



MARKSCHEME

November 2008

INFORMATION TECHNOLOGY IN A GLOBAL SOCIETY

Standard Level

Paper 2

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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 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.

SECTION A

Area of impact: Business and employment

1. (a) **Identify two ways that this e-mail could trick Citibank customers into providing sensitive information.** *[2 marks]*

Answers may include:

- presence of the citi logo
- link with https protocol suggests security
- other comment suggesting official look *e.g.* “A member of citigroup”, “Copyright @ 2004 Citicorp”
- threat of blocked account
- the bank's name is included in the sender's e-mail address
- reasons given sound plausible *i.e.* need to update software
- citbank.com appears in the reference link
- customers are tricked when they follow the link as they follow instructions to enter their account number and PIN
- customers are tricked as the link may download spyware which collects user information and sends it back to the criminal's server.

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

- (b) **Describe the steps used by the bank’s IT system to authorize a customer’s access to their bank account when using a card at an ATM.** *[4 marks]*

- customer ID read from card/card is scanned/read
- the IT system checks that the card has not expired
- the IT system requires the PIN to be entered (or iris scan, voice recognition other characteristic)
- PIN is compared with PIN stored in database/account details (encrypted) are sent to bank's central computer/account details are matched in the customer database to check the account is valid
- if PIN matches the database then access is authenticated.

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

(c) Explain *two* actions that could be taken by the bank to assist customers in identifying fraudulent e-mails. **[4 marks]**

- *Citibank* creates service to customers for reporting fraudulent e-mails – e.g. a special phone line to phone & check on specific email received
- availability of an online policy from *Citibank* – customers can immediately check on *Citibank* policies (e.g. *Citibank* will never send e-mails to customers requesting them to access a *Citibank* web site or input account details)
- *Citibank* posts warnings about fraudulent e-mails – notices/flyers posted in the bank
- *Citibank* posts warnings on its website
- the bank contacts customers - mailings by post/e-mail to customers explaining the problem and actions customers should take
- during ATM transactions screen displays include warning messages about fraudulent e-mails
- *Citibank* offers seminars regarding phishing – educates customers about how phishing occurs and what actions they should take
- the bank sends a letter to customers advising of the bank's e-mail address so they know this will be the only valid email address to receive valid email from the bank
- the bank provides a list of known phishing scams to help customers identify fraud
- the bank provides free anti-phishing software for customers to download from the bank's web page
- advice is given to customers face-to-face – e.g. from the teller when they visit the bank.

[1 mark]

A limited response that indicates very little understanding of the topic.

[2-3 marks]

A reasonable explanation of actions that could be taken by the bank to assist customers in identifying fraudulent e-mails, although the answer may be unbalanced and lack appropriate reasoning at the bottom end of the band. Two actions identified/one action described [2 marks]. Two actions described [3 marks].

[4 marks]

A clear, detailed and balanced explanation of actions that could be taken by the bank to assist customers in identifying fraudulent e-mails.

(d) To what extent have ATMs *and* online banking changed the way that people manage their finances? **[10 marks]**

- finance management is more efficient – done from home/less trips to bank/more convenient
- finances can be managed from anywhere in the world – convenient when travelling
- finances can be managed at any time of the day – ATMs and online banking are available 24/7
- bills may be paid on line – ease of transactions/convenience
- money can be transferred on line to other accounts
- statements can be printed online instead of received through the post
- less use of cash/cheques – bills are paid online and no need to pay with cash or use cheques
- better management of finances as statements can be accessed anytime
- choice of global/virtual banks (*e.g.* ING) which may offer higher interest rates
- customers can choose automatic payments – prevents charges due to late fees
- greater independence – customers can do their own handling of finances without needing to wait in the bank for a bank clerk who might be busy and may cause a delay in the transactions
- online banking allows transfers to systems such as PayPal – to allow customers to buy online goods from home
- managing finances using paper files is no longer necessary – online banking replaces the need to keep paper files/information can be accessed from anywhere and no need for storage cabinets
- people do not have to rely on credit cards for online transactions – when shopping online payments can be done online directly from their accounts.

Analysis could include arguments which explain the need to be aware of risks using online banking (*e.g.* hackers accessing credit card details) and ATMs (*e.g.* criminals can skim cards).

