



# **MARKSCHEME**

**November 2006**

## **INFORMATION TECHNOLOGY IN A GLOBAL SOCIETY**

**Standard Level**

**Paper 2**

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**Area of impact: Business and employment**

1. (a) **Identify *two* ways in which PDAs can communicate with computer systems. [2 marks]**

*Award [1 mark] for a way that is clearly identified up to a maximum of [2 marks].*

Answers may include:

- WiFi
- infrared
- interface cables
- Bluetooth
- a docking device.

*Reward other acceptable answers with the approval of your team leader.*

- (b) **The term “convergence” is used to describe instances where different mobile digital devices are combined to produce one new product. Describe *two* new products where the features from different mobile digital devices are combined. [4 marks]**

*Award [1 mark] for each example of convergence that is clearly identified up to a maximum of [2 marks].*

*Award [1 additional mark] for a description of features used in the convergence to a maximum of [2 additional marks].*

Answers may include:

- New mobile phones created from the convergence of current mobile phone technology and PDAs [1 mark] plus description/examples (e.g. features such as address books, diary and games from PDAs are included in the mobile phone) [1 additional mark].
- New cameras created from current digital camera technology and the communications capabilities from mobile phones [1 mark] plus description/examples (e.g. allows the user to take high quality photographs and send via MMS, email attachment or upload the file to a server) [1 additional mark].
- New laptop with mobile phone capabilities combined with laptop capabilities [1 mark] plus description/examples (e.g. user can utilise all features of computer and communicate via microphone/speaker or via Internet using mobile phone technology) [1 additional mark].
- New mobile phones created from the convergence of current mobile phone technology and music players [1 mark] plus description/examples (e.g. it is now possible to store and play your favourite music as well as calling friends on the phone) [1 additional mark].
- New cameras created from current digital camera technology plus mp3 players [1 mark] plus description/examples (e.g. now it is possible to take photos and store and play your favourite music using the one device) [1 additional mark].

*Reward other acceptable answers with the approval of your team leader.*

- (c) **Some people think that PDAs will eliminate the need for people to use laptop computers. Examine this argument.** **[4 marks]**

*Award [1 mark] for identifying an issue/situation.*

*Award [1 additional mark] for a description of the issue/situation.*

**Or**

*Award up to [2 marks] for identifying more than one issue/situation (as the question does not specify how many issues).*

*Award up to [2 additional marks] for some critical analysis (advantages/disadvantages, reasons to agree or disagree with the argument).*

Answers may include:

- The increase in the technology in PDAs in the future will allow software that is normally on laptop computers to be included in PDAs making the need for laptop computers unnecessary **[1 mark]** plus description (e.g. these features include email and Internet access/software packages including word processing, spreadsheets and slideshows) **[1 mark]**. Advantages e.g. PDAs are more portable and affordable than laptops. **[1 mark]** Disadvantages e.g. the small screen size makes viewing websites/word processing difficult **[1 mark]**.
- The input capabilities of PDAs will eliminate the need for a keyboard for entering information **[1 mark]** plus description (e.g. advances in speech recognition and handwriting recognition systems will reduce the need for laptop computers or reduce the laptop to a PDA) **[1 mark]**. Advantages e.g. PDAs are smaller and portable **[1 mark]** but limitations e.g. speech recognition and handwriting recognition require user training **[1 mark]**.
- All work files will be stored on company servers with PDAs having quick remote access **[1 mark]** plus description (e.g. this is due to advances in technology such as Internet/increased bandwidth/PDA technologies) **[1 mark]**. Advantages e.g. the portability for workers/travellers **[1 mark]** compared with carrying a laptop which is cumbersome for travellers/labourers **[1 mark]**.
- PDAs will have increased speed, memory and storage capabilities that will enable them to perform the same functions as laptop computers **[1 mark]** plus description (e.g. advances in sound, imaging and video capabilities on PDAs) **[1 mark]**. Advantages e.g. this is a big cost saving with similar functionality at a lower price **[1 mark]**. Disadvantages are screen size which limits viewing images and video **[1 mark]**.
- It is unlikely that PDAs will eliminate laptops. PDAs have the basic software of a laptop and can act as an organiser **[1 mark]** however it does not have the functionality to run large graphics applications e.g. Adobe Flash **[1 mark]**. There is also the fact that the screen of the PDA is small and it has a touch screen for input rather than a keyboard **[1 mark]**. Unlike a laptop the small screen and lack of keyboard can result in the user working in a hunched up position and this could lead to bad ergonomics and RSI **[1 mark]**.
- PDAs are preferred by many people due to their small size and portability **[1 mark]**. Mobile workers can easily carry them around in their pocket or handbag whereas laptops are much heavier more bulky **[1 mark]**.

