



MARKSCHEME

November 2014

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. E-receipts

(a) (i) State the name of the primary key field of the table *tblOrders*. [1 mark]

- OrderID

Award [1 mark] for the correct key field stated.

(ii) State the relationship between the tables *tblOrders* and *tblPayment*. [1 mark]

- One to many.

Accept PaymentID.

Award [1 mark] for the correct relationship stated.

(iii) State a field type that would be suitable for *Firstname* in the table *tblCustomer*. [1 mark]

Answers may include:

- string
- varchar
- text.

Award [1 mark] for a field type stated up to a maximum of [1 mark].

(iv) State a field type that would be suitable for *Email* in the table *tblCustomer*. [1 mark]

Answers may include:

- hyperlink
- varchar
- alphanumeric
- text.

Award [1 mark] for a field type stated up to a maximum of [1 mark].

(v) State a field type that would be suitable for *Allowed* in the table *tblPayment*. [1 mark]

Answers may include:

- logical
- Boolean
- yes/no
- true / false.

Award [1 mark] for a field type stated up to a maximum of [1 mark].

- (vi) State a field type that would be suitable for *Telephone_Number* in the table *tblCustomer*. [1 mark]

Answers may include:

- string
- character
- text
- varchar.

Award [1 mark] for a field type stated up to a maximum of [1 mark].

- (b) Explain *three* social/ethical considerations for RAX when storing the e-receipt data collected from customers in the store database. [6 marks]

Answers may include:

- security – keeping information safe from unauthorized access (eg firewalls)
- security – authorized access to data – creating levels of authorization for secure access to data
- privacy – data should not be shared with third party without permission from customer – customer determines what is shared
- policies – company should develop a policies concerning how the data is collected and stored
- privacy – customers should be asked if they want their data stored in the store’s database
- availability – the store needs to make provisions to ensure data is available with other alternatives if there is no internet connection or servers are malfunctioning.

Award [1 mark] for each social/ethical consideration identified up to a maximum of [3 marks].

Award an additional [1 mark] for the explanation for each social/ethical concern that has been identified up to a maximum of [3 marks].

Award [6 marks] in total.

- (c) **To what extent is an e-receipt system such as at Myreceipt.com beneficial to the customer?** **[8 marks]**

Answers may include:

- minimize clutter – will not have to carry around receipts in their wallet or purse
- lost receipts – will not lose receipt that may be needed to return an item
- promotions – e-receipts can give access to other promotions, websites, discounts via a website, link or barcode
- item details – some receipts may provide links to items purchased that contain further details about the item
- surveys and contests – customers can complete surveys or enter contests from the e-receipt
- tracking – easier for the customer to track their expenses
- environmental – paperless storage, reducing the amount of paper used / is better for the environment.

In part (c) of this question it is expected there will be a balance in the ITGS terminology between IT technical terminology and the terminology related to social and ethical impacts.

Please see generic markband information sheet on page 19.

2. Magic Medicine Cabinet

- (a) (i) Identify *two* advantages of using RFID *smart* labels (tags) in the MMC. [2 marks]**

Answers may include:

- line of sight not required, just need proximity
- hi-speed data capture
- durability
- can read multiple tags at once
- high accuracy in data collection
- automated, you do not need to scan manually
- will recognize the medicine being retrieved – will be able to give the right message.

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

- (ii) Identify *four* steps involved in the face recognition process used by the MMC. [4 marks]**

Answers may include:

- initial image is entered into system database during setup
- image is read/captured when someone approaches the MMC
- software checks image characteristics
- image is compared to image in the database
- system authenticates person
- access is granted to system.

Award [1 mark] for each step identified up to a maximum of [4 marks].

- (b) **John’s wife wants to take her blood pressure. Compare *two* methods of training that could be provided in using the blood pressure monitoring device.**

[6 marks]

Answers may include:

- website/video conference
 - access a website with tutorials on how to use the blood monitoring device
 - may include videos, links and a chat option for further assistance
 - household may not have sufficient bandwidth to access site multimedia resources
- manual/diagrams
 - a paper manual/diagrams can be provided in box during purchase
 - include step-by-step printed instruction as well as a phone number to call for further assistance
 - may be difficult to get a hold of someone for assistance (*eg* time zones, busy signals ...)
 - language of the manuals may not be the same as of the user
- onscreen tutorial
 - have a built in tutorial that walks the user through a step-by-step tutorial on the screen
 - tutorial may be customized for each family member
 - may be difficult for some users to operate
- onsite training/face to face training
 - onsite training can be provided by the MMC installer
 - might be forgotten by users after a period of time.