Do not award marks for discussions about the use of credit cards.

Please see generic markband information sheet on page 19.

SECTION B

Area of impact: Education

2. (a) **The location for the web site is <http://www.ratemyteachers.co.uk/index.asp>**

(i) **Identify the protocol used to access this web site.** *[1 mark]*

- protocol: http
- protocol: hypertext transfer protocol
- protocol: hypertext transport protocol

[1 mark] for any of the above protocols.

(ii) **Identify the name of the file being accessed.** *[1 mark]*

- name of the file: index.asp

[1 mark] for the above response. Do not accept “index”.

(b) **RateMyTeachers requests personal information from the students such as name, address, birth date and gender when they register for accounts. Describe *two* ways that additional information can be collected about students’ use of the web site without them being aware of it.** *[4 marks]*

- cookies are installed on the students’ computer – cookies keep track of web pages that have been visited and advertising that has been clicked when the computer has been used (applies to this or any website visited)
- the server log keeps track of the students surfing habits in a server log – web pages visited, length of time on each page, the time of day (IP is about the student’s computer, web pages visited could be any other page)

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

(c) Explain *two* situations where *RateMyTeachers* might be required to pass information entered on the web site to either school or legal authorities. **[4 marks]**

- serious indications of a teacher harming students/teacher with illegal conduct – reason: to protect students/to allow teacher involved to defend himself/herself against harmful comments
- threats to teacher, another student or the administration – reason: necessary to protect those threatened and prevent a serious situation
- indication of the student being involved in criminal activity against the school/teachers – reason: preventing student action against the school, e.g. property damage, reported theft
- indication that the student will cause harm to themselves – e.g. psychological or stress-related problem, reason: needs to be reported to the school and legal authorities
- students defaming a teacher or group of teachers to a point of harming their reputation.

[1 mark]

A limited response that indicates very little understanding of the topic.

[2-3 marks]

A reasonable explanation of situations where RateMyTeachers might be obligated to turn information entered on the web site over to either school or legal authorities, although the answer may be unbalanced and lack appropriate reasoning at the bottom end of the band. Two situations identified or one described [2 marks]. Two situations described of two situations identified and one reason fully explained [3 marks].

[4 marks]

A clear, detailed explanation of situations where RateMyTeachers might be obligated to turn information entered on the web site over to either school or legal authorities. For [4 marks] both situations must have a reason or a reason that clearly supports both situations why the site might be required to pass information.

(d) **“A web site allowing children to rate their teachers may sound harmless but it could ruin careers”. To what extent do you agree with this statement? [10 marks]**

- unsubstantiated comments could affect employment prospects *e.g.* anonymous comments may not be real and teachers may be wrongly rated by unhappy students – schools may take action against teacher without verifying the information/director from other schools may read comments about teachers opting for a position in their school and be impressed or not and use this information to decide if the teacher is hired
- gossip could lead to unfair treatment by head teachers, such as in giving references/promotion
- positive comments may help career prospects
- teachers may choose to work in schools on basis of comments on the web site
- comments may be made out of spite/because of disaffection and affect the teachers' jobs/careers.

Please see generic markband information sheet on page 19.

Area of impact: Health

3. (a) **Identify *two* uses for a computer system during a consultation between Dr James and a patient.** **[2 marks]**

Answers may include:

- check medical history
- book appointment
- record treatment
- record diagnosis
- write referral
- look up symptoms
- look up drugs
- use an expert system to help diagnose patient
- use sensors connected to the computer to capture and analyse data during the consultation
- use simulations to show patients the surgery process or expected outcomes of certain procedures
- use other tools to analyse results (spreadsheet to enter height, weight and pulse to make a graph)
- word processor to write and print follow up procedures, steps to follow by patient, dietary requirements
- if a patient is being monitored the sensors could be connected to the computer to see the results
- Send results of a consultation to a patient by e-mail.

[1 mark] for each correct use identified up to [2 marks].

- (b) **Describe *two* threats to the integrity of the data held on the LAN at Dr James' general practice.** **[4 marks]**

Answers may include:

- simultaneous access of records
- fraudulent access to change data in records to harm someone/to create chaos
- careless data entry – mistakes entering data about a patient
- insufficient validation
- program to access data handled incorrectly by inexperienced nurse/doctor
- lack of password to protect data from unauthorized access allows others to enter and modify data
- virus altering information in the database or patient files
- data transfer error may cause some data to get lost or have alterations.