*Reward other acceptable answers with the approval of your team leader.*

- (d) **Discuss the advantages of multi function PDA equipment to businesses and their employees. Evaluate these advantages.** **[10 marks]**

*Award up to [4 marks] for each advantage discussed [up to a maximum of 8 marks]*

- identify [1 mark]*
- description/example [1 mark]*
- expansion/new level [1 mark]*
- opinion/argument/adv/disadv [1 mark]*

*Therefore:*

*2 advantages fully discussed would score [8 marks].*

*3 advantages would probably not each be fully discussed but could total [8 marks].*

*Award up to [3 marks] for evaluation.*

*Award a maximum of [10 marks].*

Answers may include:

- Employees are constantly available via mobile to the employer. Companies can expect employees to be contactable whenever they are out of the office, easy to keep employees informed of current developments within the company. There is no danger of missed calls from prospective clients, employees can conduct business at anytime anywhere.
- Employees can use using photographic capabilities of mobile digital devices to relay images back to the company. Employees can immediately take photos relevant to a development and send them to the company. The immediate access to images may facilitate the understanding in a phone conversation to someone in the company, provide company advantage in a business situation.
- Employees can synchronize their time planner with the company time planner. Employees can frequently update their calendar with the company time planner so that time schedules for employees are available to everyone in the company. The availability of persons for particular jobs is always accessible, increases productivity within the company.
- There is a cost saving for the business as PDAs are cheaper than computers. Computers are expensive and maintenance costs can be high but PDAs are relatively inexpensive with low maintenance. There is a further cost saving as a PDA can include camera/phone so there is no need to buy separate items.
- PDAs are quite easy to use so less training would be required. This is a cost saving to the employer. Employees can also take them home to become familiar with their functions. This of course can infringe on family time and result in expectations of after hours work.
- In service industries PDAs can provide improved customer service. In a restaurant an order can be sent by wireless technology to the kitchen faster than a waiter can walk there. There are likely to be fewer errors with orders which can easily occur in a paper based restaurant system.
- A multi-function PDA offers the convenience for the employee who has multiple functions within the one piece of equipment. This provides portable, anywhere/anytime access to phone/camera/PDA. Of course if the device is lost it means the employee loses access to all these services.

Evaluation or weighing up of arguments may include:

- evaluation of the impact of each advantage on the stakeholders
- comparisons between advantages (apportioning priority)
- short term and long term comparisons and evaluation
- long range impact of the advantages and evaluation
- an appraisal based on the arguments.

*Reward other acceptable answers with the approval of your team leader.*

**Area of impact: Education**

2. (a) **Identify *two* different types of software that could be used to produce an advertising brochure for the school.** **[2 marks]**

*Award [1 mark] for each type of software that is clearly identified up to a maximum of [2 marks].*

Answers may include:

- word processing
- desktop publishing software (DTP)
- photo editing software
- other graphics software.

*Award a maximum of [1 mark] where only the name of the software product is provided (e.g. Photoshop, InDesign, Word).*

*Reward other acceptable answers with the approval of your team leader.*

- (b) **Describe *two* advantages of using spreadsheets for preparing the school budget over a paper-based system.** **[4 marks]**

*Award [1 mark] for each advantage that is identified up to a maximum of [2 marks].*

*Award [1 additional mark] for a description of each of these advantages up to a maximum of [2 additional marks].*

Answers may include:

- Speed and/or accuracy of calculation **[1 mark]** *plus description/examples* (e.g. the use of formulas in spreadsheets helps the user to quickly calculate figures whereas paper and pencil methods will take much longer) **[1 additional mark]**.
- Facilitates forecasting outcomes **[1 mark]** *plus description/examples* (e.g. spreadsheets allow users to use formulas to forecast “what if” scenarios, whereas the length of time to develop different scenarios using paper based methods would make the task impossible) **[1 additional mark]**.
- Easy modification in the event of budget changes **[1 mark]** *plus description/examples* (e.g. the user only needs to change data in cells and the new result is produced whereas in a paper system one would need to start again) **[1 additional mark]**.
- Spreadsheets facilitate graphical comparisons **[1 mark]** *plus description/examples* (e.g. graphs are quickly drawn from data in the spreadsheet and automatically update if the data changes unlike a paper based system where the graphs would be drawn by hand) **[1 additional mark]**.
- Data in spreadsheets can be used in other programs without the need of retyping the data **[1 mark]** *plus description/examples* (e.g. results can be pasted into a word document to produce a report / results can be exported into a different program – database manager to allow for other type of analysis).

*Reward other acceptable answers with the approval of your team leader.*

- (c) **Describe *two* rights that International Baccalaureate (IB) students should have regarding their personal data being stored in the school administrative system.**  
[4 marks]

*Award [1 mark] for each right that is clearly identified up to a maximum of [2 marks].*

*Award [1 additional mark] for a description of each of these rights up to a maximum of [2 additional marks].*

Answers may include:

- Students have the right to view the data that is stored about them [1 mark] *plus description/examples* (e.g. some of the data may be incorrect, out of date or irrelevant) [1 additional mark].
- Students should know who could access their data [1 mark] *plus description/examples* (e.g. the student's data may contain information about a serious illness, such as AIDS, or that the student has been in serious trouble in school, How will the data be used?) [1 additional mark].
- Students should know how the data was collected [1 mark] *plus description/examples* (e.g. data should not have been collected without the students' knowledge) [1 additional mark].

*Reward other acceptable answers with the approval of your team leader.*

- (d) **The IB has developed a central database system for storing and maintaining IB student records and assessment results. Discuss the advantages of maintaining records on a centralized computer system like the one used by the IB rather than having computerized records stored within individual schools. Evaluate these advantages.**  
[10 marks]

*Award up to [4 marks] for each advantage discussed [up to a maximum of 8 marks]*

- identify [1 mark],
- description/example [1 mark],
- expansion/new level [1 mark],
- opinion/argument/advantages/disadvantages [1 mark]

*Therefore:*

*2 advantages fully discussed would score [8 marks].*

*3 advantages would probably not each be fully discussed but could total [8 marks].*

*Award up to [3 marks] for evaluation.*

*Award a maximum of [10 marks].*



- Data change for IB purposes will occur in one place ensuring that data is the same for all users who have access to it. Making updates in one centralized database ensures the reliability of the data (This can take into account personal information as well as subject results).
- A centralized database may be protected by secure and reliable database processes and this may not be the case in some smaller schools. Virus checkers, backup systems, authorized access.
- IB centralized database would be protected by automatic updates to security software and this may not be the case in smaller individual schools, data in schools could be lost if proper backup procedures are not followed.
- Student records and assessment stored on an IB centralized database would allow for extensive analysis of data within an examination year and between examination years. The results could be analyzed for particular regions, gender performance, achievement on IB assessment components. Storage of data in individual school databases would not allow for data analysis.
- Data stored centrally can be used to provide moderation of results, final results and diplomas/certificates, analysis of the data.
- The storage of data in a centralized data base allows for individual marks and results from examiners to be received in one place, moderated and awarded to students for that session or carried forward.

Evaluation or weighing up of arguments up to a maximum **[2 marks]** may include:

- evaluation of the impact of each method of storing and maintaining student records
- comparisons between the two systems (apportioning priority)
- evaluation of solutions to address related problems and their effectiveness
- short term and long term comparison and evaluation
- long range impact of developments and evaluation
- an appraisal based on the arguments.

