



MARKSCHEME

November 2012

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 *e.g.* “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. Health and dentistry

- (a) (i) Describe *one* difference between a local area network (LAN) and a wide area network (WAN). [2 marks]**

Answers may include:

- LAN is within close proximity, (*ie* home, office, same building or group of buildings close together), whereas a WAN is not restricted to a geographical area
- WAN connects several LANs together
- they use different protocols. A LAN transmits to other devices within the network, whereas a WAN uses point to point transmissions between nodes
- LAN has a high transfer rate, WAN is much slower.

Award [1 mark] for identifying one difference and an additional [1 mark] for a brief description up to a maximum of [2 marks].

- (ii) The upgraded IT system is a LAN based on a client/server network. Outline the relationship between the client and the server in the upgraded IT system. [2 marks]**

Answers may include:

- the server hosts information and programs that are shared to the clients (computers used in the examination rooms by dental hygienist/dentist)
- the client (computer used by the dental hygienist/dentist) makes a request to the server
- the server fulfills the request.

Award [1 mark] for any aspect of the relationship between the client and the server that is identified. Award an additional [1 mark] if the relationship between the two is outlined.

- (iii) **The developers of the upgraded IT system own the intellectual property rights for the system. Define the term *intellectual property*. [2 marks]**

Answers may include:

- intellectual property refers to any property that is created using original thought
- the creator owns the rights to the artifacts that they created, this includes artistic works and ideas
- intellectual property is protected by copyrights, trademarks and patents
- unlike tangible property, rights are not extinguished when the property is destroyed
- developers of the IT system own the ideas used in the system (design, how it works and what it does). No other developer can create a system with these same ideas.

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

(b) Analyse the impacts of implementing the upgraded IT system for the dentist. [6 marks]

Answers may include:

- access to data – transfer data from paper records to electronic will make access easier to data
- access to data – dentist and his staff have faster access to a patient’s electronic chart than it is to locate a patient’s paper chart
- queries – dentist will be able to do online search queries for patient information
- simulations – dentist can use the new IT system to show before and after simulations so patients can see what their teeth will look like once a procedure is completed, or what it will look like if they don’t have a procedure done
- cost – dentist will need to provide training for all office staff, which can be costly and time is needed to implement this new system
- backup – if system malfunctions (power outage, server crash, virus), dentist requires a backup plan will need to be in place to access patient records
- updates – once the system has been installed, the dentist may want to keep up with updates and this might have a cost / involve a risk of having to adapt to great changes / assume mistakes of the newer and not tried versions.

Award marks for impacts for the dentist.

[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) **To what extent should dentists use simulation software to determine future treatment for their patients?** **[8 marks]**

Answers may include:

- dentists can show patients what will happen if they don't take care of their teeth
- dentists can show how a certain procedure could correct their current problem with their teeth
- simulations cannot account for all unexpected complications
- simulations can persuade patients into taking care of the situation now, rather than later
- if dentists enter incorrect data into the simulation, then the output will not be reliable and the patient can be given incorrect information.

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. *Live-brary*

(a) **The information about the e-books, borrowers and circulation is stored in a relational database, similar to the one shown below.**

(i) **State the key field in the table *tblBorrower*.** **[1 mark]**

- Borrower_ID

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

(ii) **State the data type for *Telephone*.** **[1 mark]**

Accept any of the following answers:

- text (if not used in calculations)
- varchar datatype (variable-length data type)
- alphanumeric.

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

(iii) ***Loan_Length* uses a drop-down list with 7, 14 and 21 days. Outline why the drop-down list is used for this field.** **[2 marks]**

Answers may include:

- consistency – user cannot input different numbers or formats/prevents users from making mistakes
- preset values – limits users choices to those provided
- simplifies process – values are already provided/select options is faster than typing
- input does not need validation check.

Award [1 mark] for outlining each point up to a maximum of [2 marks].

(iv) **Identify *two* features of the database query shown below.** **[2 marks]**

Answers may include:

- is a derived query / has a calculated field
- shows three fields of the five / two fields are hidden
- only selects records where IsJunior value = 0 / does not select records where IsJunior value = –1
- uses data held in the *tblBorrower* table
- only includes borrowers who are under 18 years old the day the query is run
- uses the DateAdd and Date functions.

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

- (b) **Explain *two* advantages that digital rights management (DRM), associated with the e-books, provides to the *Live-brary*.** [6 marks]

Answers may include:

- e-book is encrypted – may need an electronic key to unlock it
- cannot copy and paste the e-book into another program
- e-books do not have to be returned
- cannot keep the e-book
- stops borrowers from sharing the e-book with others when it has been downloaded.