[1 mark] for each threat described up to [4 marks].

(c) **Explain the relationship between client computers and a server in a client/server LAN.** **[4 marks]**

- the client is the workstation
- the workstation sends requests to the server for services such as logins, file storage or retrieval and print resources
- the client runs client-side software
- client may be connected to the server with cables or wireless connection
- clients access the (file) server to store and retrieve files

- the server provides services to the client
- the server deals with security and record keeping
- the server runs server-side network software
- the server may store the applications
- the server stores the data used by the clients
- some servers have specialist functions such as providing e-mail services.

[1 mark]

A limited response that indicates very little understanding of the topic.

[2-3 marks]

A reasonable explanation of the relationships with mention of client and server functions, although the answer may be unbalanced and lack appropriate reasoning at the bottom end of the band.

[4 marks]

A clear, detailed and balanced explanation of how the client computers interact with the servers with some examples of functionality given.

- (d) **Discuss reasons why the uptake of IT systems has been greater in small general practices than in large hospitals.** *[10 marks]*

General practice:

- small general practices are likely to have autonomy over their IT provision
- there is less need to link with other systems, making the system less complex
- they have control over their budget
- they are less likely to be able to write off mistakes
- can work with pre-made software and adapt to its requirements

Hospital:

- hospitals need more complex systems/software specially programmed for their needs
- hospitals handle larger databases and greater number of databases (patients, staff, medicines, inventory)
- there are more people working there/more departments – will need more equipment/resources/training less likely to be popular with users
- they are run by large authorities or government departments where wastage of money is more likely
- systems are more complex as they need to consider several aspects (multiusers, centralised database)
- doctors in hospitals are likely to be mobile (moving amongst patients) which makes the provision of computer systems more difficult.

Please see generic markband information sheet on page 19.

Area of impact: Arts, entertainment and leisure

4. (a) **Identify *two* methods of payment used by customers in order to be able to place their bets with an online gambling casino.** *[2 marks]*

- credit card
- debit card
- e-payment schemes, *e.g.* PayPal
- using phone to debit from phone account.

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

- (b) **Describe *two* IT methods used by online casinos to attract new customers to online gambling.** *[4 marks]*

- advertising banners/pop-ups to attract new customers to their web sites
- spam
- provide online tutorials on how to play the gambling games
- provide the possibility to chat to other players participating in the online gambling games
- make special offers for the customer who plays the games
- allow the new customers to win a disproportionate amount of times at the beginning
- deliver CDs by post with multimedia information about the casino and link to web site.

[1 mark] for each method identified up to [2 marks], and an additional [1 mark] for each relevant description (a dot point) up to [2 marks]. Do not accept any non-IT methods such as TV sponsorship.

- (c) **Explain why a casino customer would prefer to use an online casino instead of gambling in a traditional casino.** **[4 marks]**

- lower bets are allowed than in traditional casinos
- pay-offs are better
- convenience of betting from home and not having to travel
- can play a range of gambling on worldwide sites
- taxes on winnings can be evaded because no one is aware of the amount of money that an individual has won
- anonymity – a respected member of a community is not “seen” in the casino
- can gamble e.g. under aged people, people banned from casinos, people not allowed in normal casinos
- access for people who have mobility issues or disabilities
- less risk of being robbed when arriving or leaving as no cash is handled
- will be able to get a place because in most casinos you had to book
- some customers will not like the risk of others handling their coins/tokens.

[1 mark]

A limited response that indicates very little understanding of the topic.

[2-3 marks]

A reasonable explanation of why a casino customer would prefer using an online casino instead of gambling in a traditional casino, although the answer may be unbalanced and lack appropriate reasoning at the bottom end of the band.

[4 marks]

A clear, detailed and balanced explanation of why a casino customer would prefer using an online casino instead of gambling in a traditional casino.