*Reward other acceptable answers with the approval of your team leader.*

**Area of impact: Health**

3. (a) **Identify *two* ways IT can be used to provide medical advice and information directly to people.** **[2 marks]**

*Award [1 mark] for each type of information technology that is clearly identified up to a maximum of [2 marks].*

Answers may include:

- medical websites
- medical CD-ROMs
- medical information accessible through Digital TV
- cellular phones that provide access to online medical/services
- e-mail to doctor
- VoIP communication with doctor
- medical expert system
- chat room with medical specialist
- video conference with medical expert.

*Reward other acceptable answers with the approval of your team leader.*

- (b) **A person thinks that he may have a disease called “Fibromyalgia”. Describe *two* ways in which IT-based resources may be helpful to this person. [4 marks]**

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

*Award [1 additional mark] for the description of how each IT-based resource may be helpful to this person up to a maximum of [2 additional marks].*

Answers may include:

- Individuals can be informed of specific information about Fibromyalgia/symptoms/how to get help and from online medical sources **[1 mark]** *plus description/examples* (e.g. by searching online for details of symptoms to determine if they have the disease/by searching for specialists in the area that they could contact) **or** (e.g. individuals may experience symptoms and try to determine if they have the illness, they wish to find the contact details of a Fibromyalgia specialist) **[1 additional mark]**.
- Individuals can consult online information about treatments for Fibromyalgia **[1 mark]** *plus description/examples* (e.g. accessing online dietary information, medical details regarding medicine for Fibromyalgia from recognized online medical services) **[1 additional mark]**.
- The individual may contact online patient user groups for Fibromyalgia **[1 mark]** *plus description/examples* (e.g. the individual may post questions to the group and receive responses) **or** (e.g. user groups may know of new sources of help or medication for the illness, user groups can provide emotional support for coping with Fibromyalgia) **[1 additional mark]**.

*Reward other acceptable answers with the approval of your team leader.*

- (c) **Describe *two* advantages of an IT medical system compared to direct consultation with a doctor.** **[4 marks]**

*Award [1 mark] for each advantage that is identified up to a maximum of [2 marks].*

*Award [1 additional mark] for describing how an IT medical system is an advantage compared to direct consultation with a doctor up to a maximum of [2 additional marks].*

Answers may include:

- IT can provide an opportunity for people to access advice on a more anonymous basis than visiting a doctor **[1 mark]** *plus description/examples* (e.g. people do not want their family doctor to know/they are afraid the family doctor will share the sensitive or embarrassing information with family members or others in the community) **[1 additional mark]**.
- Inconvenient or not possible for employees to visit a doctor and they can consult the Internet whenever they want **[1 mark]** *plus description/examples* (e.g. location of the doctor is inconvenient, office hours are not suitable, doctors office hours are not compatible with the study/work hours of person, “24 hours a day/7 days a week” access to web medical information) **[1 additional mark]**.
- Internet medical services are perceived as providing an authoritative/unbiased/comprehensive source compared with the doctor **[1 mark]** *plus description/examples* (e.g. the doctor may not have seen the disease before/can’t diagnose it) **[1 additional mark]**.
- The Web may provide a clearer/fuller explanation than a doctor **[1 mark]** *plus description/examples* (e.g. information can be repeatedly accessed/comparison of medical information between online sources is possible/additional links may be provided to further information) **[1 additional mark]**.
- Cost saving as there is no doctor’s fee **[1 mark]** *plus description/examples* (e.g. medical websites are usually free/no travel cost and lost income).

*Reward other acceptable answers with the approval of your team leader.*

- (d) **Many people are reluctant to use IT-based advice instead of advice direct from doctors. Discuss the concerns that they may have. Evaluate these concerns.** [10 marks]

*Award up to [4 marks] for each concern discussed [up to a maximum of 8 marks]*

- identify [1 mark]
- description/example [1 mark]
- expansion/new level [1 mark]
- opinion/argument/adv/disadv [1 mark]

*Therefore:*

*2 concerns fully discussed would score [8 marks].*

*3 concerns would probably not each be fully discussed but could total [8 marks].*

