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INFORMATION TECHNOLOGY IN A GLOBAL SOCIETY

Standard Level

Paper 2

17 pages

Area of Impact: Business and employment

1. (a) Describe the meaning of the term URL in the context of online travel. ***[2 marks]***

*Award **[1 mark]** identifying the acronym URL and **[1 mark]** for describing its use in the context of online travel.*

- URL stands for Uniform/Universal Resource Locator ***[1 mark]*** plus description (e.g. URL stands for Uniform Resource Locator. It is the address of an online travel company on the web, for example http://www.airfrance.com)
- URL is the site address by which a web browser can locate a web page. ***[1 mark]*** + expansion relevant to online travel (e.g. In the context of online travel an example would be www.britishairways.com). ***[1 additional mark].***

Do not accept issues relating to issuing and checking tickets.

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

(b) Describe *two* different ways that IT could be used to authenticate a passenger's identity when boarding a plane. ***[4 marks]***

*Award **[1 mark]** for each way which is identified up to a maximum of **[2 marks]**.*
*Award **[1 additional mark]** for the description of the way up to a maximum of **[2 additional marks]**.*

- using a fingerprint scanner / iris scanner / face scanner/voice recognition ***[1 mark]*** plus expansion/example (and matching with database to authenticate passenger) ***[1 additional mark]***
- swiping a smart card / Machine Readable Passport with passenger's details ***[1 mark]*** plus expansion/example (e.g. a card/chip stores the passenger's photo and this is matched manually by the check in person or electronically using facial recognition technology) ***[1 additional mark]***
- using a logon and password ***[1 mark]*** plus expansion/example (e.g. customers are given a special logon and secret password which is matched against the customer database to verify the person) ***[1 additional mark].***
- Typing into a terminal the passport number of the passenger ***[1 mark]*** plus expansion/example (e.g. matching the photograph from database with the passenger) ***[1 additional mark].***
- carrying a card embedded with RFID technology ***[1 mark]*** plus RFID must be combined with biometrics to authenticate the traveller eg finger print is compared with a database of fingerprints ***[1 additional mark]***
- using a VeriChip, an RFID device implanted into the traveller ***[1 mark]*** plus expansion/example (eg a scanner reads the information on the chip and matches the ID with the database of passengers) ***[1 additional mark]***

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

(c) Describe *two* advantages of Internet access for a travel agent when making customer bookings. ***[4 marks]***

*Award **[1 mark]** for each advantage which is identified up to a maximum of **[2 marks]**.*
*Award **[1 additional mark]** for the description of the advantage up to a maximum of **[2 additional marks]**.*

- the travel agent can quickly check the availability of seats ***[1 mark]*** plus expansion/example (e.g. by logging onto an airline booking site and keying in the flight number a list of available seats will be shown) ***[1 additional mark]***
- the travel agent can immediately book or reserve a seat ***[1 mark]*** plus expansion/example (e.g. this prevents double booking of seats) ***[1 additional mark]***
- the travel agent can quickly locate the alternatives / prices for the customer ***[1 mark]*** plus expansion/example (e.g. all airline Internet sites can be searched and prices compared or e.g. search bots may be used to find the cheapest fare) ***[1 additional mark]***.
- the customer and travel agent can communicate by email ***[1 mark]*** plus expansion/example (e.g. travel agent may pick up extra sales this way) ***[1 additional mark]***.
- the travel agent can make other travel bookings on the Internet at the same time ***[1 mark]*** plus expansion/example (e.g. hotels, car hire, tours) ***[1 additional mark]***
- the travel agent does not need to be in the office to deal with the customer ***[1 mark]*** plus expansion/example (e.g. bookings can be made anywhere and anytime ie not restricted to office hours/could lead to less need for office space and fewer staff) ***[1 additional mark]***
- the travel agent can save time dealing with customers ***[1 mark]*** plus expansion/example (e.g. this could mean the ability to serve more customers each day and increase income) ***[1 additional mark]***

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

(d) Passengers are often worried about booking travel online.

Discuss privacy, security and reliability concerns when passengers book their trips online. Evaluate these concerns. ***[10 marks]***

For each concern
*Award **[1 mark]** for identifying the concern.*
*Award **[1 additional mark]** for an expansion/description of the concern.*
*Award **[1 additional mark]** for adding a new dimension to the discussion.*

*Award up to **[3 marks]** for evaluating the arguments*.
Evaluation can take place within a concern up to a maximum ***[1 mark]*** per concern or up to ***[3 marks]*** as a final summary at the end.

*The mark scheme provides for 12 possible marks. Tick every valid point but award to a maximum of **[10 marks]**.*

N.B.: Do not expect the candidates to distinguish privacy, reliability and security issues. Mark what they have written irrespective of the heading they use.