- (d) **Discuss the concerns that governments would have regarding the increase of online gambling.** **[10 marks]**

Concerns:

- avoiding taxes within a country because the casino customer is outside the country
- lack of control of fraudulent practices of online casinos (e.g. running of the games, payout schemes)
- online gambling sites promote addiction because there is no control of online access
- online gambling encourages continuous growth in the number of persons gambling
- persons who are under the legal gambling age can still find ways of gaining access which is not the case with physical casinos
- need to regulate the use of casinos by the general public.

Please see generic markband information sheet on page 19.

Area of impact: Science and the environment

5. (a) **Identify *two* ways that data collected in a weather station could be transferred to the weather database.** *[2 marks]*

- internet connection
- telephone/modem
- cellphone/modem
- radio signals
- wireless connection to computers
- via a PC and transferred to the database computer
- via memory card CD/DVD/USB memory device that is taken to the database computer
- cables connecting data loggers/sensors and database computer
- connection via LAN/WAN
- FTP
- Bluetooth
- satellite
- manual entry of data
- e-mail.

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

(b) **Describe the differences between a computer model and a computer simulation.** *[4 marks]*

Model:

- model is a set of relationships
- representation/description of reality
- using a set of variables and relationships
- a physical representation of a system/process/entity
- abstraction/set of ideas to represent a system.

Simulation:

- simulation is a representation of reality/imitation of a real situation
- application/use of a model to determine the output
- pretending to have a real situation.

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

(c) **Explain why the path of a hurricane may not match the prediction from the computer simulation.**

[4 marks]

- inaccurate data has been collected and used to create the computer simulation
- practice of simplifying the parameters within the simulation which eliminates important aspects of the real situation (model may not consider enough variables)
- assumptions were made in generating the simulation that make the simulation inaccurate
- a programming error may have occurred which has not been detected (model is incorrect)
- the path and effect of the hurricane may be influenced by factors not considered in the model
- the simulation does not use continuous real time data, only some initial data, that does not correct the path as it goes along.

[1 mark]

A limited response that indicates very little understanding of the topic.

[2-3 marks]

A reasonable description of how the path of the hurricane may not match the predictions from the computer simulation although the answer may lack appropriate reasoning at the bottom end of the band.

[4 marks]

A clear, detailed explanation (with reasons) of why the real path may not match the predicted path.

(d) Evaluate how the use of different IT systems could help a country prepare against natural disasters. **[10 marks]**

- sensors/datalogging of weather/other forecasts – to forewarn population to allow for preparation
- database of resources – to assist citizens in an emergency
- database of specialist help – to assist citizens in an emergency
- Internet help site – to assist citizens in an emergency
- online backup of data – to prevent data loss in case equipment is destroyed
- satellites and remote sensing of weather – to provide information/warnings from wider areas
- multimedia tutorials for citizens/schools on the Internet/CD/e-mail – showing steps to follow in an evacuation
- GPS systems - to help evacuate vehicles/deliver emergency provisions
- Internet/SMS/networks (LAN/WAN) – to advertise warnings of closed routes/dangers
- the combination of weather forecasting techniques plus data from previous floods plus images from satellites, and models about river flows may allow the government to warn the population against possible floods
- deep underwater sensors to detect earthquakes and to confirm whether or not a tsunami has been generated
- map generation for different waves and inundations to warn different coastal towns
- sensors and data logging for continuous data collection – to create a database and identify patterns or use in a model to simulate a disaster (*e.g.* volcanic eruption)
- use of data bases previously collected to input into computer models to simulate different situations
- use of simulations on models of planned buildings to see if they would resist an earthquake.

Evaluation could include:

- warnings allow citizens to rescue valuables
- protective measures to buildings can be put into place
- associated costs of the IT systems
- reliability of warnings – if incorrect could lead to unnecessary panic/costs
- some countries may not have the infrastructure to connect the weather prediction equipment and the communication network
- evacuation is possible with forewarning
- possible privacy breaches if personal information from databases is used to find/contact people after a natural disaster.

Please see generic markband information sheet on page 19.

Area of impact: Politics and government

6. (a) Identify *two* reasons why the new passport photographs must conform to strict regulations. [2 marks]

- so that facial features are in standard positions
- allows facial scanning software to make measurements
- allows measurements to be compared to stored measurements using the same ranges
- ensures all facial features are visible.

[1 mark] for each correct reason identified up to [2 marks].