Do not accept “call a friend”.

[1–2 marks]

A limited response that demonstrates minimal knowledge and understanding of the topic through simple statements. There is little or no appropriate ITGS terminology in the response. Award a maximum of [2 marks] if only one method of training is included in the response.

[3–4 marks]

A response that demonstrates some knowledge and understanding of how two methods of training could be provided. Some relevant examples are used within the response. There is some use of appropriate ITGS terminology in the response. There may be no explicit comparison of the two methods of training.

[5–6 marks]

A thorough response that demonstrates knowledge and understanding of the topic and makes comparisons between two methods of specific training. Relevant examples and appropriate ITGS terminology are used throughout the response.

- (c) **Discuss the advantages and disadvantages to the patient of using the MMC as a health care tool.** [8 marks]

Answers may include:

Advantages

- remind patient to take the correct medication – uses facial recognition to identify patient and RFID tags on patient’s medication to ensure they are taking correct medication and not someone else’s
- remind patient to take medication on time – using facial recognition, identifies patient and reminds them to take medications daily
- tracking vital signs – can send information to doctor/nurse who can determine in levels are acceptable
- access up-to-date personalized health information – stores your health information (prescriptions, vital signs, *etc*) in one location
- interact online with physicians and pharmacists – if user cannot get out to office, that data collected can be accessed online by doctor/pharmacist
- used by people in remote areas with limited access to health care
- RFID-based smart labels attached to the individual medication as a safety measure
- vital sign sensors to monitor blood pressure and heart rate – like having nurse at home, and can be sent to doctor
- voice synthesis technology to allow additional audio output to what is shown on the cabinet display – gives audio cues for those visually impaired

Disadvantages

- malfunction – may stop working, and therefore may not be able to access data
- malfunction – may not work if there is a power failure
- lockout – system may lock out patients making them unable to access their prescriptions
- may cause problems if patient does not use that bathroom for a period of time (gone on holiday, uses another bathroom, *etc*)
- database may not be kept up-to-date
- face recognition may wrongly identify a person within a house where there are members that look alike, and the image is captured with poor lighting
- people become reliant. Will not be able to reliably take medicine if it breaks down because they will not know what to do.

Do not accept “it is difficult to use/handle”.

In part (c) of this question it is expected there will be a balance in the ITGS terminology between IT technical terminology and the terminology related to social and ethical impacts.

Please see generic markband information sheet on page 19.

3. Who has my data?

- (a) (i) Identify *four* characteristics that may be required by a system when setting up a strong password. [4 marks]**

Answers may include:

- minimum length required
- combination of numbers, symbols, lowercase **OR** uppercase letter
- lowercase **AND** uppercase letters
- avoid sequences or repeat characters
- avoid dictionary words
- password cannot be the same as the username
- is different than previous passwords.

Award [1 mark] for each characteristic identified up to a maximum of [4 marks].

- (ii) Passwords are often set to expire periodically, such as every 90 days. Identify *two* reasons why passwords are set to expire on a regular basis. [2 marks]**

Answers may include:

- narrows window of opportunity for hacker
- old passwords cannot be reused if found as they have expired
- it is a way to disable accounts that are not being used/are not active
- secures data from previous employees who once had access
- protects the account in case the owner has been sharing the password
- when same password is used for too long it is easier for hackers to crack it. Some methods to crack a password (brute force and dictionary) may take some time to discover a password.

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

- (b) **Compare the security of typing a password with the security of using a finger scan.** [6 marks]

Answers may include:

Typing

- could be viewed by an individual watching keyboard
- keylogger programs can record passwords typed into system
- typed password could be guessed or hacked by an individual
- user writes down the password as he/she may not remember the password
- user constantly change password regularly and to remember them they will write them down.

Finger scan

- someone else cannot login to your account – more secure, but can also be a problem if you need someone else to login for you
- someone cannot steal your password
- users do not need to memorize a password – no need to write down the password
- scan never changes because finger biometric patterns do not change – it cannot be used by a different person
- technology experts can duplicate a fingerprint, major security issue as user cannot change his/her fingerprint
- sensitivity of equipment may change over time, making the process less secure.