For each explanation:

Award [1 mark] for an advantage identified.

For that advantage award up to [2 marks] for an explanation.

Award a maximum of [3 marks] for explanation of each advantage.

- (c) ***Live-brary* allows borrowers to access free digital content which can be read online and be downloaded to read offline. Evaluate *both* these options.** [8 marks]

Answers may include:

Streaming

- must be online to read the book, constant internet access
- if connection is slow, may have difficulty reading, turning pages
- if connection is lost, unable to read book
- can get access to up-to-date books.
- if the text has links (*ie* to websites, additional content material), these may be followed while reading the online version
- if users are making comments to passages in the book these will be updated online and the online reader will be able to access them at any time
- large books may be read online without having to worry about the amount of storage space they might take.

Downloading

- only need to have internet access long enough to download book
- can read the book in areas without internet access once downloaded
- cannot get more books unless internet connection is established
- may require a large amount of storage space on the device used to read the e-book offline
- the device's battery will last longer if the device is not connected to the internet while reading the downloaded book (*ie* provides user with more hours of use without recharging, important consideration when travelling)
- books can be read on planes, trains or other places where there is no Wi-Fi connection.

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. Running your home from your touch-screen tablet

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

Answers may include:

- wireless fidelity
- wireless network technology
- uses high frequency radio signals
- also referred to as 802.11
- standard by which wireless computers connect to a network.

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

(ii) Define the term *USB*. **[2 marks]**

Answers may include:

- universal serial bus
- common type of computer port or connection
- a plug-and-play interface between a computer and peripherals.

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

(iii) Identify *two* tasks carried out by a router. **[2 marks]**

Answers may include:

- directs data to the required IP address
- forwards data packets
- level three device
- splits up an internet or network signal to go to different computers
- allows multiple computers to use one IP address.

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

- (b) (i) **Explain why the use of computers would be an efficient way to control your home.** [4 marks]

Answers may include:

- cost – turn lights off if you forget and have already left your home – save on electricity bills – do not have to return home to do it
- convenience/comfort – turn heat/air conditioning on shortly before you get home – your home is at the required temperature when you arrive
- security – video surveillance – can see for yourself what is happening in and around your home.

[1 mark]

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

[2–3 marks]

A reasonable explanation of the problems that may arise from using this to control your home. 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 this would be an efficient way to control your home.

- (ii) **Explain one difference between the access to a WiFi and a 3G mobile network.** [2 marks]

Answers may include:

- range – WiFi is limited to a small area or hot spot within a small region, whereas 3G is a broad signal available in a wider area
- coverage – WiFi must be within range of a router, usually indoors or a confined area where signals can sometimes be interrupted by other devices, whereas 3G can be outside and is available in remote areas
- cost – WiFi is free in many hot spots, whereas with 3G there are costs incurred through a local company.

Award [1 mark] for one reason identified and [1 mark] for an appropriate explanation of that reason up to a maximum of [2 marks].

- (c) When setting up software and accessing web sites such as *Amazon*, the user is often given a choice of two options:
- remain permanently logged in
 - require the username and password to be entered every time.

Justify the option you would choose when using a computer to access a website from home.

[8 marks]

Answers may include:

Permanently logged in:

- so you do not have to type in credentials to gain access quicker
- if you want others to access information on your system
- your own personal computer, no need to logout.

Log in each time:

- security – no one can gain access without your login credentials
- ensures you don't forget your password over time
- multi-users – if others use the machine, you would want them to log in as themselves
- networked computer – required personal login each time.

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. 3D in the classroom

- (a) (i) Define the term *storage area network*.** **[2 marks]**

Answers may include:

- networked storage devices
- multiple servers share disk storage in one central location
- type of LAN designed to handle large data transfers.

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

- (ii) State *one* advantage of using fibre optic cable.** **[1 mark]**

Answers may include:

- speed of data transfer
- increased bandwidth
- not susceptible to magnetic interference.

Award [1 mark] for an advantage to a maximum of [1 mark].

- (iii) State *one* disadvantage of using fibre optic cable.** **[1 mark]**

Answers may include:

- fibre optic cable is expensive to purchase/install
- more fragile than other cable options
- the difficulty in making connections
- difficult to install/repair.

Award [1 mark] for a disadvantage to a maximum of [1 mark].

- (iv) The school has bought a 5-user concurrent licence for the 3D software. Outline how this licence works.** **[2 marks]**

Answers may include:

- can only be used by 5 machines/users at a time
- denies access to anyone else once the 5-user limits has been reached, often with a warning alert.

Award [1 mark] for identifying each point up to a maximum of [2 marks].