*Award up to [3 marks] for evaluation.*

*Award a maximum of [10 marks].*

- A person may be concerned about the **accuracy** of the site. Anyone can publish a Web site. There is concern that a serious illness is not correctly diagnosed by an online IT medical service. Patients have more confidence in the advice from a doctor. Doctors can send the patient for additional diagnostic tests. Family doctors know a patient's medical history. Patients can't always correctly input symptoms.
- The person feels that the illness requires personal or reassuring advice that an experienced doctor could give. **Personal counselling** and advice not available on web-based medical sites. Doctors can take more circumstances into consideration, such as illnesses that have occurred in previous generations in the family, additional symptoms undetected by the patient.
- The person is concerned that the information on the IT-based system (online, CD-ROM) may not be the most **current** information. Some websites do not have any indication of when the information was last updated or who is responsible for the information. The person does not have confidence in an IT-based system where no one seems responsible or accountable for the information being up-to-date.
- There are concerns about the **privacy** of search terms. The search details may be stored and become available to third parties.
- There is a concern about **authenticity** of 'medical experts' in chat rooms/forums. How does the person know if the 'medical expert' is authentic?
- A person may not have the medical knowledge to type in the correct symptoms/interpret the advice given by an IT system. When visiting a doctor the patient can ask for clarification and the doctor can answer questions and interpret medical jargon.
- The patient may not understand advice from the Internet due to technical terms. A doctor can interpret jargon and answer patient queries.

*Evaluation or weighing up of arguments may include:*

- evaluation of the impact of each concern of the people seeking advice
- comparisons between concerns (apportioning priority)
- short term and long term comparison and evaluation
- long range impact of the concerns and evaluation
- an appraisal based on the arguments.

*Reward other acceptable answers with the approval of your team leader.*

**Area of impact: Arts, entertainment and leisure**

4. (a) **The URL for the online casino is: <http://www.casinodot.co.uk>. Identify what is meant by *http* and [www.casinodot.co.uk](http://www.casinodot.co.uk) in the above URL.** [2 marks]

Answers may include:

*Award [1 mark] for each meaning that is clearly identified up to a maximum of [2 marks]*  
*http:*

- *http* stands for hypertext transfer protocol
- *http* is a protocol or set of rules used to transfer pages on the Web.

*www.casinodot.co.uk:*

- *www.casinodot.co.uk* is the domain name
- unique name for a host computer on the Internet.

*Reward other acceptable answers with the approval of your team leader.*

- (b) **The website <http://www.casinodot.co.uk> places cookies on user's computers. Define the term "cookie" in this context.** [2 marks]

*Award [1 mark] for each part of the definition up to a maximum of [2 marks].*

Answers may include:

*A cookie:*

- is a file stored by the Internet Browser
- stores information about the user's gambling habits/actions
- allows user information to be collected by the casino's web server.

*Reward other acceptable answers with the approval of your team leader.*

- (c) **Explain why the gambling site would use cookies.** [2 marks]

*Award [1 mark] for identifying why a gambling site would use cookies.*

*Award [1 additional mark] for explanation.*

Answers may include:

- The casino web server can provide better customer service in accessing the website [1 mark], plus description/examples (e.g. the gambling site server could store customer's username and password to speed up future logons, the gambling site could store information about your 'money purse' left over from a previous logon) [1 additional mark].
- By storing a small file on your computer, the casino web server can target their advertising to the customer's interest [1 mark], plus description/examples (e.g. make customer preferred casino games appear more prominently on the website, target casino advertisements to the customer's interest) [1 additional mark].

*Reward other acceptable answers with the approval of the team leader.*

- (d) **Describe *one* advantage and *one* disadvantage for customers using online casinos instead of traditional ones.** **[4 marks]**

*Award [1 mark] if the advantage is only identified.*

*Award [1 additional mark] if the advantage is fully described.*

*Award [1 mark] if the disadvantage is only identified.*

*Award [1 additional mark] if the disadvantage is fully described.*

Answers may include:

**Advantage of online casino over traditional casino's**

- Customers can access online gambling sites from anywhere in the world **[1 mark]**, *plus description/example* (e.g. attractive to customers from countries where there are no traditional casinos / gamblers may continue gambling in their home town casino even when travelling / gamblers can chose their favourite sites even if they are not in the same town) **[1 additional mark]**.
- Payouts/gains for the customer are better than in traditional casinos **[1 mark]**, *plus description/examples* (e.g. the casino has smaller overheads) **[1 additional mark]**.
- Customers can access online gambling sites from the privacy/security of their homes **[1 mark]**, *plus description/example* (e.g. Some people do not like to be seen going into casinos, or are worried about the security of casinos and entering/leaving the place with cash in their pockets) **[1 additional mark]**.
- Customers can try several online gambling sites simultaneously **[1 mark]**, *plus description/example* (e.g. People who visit casinos many times leave one casino to go to another one and try fortune with online places they can try luck in several sites without leaving their computer) **[1 additional mark]**.