(b) Describe the steps that could be taken by an IT based check-in system to verify that a person is the authentic owner of a particular passport. [4 marks]

- take photo of person
- scanning software measures dimensions of facial features
- information is read from RFID chip
- these are compared with the stored dimensions in the RFID chip
- if a good match, then passport validated
- warning given if not a good match
- check other personal details/passport number to ensure they are stored on system.

[1 mark] for each correct step described up to [4 marks].

(c) Explain how the use of the biometric passports could speed up checking in at airports. **[4 marks]**

- there will be no need to check details manually
- there will be more confidence that the match is correct, thereby reducing the need for extra checks
- security clearance can be quicker because attention can be focussed on suspect individuals and less time is spent on most travellers
- there is no need to open passports
- the radio signal can pass through paper
- there is no need to study faces and photos because the system does that.

[1 mark]

A limited response that indicates very little understanding of the topic.

[2-3 marks]

A reasonable explanation of how the new passports may speed up checking in, although the answer may be unbalanced and lack appropriate reasoning at the bottom end of the band.

[4 marks]

A clear, detailed and balanced explanation of how the new passports might speed up checking in, with clear awareness of the technical issues involved. There may be some comment on possible difficulties encountered.

(d) Discuss possible objections to the introduction of biometric passports. **[10 marks]**

- the introduction of the new passports incurs a cost – this cost is passed on to the passport applicants
- more data is now stored about an individual
- concerns about how safe the data will be
- concerns about who will have access to data
- governments do not have a good record of keeping personal data safe
- there are worries about identity theft
- more records will exist about a person’s movements
- these details are no business of governments
- the data can be collected by others such as banks and hotels (when a passport is used as an ID check)
- data may be collected surreptitiously by portable devices held by people nearby
- system is not foolproof – biometric systems can return a “false positive” when someone is using a false passport
- there may be delays and other problems if false interpretations occur
- caused by poor data capture or limited capabilities of the matching software
- may cause problems with people with different religious beliefs about showing their faces in public
- job replacement at airports – less people needed at check-ins.

Please see generic markband information sheet on page 19.

Markband for all extended response questions

<p>4 Opinion discuss, evaluate, justify, recommend and to what extent</p>	<p>0</p>	<p><i>No knowledge or understanding of IT issues and concepts or use of IT terms</i></p>
	<p>1-2 marks</p>	<p><i>A brief and generalized response with very little knowledge and understanding of IT issues and concepts with very little use of IT terms.</i></p>
	<p>3-5 marks</p>	<p><i>A response that may include opinions, conclusions and/or judgments that are no more than unsubstantiated statements. The response will largely take the form of a description with a limited use of IT terms and some knowledge and/or understanding of IT issues and/or concepts. If no reference is made to the information in the stimulus material, award up to [3 marks].</i></p> <p style="text-align: center;"><i>At the top end of this band the description is sustained.</i></p> <p style="text-align: center;"><i>At the bottom of the band a tendency towards fragmentary, common sense points with very little use of IT terms.</i></p>
	<p>6-8 marks</p>	<p><i>A response that demonstrates opinions, conclusions and/or judgments that have limited support. The response is a competent analysis that uses IT terms appropriately. If there is no reference to IT terms the candidate cannot access this markband. There is evidence that the response is linked to the information in the stimulus material.</i></p> <p style="text-align: center;"><i>At the top end of the band the response is balanced, the response is explicitly linked to the information in the stimulus material and there may be an attempt to evaluate it in the form of largely unsubstantiated comments. There is also evidence of clear and coherent connections between the IT issues.</i></p> <p style="text-align: center;"><i>At the lower end of the band the response may lack depth, be unbalanced or tend to be descriptive. There may be also implicit links to the information in the stimulus.</i></p>
	<p>9-10 marks</p>	<p><i>A detailed and balanced (at least one argument in favour and one against) response that demonstrates opinions, conclusions and/or judgements that are well supported and a clear understanding of the way IT facts and ideas are related. Thorough knowledge and understanding of IT issues and concepts. Appropriate use of IT terms and application to specific situations throughout the response. If there is no reference to IT terms candidates cannot access this markband. The response is explicitly linked to the information in the stimulus material</i></p> <p style="text-align: center;"><i>At the bottom end of the band opinions, conclusions and/or judgment may be tentative.</i></p>