- (b) Teachers find the on-screen instructions for changing settings from 2D mode to 3D mode very complicated and time-consuming. For example, the teacher must choose the following menu items each time they want to use 3D:

Menu > Detailed Menu > Image > Advanced Menu > 3D Mode > On

Analyse *two* IT methods of providing training for teachers to use the software and hardware linked to the new 3D system. **[6 marks]**

Answers may include:

Face-to-face training:

- requires attendance in person
- can interact in person with instructor
- can ask questions directly to instructor.

Online training:

- flexibility – do not have to be present at a specific time
- convenience – do not have to be present at a specific location
- can often review online training several times
- can often interact with instructor via discussions
- can be individualized to user’s needs – can skip or redo steps when required.

Do not accept reading a manual, as it is not an IT method.

[1–2 marks]

The candidate conveys a limited understanding of the difference between face-to-face and online training. The examples compared will be identified or partially described in isolation.

[3–4 marks]

The candidate conveys some understanding of the difference between face-to-face and online training, but the two ways would have been described in isolation.

[5–6 marks]

The candidate provides an explicit and direct contrast of the two types of training with the use of appropriate terminology.

- (c) **Other schools are investigating this 3D technology for their classrooms. Discuss whether they should invest in this system.** *[8 marks]*

Answers may include:

- cost – new equipment will need to be purchased
- availability of resources – special resources and software will need to be purchased
- ease of use – need to ensure it is easy to use for all teachers
- engaging – new technologies will be of greater interest to students
- better understanding – 3D technology allows students to see from various perspectives and learn more from these models.

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. Voice over internet protocol (VOIP)

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

Answers may include:

- a telephone connection over the internet
- audio data is sent digitally over the internet
- a system for converting analogue signals to digital so that telephone calls can be made over the internet.

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

- (ii) Define the term *protocol*. [2 marks]**

Answers may include:

- set of rules/standards/instructions
- protocols determine specific tasks (*ie* error checking, method of data compression, when the receiving device has received all of the data, when the sending device has completed the transmission of data)
- governs the transmission of data
- protocols specify interactions between devices
- specific example of protocol (*ie* FTP).

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

- (iii) State *two* stages where a *Skype* call can be blocked from reaching the intended recipient. [2 marks]**

Answers may include:

- user level
- server level
- firewall
- ISP level.

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

- (b) Analyse the decision of some countries to ban services such as *Skype*. [6 marks]

Answers may include:

Advantages for the government:

- economic – countries will lose money if business is taken away from national telecom companies
- increased government control over calls and records that happen within their country through national telecom companies
- security – data can be more easily intercepted
- reduce the demands caused by Skype on Internet service (*ie* bandwidth).

Disadvantages for the government:

- restriction of users' communication promotes illegal providers of *Skype* to emerge.

Advantages for the user:

- better national telecom services may emerge because all citizens must use these services.

Disadvantages for the user:

- users could have no alternative to paying excessive fees charged by national telecom companies
- anyone attempting to by-pass the law will face consequences such as imprisonment or fines
- users may need to travel to neighbouring countries that do not have such restrictions to use *Skype*
- encryption of telephone communication is no longer possible (whereas *Skype* is encrypted so governments do not have easy access to the data).

[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) **In most countries the use of VOIP is legal. Discuss the decision of a business in these countries to use VOIP services instead of a conventional phone system.**

[8 marks]

Answers may include:

- low cost – can make long distance calls for free, anywhere in the world via VOIP
- portable and convenient – can make calls anywhere there is an internet connection by signing into your VOIP account
- added features – caller ID, call forwarding, call waiting, voicemail at no charge unlike conventional phone systems
- sharing resources – can send picture and documents while you are talking on the phone since it uses data lines
- virtual phone number – you can choose a phone number with an area code different from where you reside
- group conversations – on a traditional phone line, only two persons can speak at a time. With VOIP, you can setup a conference with a whole team communicating in real time
- power – internet based phones need power, so they will not work during a power outage unlike conventional phones
- emergency calls – emergency services cannot trace the location of a call (dangerous if you can't talk in an emergency) if it is on a data line such as VOIP
- sound quality – voice data sent across the internet can experience dropped data packets which would cause short periods of silence
- video quality – delay in the video resulting from technical limitations (*ie* low bandwidth either by the sender or receiver, incorrect settings)
- reliability – the distance and speed of the connection affects the reliability of the sound arriving
- bandwidth – too much traffic on a network can cause a drop in audio data when using VOIP
- security – VOIP may not be as secure as a regular telephone service; phone calls may be intercepted as they are transmitted over the internet.

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.