**Disadvantage of online casinos for customers**

- It is easier for customers to lose more money when payment is virtual **[1 mark]**, *plus description/examples* (e.g. parting with paper money makes gambling more realistic than paying electronically using a credit card, gambler may develop online addiction) **[1 additional mark]**.
- Customers' gambling habits can be tracked in casinos using credit card payment **[1 mark]**, *plus description/examples* (e.g. hackers can keep records of customers and use this information without the users' consent) **[1 additional mark]**.
- Customers may be tricked into losing money on a scam site **[1 mark]**, *plus description/examples* (e.g. there are many scam casino sites which could take the gambler's credit card details and steal money from his bank account, gamblers may not want adverse publicity they may be reluctant to report such crimes) **[1 additional mark]**.

*Reward other acceptable answers with the approval of the team leader.*

- (e) **There is a growing concern that increased availability of gambling may be harmful for particular groups of people in society. Discuss *two* possible measures that online gambling sites can use to protect vulnerable groups. Evaluate these measures.**

**[10 marks]**

*Award up to [4 marks] for each measure discussed [up to a maximum of 8 marks]*

- *identify [1 mark]*
- *description/example [1 mark]*
- *expansion/new level [1 mark]*
- *opinion/argument/advantages/disadvantages [1 mark]*

*Award up to [2 additional marks] for an evaluation of arguments relating to the measures used to protect vulnerable groups.*

*Evaluation may appear anywhere in the response.*

Evaluation or weighing up of arguments up to a maximum [2 marks] may include:

- evaluation of each method
  - comparisons between the two methods (apportioning priority)
  - evaluation of solutions to address related problems and their effectiveness
  - short term and long term comparison and evaluation
  - long range impact of developments and evaluation
  - an appraisal based on the arguments.
- 
- A casino can request the customer's credit card information to prevent under-aged persons from gambling. Only persons over a legal age can have credit cards. Under-aged persons can by-pass the precaution and give the credit card details from older persons.
  - The casino can post a warning on its opening screen against the use of the online casino by minors. Online policies cite the responsibility of the casino and persons using the online gambling site, users can be made aware of laws related to online gambling. Possible consequences for the various stakeholders if the warnings are ignored.
  - The casino can implement restrictions on the gambling site to help control online gambling addiction. Limits include the amount of time allowed online in a session, amount of money bet, amount that can be won. Effectiveness of the limits for the various stakeholders.
  - The casino can use software to monitor the online gambling habits of customers and not allow gamblers with suspicious behaviour to continue gambling. Software can be installed to detect significant losses, erratic gambling patterns. Access can be temporarily or permanently blocked.

*Reward other acceptable answers with the approval of your team leader.*



**Area of impact: Science and the environment**

5. (a) **Identify *two* hardware components that are necessary in order for complex simulations to be run in a short period of time.** **[2 marks]**

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

- high resolution monitor with a fast refresh rate
- large allocation of RAM
- large hard drive for storage of images
- graphics card capable of 3D graphics
- fast microprocessor.

*Reward other acceptable answers with the approval of the team leader.*

- (b) **Explain why the results of the simulation are best displayed as an airflow animation rather than as a table of calculated results.** **[4 marks]**

*Award [1 mark] for the reason identified.*

*Award [1 additional mark] for the reason described / compared / example.*

*Award [2 additional marks] for the explanation (reason).*

Answers may include:

- Graphical representation of results (animation) is easier to interpret than a statistical table **[1 mark]** numbers in a table have to be studied **[1 additional mark]**. *Explanation/reason* (e.g. animation shows the user what is happening this is much perceive from a table of numbers, visual representation may lead to discoveries that may otherwise go unnoticed) up to **[2 additional marks]**.
- Much quicker to see the effects of changes in animations **[1 mark]** whereas they may prove difficult to spot in a table of numbers **[1 additional mark]** *plus explanation/reason* (e.g. easier to see how changes to one part of the model affects other parts, allows the user to visualize the effects of the changes in the data) up to **[2 additional marks]**.
- More effective method for communicating/explaining the effects of the simulation to other stakeholders **[1 mark]** these people may need more time to understand data in the table **[1 additional mark]** *plus explanation/reason* (e.g. persons working with the airflow simulation may need to demonstrate the model to other stakeholders for the purpose of approval, financing, or other support, it is easier to persuade people to invest in particular design projects based a simulation) up to **[2 additional marks]**.

*Reward other acceptable answers with the approval of the team leader.*

- (c) Describe *two* other situations in which a simulation can be used in design processes. **[4 marks]**

*Award [1 mark] for each situation that is clearly identified up to a maximum of [2 marks].*

*Award [1 additional mark] for a description of each up to a maximum of [2 additional marks].*

Answers may include:

- The designing of car/ships/aircraft bodies and engines **[1 mark]**, *plus description/examples* (e.g. animations show the designer the effects of wind flow over a car body or predict how a design may react in a crash) **[1 additional mark]**.
- The designing of motorbike exhaust pipes **[1 mark]** *plus description/ examples* (e.g. simulation software allows the designers to predict the volume of the exhaust from various designs before the components are manufactured) **[1 additional mark]**.
- The designing of gardens **[1 mark]** *plus description/examples* (e.g. simulation software allows gardeners to project how a garden will look after a period of time when it has been planted in a particular way). **[1 additional mark]**.
- The designing of buildings and architecture in general **[1 mark]** *plus description/ examples* (e.g. simulation software allows architects and engineers to predict how buildings will react to the forces that are applied to them by nature and/or potential disasters e.g. earthquakes or flood, simulations communicate the project development/effects of natural forces to persons who will be financing the building) **[1 additional mark]**.

*Reward other acceptable answers with the approval of the team leader.*

- (d) **Discuss reliability issues related to the use of simulation software for design processes. Evaluate these issues.** **[10 marks]**

*Award up to [4 marks] for the reliability of each issue discussed [up to a maximum of 8 marks]*

- identify [1 mark]
- description/example [1 mark]
- expansion/new level [1 mark]
- opinion/argument/adv/disadv [1 mark]

*Therefore:*

*2 issues fully discussed would score [8 marks].*

*3 issues would probably not each be fully discussed but could total [8 marks].*

*Award up to [3 marks] for evaluation.*

*Award a maximum of [10 marks].*

- Insufficient data may have been provided for the simulation. Not enough data was collected, not all the relevant variables were considered, some of the data in the real world situation have changed since the simulation was created. The real object may differ significantly from the simulation.
- Safety may be compromised if the simulation is not accurate. Unforeseen parameters were not included in a medical simulation, the simulation contains an error. Simulation must be supplemented with thorough testing, real testing advisable wherever possible, serious risk could result due to mismatch.
- Outcome of the simulation may not closely match the real world situation. When an actual model of a car is put through a crash test, it may perform differently than the simulation. Causes due to a change in materials or implementation of the design in the real situation from the simulation, the simulation is not the real situation.

*Evaluation or weighing up of arguments up to a maximum [2 marks] may include:*

- evaluation of each reliability issue
- comparisons between the two systems (apportioning priority)
- evaluation of solutions to address related problems and their effectiveness
- short term and long term comparison and evaluation
- long range impact of developments and evaluation
- an appraisal based on the arguments.

*Reward other acceptable answers with the approval of your team leader.*

**Area of impact: Politics and government**

6. (a) **Identify *two* hardware components of a WiFi system other than the user's computing hardware.** **[2 marks]**

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

Answers may include:

- Wireless base station
- web server
- network cabling from the wireless base station to the web server.