[1–2 marks]

A limited response that demonstrates minimal knowledge and understanding of the topic through simple statements. There is little or no appropriate ITGS terminology in the response. Award a maximum of [2 marks] if only one method of security is included in the response.

[3–4 marks]

A response that demonstrates some knowledge and understanding of comparing the security of typing a password with the security of using a finger scan. Some relevant examples are used within the response. There is some use of appropriate ITGS terminology in the response. There may be no explicit comparison of the two methods of security.

[5–6 marks]

A thorough response that demonstrates knowledge and understanding of the topic and makes comparisons between the security of typing a password and the security of using a finger scan. Relevant examples and appropriate ITGS terminology are used throughout the response.

- (c) **To what extent is it acceptable for the State of Furlong to hold sensitive data in its criminal database?** [8 marks]

Answers may include:

Benefits

- would allow them to solve crimes using stored information, (eg, data in a DNA database)
- provides protection for children, holds a list of offenders in database
- allows background safety checks (jobs, schools)
- companies such as grocery stores and clothing stores already collect information with loyalty cards, many people are already giving out their information publically
- sensitive information as DNA may allow to identify a dead body.

Concerns

- could open doors to misuse of information collected, who is authorized to access information
- database can be hacked, leads to possible loss of personal data
- data sharing between departments can be misused by others
- people have right to privacy, Human Rights Act
- accuracy of data, if not always kept current then incorrect information will be shared
- human error can occur during data input
- false positives can occur if persons are linked incorrectly by similar name or birth date
- source of information not always reliable, do not know where the information in the database originally came from
- identity theft can occur if this information can be stolen and misused.

In part (c) of this question it is expected there will be a balance in the ITGS terminology between IT technical terminology and the terminology related to social and ethical impacts.

Please see generic markband information sheet on page 19.

4. Donating or disposing of old computers

- (a) (i) Identify *two* peripheral devices. [2 marks]**

Answers may include:

- keyboard
- mouse
- monitor
- speakers
- printer
- scanner
- cameras
- external hard drive.

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

- (ii) Identify *two* methods the C&R Company can use to save data from the hard disk before they delete it. [2 marks]**

Answers may include:

- copy files to an external hard drive
- copy files to a server
- copy files to a CD/DVD/memory stick
- move it to the cloud.

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

- (iii) Identify *two* methods to remove all of the information from these hard disks that does not physically destroy the disk. [2 marks]**

Answers may include:

- software to wipe data, data destruction software (*eg* DiskWipe)
- overwriting media – overwrite data/use random numbers/file shredding software
- use a strong magnet
- formatting hard disks.

Do not accept “destroy with hammer”.

Do not accept “delete”.

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

- (b) Explain *three* factors that could influence the decision by the school in Haiti to use open source or proprietary software on the donated computers. [6 marks]

Answers may include:

- cost – if development is done in-house by the company there are minimal development expenses / open source is free or cheaper than proprietary software, more licences can be installed (on more computers) and more software can be installed providing the donated computers with a greater variety of applications for the new users to have
- customization – open source software is designed for developers to adapt and extend. Proprietary software cannot make non-cosmetic changes
- flexible – open source software tends to adopt new trends faster than proprietary software
- integration – open source software integrates better with other systems. Proprietary software is often locked
- security – open source software fix problems quicker than proprietary software
- responsibility – proprietary software supports the product. Open source software has no direct support
- compatibility – proprietary software may offer different applications that use similar toolbars, making it easier for users / when installing open source different applications may have very different user interfaces, making it harder for users as they have to learn each.

Award [1 mark] for each factor identified that have influenced the decision whether to use open source or proprietary software up to a maximum of [3 marks].

Award an additional [1 mark] for each explanation of the factor identified that have influenced the decision whether to use open source or proprietary software up to a maximum addition of [3 marks].

- (c) **Other companies are considering whether it is better to donate or dispose of obsolete equipment. Evaluate these *two* options.** [8 marks]

Answers may include:

Donate

- give to organization in need – good publicity
- charitable companies will often pick up used equipment for free when donating equipment
- environmental issues – recycling is environmentally friendly way to get rid of older equipment, no waste
- tax friendly – is a charitable donation and eligible for a tax receipt
- age of equipment – if equipment is too old, no one will want it
- responsibility – company may feel responsibility that machines are working properly if they donate them to a school or charitable company, so they may not want to get involved
- donating will help in education/training
- gives those in need computers that they might not otherwise afford
- others can recycle/reuse these parts
- others can sell the parts for profit.

