]**

Answers may include:

Positive impacts on the students

- students may be able to “carry” many books in one electronic device without worrying about the weight
- students can make “annotations” electronically without scribbling on a book owned by the library
- students can combine the use of a book and a dictionary in case some clarification of terms is needed
- some electronic readers may have an application that will “read” the book (audio format)
- font size and background shades/colours can be changed to help readers with vision problems
- if there is a technical problem, it may be possible for the student to borrow the e-book again
- students may be able to collaborate using e-book note-taking features
- students can access the library 24/7 / students do not have to go physically go to library
- students may access to a wider range of e-books because e-books do not take up physical space
- student will not have to worry about missing the due date for returning the book which is automatically managed by the system
- student will not need to spend time in the library searching for a book – searching can now be done by a query on the e-reader.

Negative impacts on the students

- students may need training to use the electronic reader
- students may not have access to e-books (*eg* no e-book reader, no Internet access, malfunctioning reader)
- students may be concerned with the e-book reader being stolen, damaged or lost
- students will spend additional hours viewing a computer screen
- the e-book reader could lead students to be distracted.

N.B. Do not accept answers about how the student feels about using an e-book.

Please see generic markband information sheet on page 20.

4. E-waste – recycling and carbon footprint

(a) (i) State the formula needed to calculate the value in D3. [1 mark]

$$= B3 \times C3$$

N.B. Do not accept responses without =.

Award [1 mark] for the answer identified above.

(ii) State the formula needed to calculate the value in D8. [1 mark]

$$= \text{SUM}(D3:D7)$$

$$= D3 + D4 + D5 + D6 + D7$$

N.B. Do not accept responses without =.

Award [1 mark] for any of the answers stated above.

(iii) Identify the steps required by the user to produce the chart below. [4 marks]

Answers may include:

- input the data in the spreadsheet
- select columns A (type of equipment) and D (total CO2 emissions grams)
- click “create chart” button
- select graph type
- add data labels to graph
- add the title.

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

- (b) **It is generally desirable to recycle e-waste. Explain *three* effects of the irresponsible disposal of e-waste.** [6 marks]

Answers may include:

- harmful chemicals may be released contaminating the area (*ie* electronic equipment contains lead and other metals that when released may reach the water streams that are used for human or animal consumption)
- the creation of large dump areas – electronic equipment occupies large areas – computer monitors, cases, mainboards, cables
- health problems for people working at or near the recycling sites (*ie* higher levels of dioxins were found in local population)
- dangerous air pollution where e-waste is burnt
- negative effect on wildlife, animals and water life
- e-waste may be sent to locations that are not setup to responsibly dispose of e-waste.

Award [1 mark] for each effect identified and [1 mark] for an explanation of that effect up to a maximum of [2 marks].

Mark the first three effects identified.

The maximum mark for this question is [6 marks].

- (c) **To what extent can a government encourage the responsible disposal and recycling of IT equipment?** [8 marks]

Answers may include:

- government requires retailers of the equipment / manufacturers to take back obsolete equipment and dispose of it responsibly
- government can provide a service to collect obsolete equipment from homes/offices
- government may provide legal disposal/recycling locations
- government will offer financial incentives to customers (businesses, individuals, schools, ...) wishing to upgrade IT equipment if they take their old equipment to official recycling locations
- government provides information in TV commercials, websites, help phone line about the ways to recycle and the dangers of e-waste
- government conducts regular recycling campaigns
- government does not allow the export of e-waste to countries with poor disposal practices
- government will legislate and enforce the responsible disposal of IT equipment
- government encourage schools to develop education programs about the responsible disposal of IT equipment
- government requires all government agencies to use proper disposal and recycling of IT equipment.

N.B. Government action is required.

Please see generic markband information sheet on page 20.

5. Blogs and social networking tools

(a) (i) Define the term *blog*.

[2 marks]

Answers may include:

- a weblog or web log
- a journal /diary available on the web
- blogs are updated periodically
- blog postings are arranged in chronological order
- blogs are websites
- online account of an individual or group of individuals own experiences, opinions and observations.

[Source: <http://www.perrotlibrary.org/whatisablog.htm>]

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

(ii) In addition to blogs, identify two other types of social networking tools. [2 marks]

Answers may include:

- wikis
- photo sharing (accept *Flickr* or similar service)
- video sharing (accept *YouTube* or similar service)
- file sharing (accept *Dropbox* or similar service)
- conferencing/video conferencing (accept *Skype* or similar service)
- microblog (accept *Twitter*)
- *Facebook*.

*N.B. Do not accept two similar types (eg *Flicker* and *Picassa* would be similar).*

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

- (iii) Describe *one* way in which a social networking site can be used by family members living in different countries and wanting to share their daily experiences.