***Wireless network card in the user's computer – not accepted because it is in the hardware of the user's computer.***

*Reward other acceptable answers with the approval of your team leader.*

- (b) **Describe *two* reasons why Internet access appears to be very slow for users in some locations in the city.** **[4 marks]**

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

*Award [1 additional mark] for each description up to a maximum of [2 additional marks].*

Answers may include:

- Geographical/relative location of hotspots cannot handle the usage **[1 mark]** *plus description/reason* (e.g. some hotspots may be located in areas where there are a large number of users wanting access) **[1 additional mark]**.
- Bandwidth restrictions of the system **[1 mark]** *plus description/reason* (e.g. if many people are accessing the system at once in some areas the speed of the network will slow down.) **[1 additional mark]**.
- Speed of connection and network technology **[1 mark]** *plus description/reason* (e.g. a person may be used to working with a computer on a network capable of greater speed than the hotspot is capable of working) **[1 additional mark]**.
- The technology and network connections available in the area of the city **[1 mark]** *plus description/reason* (e.g. the network infrastructure in different parts of the city may effect the speed of the WiFi network) **[1 additional mark]**.

*Reward other acceptable answers with the approval of the team leader.*

- (c) **Describe *two* reasons why a business traveller, visiting Cardiff, might be unwilling to make use of the wireless network.** **[4 marks]**

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

*Award [1 additional mark] for each description up to a maximum of [2 additional marks].*

Answers may include:

- The business traveller may not have confidence in the security of information/data they pass over the network **[1 mark]**, *plus description/reason* (e.g. data could be intercepted, not enough information is provided to users about the security policies of the network) **[1 additional mark]**.
- The business traveller may be working on confidential data and so does not want to connect to the network **[1 mark]**, *plus description/reason* (e.g. if connected to a network, it is possible for someone to access the hard disk containing the confidential data) **[1 additional mark]**.
- Location can be tracked and the business traveller may not want others to know where he has been **[1 mark]**, *plus description/reason* (e.g. TCP/IP number of the traveller's laptop will be recorded on the server along with other access details such as date, length of time of access) **[1 additional mark]**.
- The business traveller is unwilling to pay for the service **[1 mark]** *plus description/reason* (e.g. the traveller does not wish to enter his credit card details, the cost of access charged is expensive) **[1 additional mark]**.

*Reward other acceptable answers with the approval of your team leader.*

- (d) **Some people in Cardiff do not think that it is right to use their local taxes to finance and install a wireless network for businesses to use. Discuss *two* arguments that could be used to convince them that it is a worthwhile use of their taxes and will benefit local residents and services. Evaluate these arguments.** **[10 marks]**

*Award up to [4 marks] for each argument discussed [up to a maximum of 8 marks]*

- *identify [1 mark],*
- *description/example [1 mark],*
- *expansion/new level [1 mark],*
- *opinion/argument/advantages/disadvantages [1 mark]*

*Award up to [2 marks] for evaluation.*

*Award a maximum of [10 marks].*

- System can provide access for elderly or disabled people. Ability to access online resources without moving to physical network connections. Can offer increased freedom and support for disadvantaged or restricted accessibility groups.
- System could provide access for health professionals at the scene of accidents. Health professionals might be able to access important information about patients via the network. Doctors could access patients records whilst out visiting patients in their homes.
- Students and teachers could be provided with access to the system. System could provide easy access to online materials and email. Consistent availability of Internet services in schools across the city.
- City Council employees could be provided with access to the system. Employees could be tracked and contacted whilst out and about around the city. Employees could access central information services from anywhere in the city whilst going about their business.
- Emergency service operatives such as police/ambulance or fire services can access the system. Police can use the system to access data about vehicles they are following. Allows police to respond more effectively to the situation that they are in by having greater information at hand.
- Equal access because everyone who is willing to pay and has a laptop or PDA can be connected to the network.
- Citizens do not have to worry about creating a physical connection to the Internet at home – they can rely on the county making all the technical and physical connections, maintenance, *etc.*

Evaluation or weighing up of arguments up to a maximum **[2 marks]** may include:

- evaluation of the arguments
- comparisons between the two arguments (apportioning priority)
- evaluation of solutions to address related problems and their effectiveness
- short term and long term comparison and evaluation
- long range impact of developments and evaluation
- an appraisal based on the arguments.

*Reward other acceptable answers with the approval of your team leader.*