Dispose

- security of data – need to ensure data is completely removed from hard drives
- environmental concerns – hazardous materials, need to be disposed of properly
- cost – often a fee for disposing of equipment properly
- functionality – if equipment is not working, it is easier to dispose of it as no one will want broken items.

In part (c) of this question it is expected there will be a balance in the ITGS terminology between IT technical terminology and the terminology related to social and ethical impacts.

Please see generic markband information sheet on page 19.

5. Using social networking data

- (a) (i) Identify *two* characteristics of social networking.** **[2 marks]**

Answers may include:

- online service that builds social networks
- online services that allow users to contact and make connections with other individuals
- social networking establishes interconnected online communities
- social networks are made of people who gather together online to share in a common purpose
- assumes all users have equal access to one another in an online community
- share and collaborate using social media (*ie* videos, images, text)
- specific examples such as *Facebook, Twitter*.

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

- (ii) Identify *two* data fields that could be collected and stored in a database from the *Twitter* postings.** **[2 marks]**

Answers may include:

- hashtag #
- time stamp
- tweets
- userID – *eg* @userID
- URL
- images
- mentions
- followers
- IP address.

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

- (iii) Identify *two* ways that a social networking site such as *Twitter* can determine your location.** **[2 marks]**

Answers may include:

- Google Maps application to map the tweets – PC
- location Services are turned on – mobile devices
- user has entered his/her location (location enabled for tweets, or in the “from” field)
- user geo-tags pictures that are uploaded
- IP address.

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

- (b) **Explain the privacy concerns for individuals when data mining is used to detect illnesses.** **[6 marks]**

Answers may include:

- purpose of the data collection – will it be used for other purposes than the reason collected
- how the data will be used – will it be public or private
- who will have access to the data – who can view the information
- how up-to-date is the data – will it reflect current situation
- link things accidentally that are not related – data mining can be misused, produce incorrect results
- employers or schools finding out about health issues
- insurance companies using data to amend premiums for individuals.

[1–2 marks]

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

[3–4 marks]

A response that demonstrates some knowledge and understanding of the topic and describes the privacy concerns for individuals when data mining is used to detect illnesses. Some relevant examples are used within the response. There is some use of appropriate ITGS terminology in the response.

[5–6 marks]

A thorough response that demonstrates knowledge and understanding of the topic and explains the privacy concerns for individuals when data mining is used to detect illnesses. The response demonstrates thorough knowledge and understanding of the topic. Relevant examples are used throughout the response. There is appropriate ITGS terminology throughout the response.

- (c) **Although the *Twitter* reporting system is not managed by the Californian authorities, they are using it to identify areas of high concentrations of flu in the state.**

To what extent can data collected by the *Twitter* reporting system benefit the California health authority?

[8 marks]

Answers may include:

Benefits

- provides information about flu outbreaks more quickly than “traditional” methods
- provides health care professionals with information that can be used to prevent epidemics spreading
- provides data that can be easily analysed by a range of stakeholders such as doctors, health centres, insurance companies, vaccine manufacturers, governments / local authorities to develop patterns over time and inform strategic planning
- use data to identify treatments by comparing symptoms and treatments needed
- patients can receive better, more affordable health care services by tracking illnesses and reduce the number of hospital visits
- provides information to guide patient interactions by determining patient preferences and needs
- identifying unusual claims patterns, inappropriate prescriptions, and fraudulent claims to medical insurance companies.

Concerns

- data collected is more likely to refer to diseases prevalent among those who use *Twitter* and might miss epidemics affecting some of the population less likely to use *Twitter*
- data mining requires data preparation which can uncover information or patterns which may compromise confidentiality and privacy obligations
- tweets can be posted by anyone, anytime, anywhere
- tweets are not reviewed or edited for accuracy
- hashtags can be added to anything, throws off search results done by hashtag.

In part (c) of this question it is expected there will be a balance in the ITGS terminology between IT technical terminology and the terminology related to social and ethical impacts.

Please see generic markband information sheet on page 19.

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

Marks	Level descriptor
No marks	<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.
Basic 1–2 marks	<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.
Adequate 3–4 marks	<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.
Competent 5–6 marks	<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.
Proficient 7–8 marks	<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.