[2 marks]

Answers may include:

- photos may be posted after an event and people in the pictures may be tagged (names added) – this can be done during the event making people who are far away feel part of the event by adding comments
- blogs can be used to keep a daily record of an activity and keep family updated
- videos and audio recording can be included in the social networking sites (for example of babies playing for grandparents, or songs)
- family members can setup a private group in *Facebook* and make daily post.

Award [1 mark] for any of the points identified above.

Award an additional [1 mark] for a description.

- (b) **Many employers now check job applicants by viewing the information the applicants have posted on social networking sites. Analyse the benefits and risks of posting information on social networking sites.**

[6 marks]

Answers may include:

Benefits

- applicants may have online profiles on social networking sites that link to useful information (*ie* achievements, projects)
- applications may have positive endorsements/recommendations on social networking sites
- employer observes that the applicant only uses social networking sites for professional purposes
- from the application's postings the employer gets the impression that the applicant is well-suited to their company.

Risks

- social networking sites are open to allow other people to add content or comment on an applicants post (*ie* the information may not be true, information is placed there to harm others) which influence employers
- applicant may have posted private information without realizing the implications of it being publically available
- information may be stored permanently; embarrassing information relating to the applicant (*ie* text, photos, videos) can have unfortunate consequences over a long period.

[Source: <http://www.focus.com/fyi/security-risks-social-networks/>
and <http://searchsecurity.techtarget.com/answer/What-are-the-risks-of-social-networking-sites>]

[1–2 marks]

A limited response that demonstrates minimal knowledge and understanding of the scenario and uses little or no appropriate ITGS terminology.

[3–4 marks]

A partial analysis, either lacking detail or balance, that demonstrates some knowledge and understanding of the scenario. Some relevant examples are used within the response. There is some use of appropriate ITGS terminology in the response.

[5–6 marks]

A balanced and detailed analysis of the issue which demonstrates thorough knowledge and understanding of the scenario. Relevant examples are used throughout the response. There is appropriate ITGS terminology throughout the response.

- (c) **Governments around the world have tried for years to control the internet and social networking sites claiming that this helps control illegal online activity. To what extent is this claim acceptable?** *[8 marks]*

Answers may include:

- legislation – government punishes offenders using the internet for crimes that are generally accepted as unlawful (*ie* cyber bullying, cyber stalking, child pornography)
- government bans websites and social networking websites that could cause harm to its citizens (*ie* websites with instructions for making weapons)
- education – government provides guidelines for education in schools to warn against the risks of pornography/violence on the web
- legislation – governments create laws to prohibit the access to certain websites (*ie* websites that provide their citizens with views different from their own)
- control of ISP – government may set rules for ISP – provide a list of accepted/non-accepted sites or type of sites.
- government attempts to control illegal downloading of files (*eg* videos, mp3 files, *etc*)
- government request for information regarding individuals' internet activity (*eg* tracking use of *Google* services).

[Source: <http://www.iol.co.za/dailynews/opinion/social-media-genie-out-of-the-bottle-1.1142583>, 22 Sept 2011]

N.B. “*To what extent*” means to consider the merits or otherwise or an argument or concept. *Opinions and conclusions should be presented clearly and supported with appropriate evidence and sound argument.*

Please see generic markband information sheet on page 20.

SL and HL paper 1 part (c) and HL paper 3 question 3 markband

Marks	Level descriptor
<p>No marks</p>	<ul style="list-style-type: none"> • A response with no knowledge or understanding of the relevant ITGS issues and concepts. • A response that includes no appropriate ITGS terminology.
<p>Basic 1–2 marks</p>	<ul style="list-style-type: none"> • A response with minimal knowledge and understanding of the relevant ITGS issues and concepts. • A response that includes minimal use of appropriate ITGS terminology. • A response that has no evidence of judgments and/or conclusions. • No reference is made to the scenario in the stimulus material in the response. • The response may be no more than a list.
<p>Adequate 3–4 marks</p>	<ul style="list-style-type: none"> • A descriptive response with limited knowledge and/or understanding of the relevant ITGS issues and/or concepts. • A response that includes limited use of appropriate ITGS terminology. • A response that has evidence of conclusions and/or judgments that are no more than unsubstantiated statements. The analysis underpinning them may also be partial or unbalanced. • Implicit references are made to the scenario in the stimulus material in the response.
<p>Competent 5–6 marks</p>	<ul style="list-style-type: none"> • A response with knowledge and understanding of the relevant ITGS issues and/or concepts. • A response that uses ITGS terminology appropriately in places. • A response that includes conclusions and/or judgments that have limited support and are underpinned by a balanced analysis. • Explicit references to the scenario in the stimulus material are made at places in the response.
<p>Proficient 7–8 marks</p>	<ul style="list-style-type: none"> • A response with a detailed knowledge and understanding of the relevant ITGS issues and/or concepts. • A response that uses ITGS terminology appropriately throughout. • A response that includes conclusions and/or judgments that are well supported and underpinned by a balanced analysis. • Explicit references are made appropriately to the scenario in the stimulus material throughout the response.