- Concern: phishing / pharming –
  there could be scams with fraudulent sites ***[1 mark],*** description/expansion/example (e.g. impact – customers could enter their credit card details and lose their money) ***[1 additional mark],*** new dimension (e.g. customers must be wary of deals sent in Spam and they should check the references of the site or even consider using a third party service (escrow service) when paying) ***[1 additional mark]***
- Concern: transmission security –
  customers may be concerned about the privacy of their booking details such as name, address, flight times in transmission ***[1 mark],*** description/expansion/example (e.g. if the transmission is not secure hackers may gain access to unencrypted data intercepted when booking details are transmitted) ***[1 additional mark]***, new dimension (e.g. if a hacker gained enough information about the customer this could result in embarrassment or blackmail) ***[1 additional mark]***
- Concern: illegal access to database –
  customers may be concerned about the security of their details once they have been sent to the travel company ***[1 mark],*** description/expansion/example (e.g. if the company doesn't have a secure network or database unscrupulous employees (insiders) could access credit card details) ***[1 additional mark]***, new dimension (e.g. an employee who gains enough information about a customer could steal the customer's identity and commit fraudulent acts) ***[1 additional mark].***
- Concern: reliability of data stored –
  customers could have concerns about unnecessary, incorrect or out of date information stored in the company's database ***[1 mark],*** description/expansion/example (e.g. incorrect address or previous booking no longer relevant) ***[1 additional mark]***, new dimension (e.g. company policy clearly stated and agreed in line with any legal Data Protection requirements) ***[1 additional mark].***

- Concern: company using data for other purposes –
  company can sell your details to other companies ***[1 mark],***
  description/expansion/example (e.g. your details used to send unsolicited mail)
  [1 additional mark], new dimension (e.g. there must be a policy telling you they will do this and giving the opportunity to opt out) ***[1 additional mark].***

- Concern: reliability of the Web site -
  Customers may have concerns about the reliability of the software on the travel site ***[1 mark],*** description/expansion/example (eg once the booking is made the page may not reload to confirm the booking or allow printing ***[1 additional mark],*** new dimension (eg the customer may even book a second time believing the booking has not been made leading to frustration getting the money back) ***[1 additional mark].***

If candidates have written under the three headings mark as below:

- **Privacy**: customers may be concerned that their personal details are sold to other companies ***[1 mark],*** description/expansion/example (e.g. if on-sold to a company this company could send you unsolicited mail) ***[1 additional mark]***, new dimension (e.g. there must be a policy telling you they will do this and giving you an opportunity to opt out) ***[1 additional mark]***

- **Security** : customers may be concerned about the **security** of their credit card details during transmission/when stored on the company database ***[1 mark],***
  description/expansion/example (e.g. unencrypted data may be intercepted when booking details are transmitted/if the booking site is not secure hackers may gain access to details stored on a server and) ***[1 additional mark]***, new dimension (e.g. a hacker who gains enough information about a customer could steal the customer's identity and commit fraudulent acts) ***[1 additional mark].*** Alternatively security could focus on transmission and the new dimension could highlight the added concern of security on the server (or vice-versa).

- **Reliability:** there could be scams with fraudulent sites ***[1 mark],***
  description/expansion/example (e.g. impact – customers could enter their credit card details and lose their money) ***[1 additional mark],*** new dimension (e.g. customers must be wary of deals sent in Spam and they should check the references of the site or even consider using a third party service (escrow service) when paying) ***[1 additional mark]***

- **Reliability alternative:** Customers may have concerns about the reliability of the software on the travel site ***[1 mark],*** description/expansion/example (eg once the booking is made the page may not reload to confirm the booking or allow printing ***[1 additional mark],*** new dimension (eg the customer may even book a second time believing the booking has not been made leading to frustration getting the money back) ***[1 additional mark].***

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

Area of Impact: Education

2 (a) Identify *three* tables that could be part of the library's relational database. ***[3 marks]***

*Award **[1 mark]** for each table identified up to a maximum of **[3 marks]**.*

- Student table
- catalogue/books/holdings table
- loans table
- publisher
- category/type.
- Classes table

(**Note: fields are not correct**).

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

(b) The librarian needs to produce a list of drama books that Year 12 students have not returned on time. Describe the query needed. ***[3 marks]***

*Award **[1 mark]** for each aspect of the query up to a maximum of **[3 marks].***

- type = drama
- due date <today's date / returned = no *(accept either of these, not both)*
- Year level = 12

Answers can be in sentence format, or in query format as above.
Must be a query ie "Make a list of Year 12 students" is not an answer it is just repeating the question.

(c) Describe *two* policies that should be implemented for backing up the library's data. ***[4 marks]***

*Award **[1 mark]** for each policy which is identified up to a maximum of **[2 marks]**.*
*Award **[1 additional mark]** for the description of the policy up to a maximum of **[2 additional marks]**.*

- data should be backed up regularly ***[1 mark]*** plus expansion/example (e.g. there should be a daily backup of the loans made on that day) ***[1 additional mark]***
  Note: the frequency must be realistic – fortnightly would not be appropriate in a library.
- backup files should be stored off site ***[1 mark]*** plus expansion/example (e.g. they could be locked in another building in a fireproof safe or e.g. some companies offer off-site data backup) ***[1 additional mark]***
- backups must be checked for reliability ***[1 mark]*** plus expansion/example (e.g. this should involve restoring the data and checking that the data is reliable) ***[1 additional mark]***
- backup media should be rotated ***[1 mark***] plus expansion/example (e.g. this could follow the grandfather, father, son method) ***[1 additional mark]***
- full or partial backup should be implemented ***[1 mark]*** plus expansion/example (e.g. partial backup every day and full backup at the end of the week ***[1 additional mark].***
- The backup must be kept secure [1 mark], plus /expansion/example (e.g. it should be safe from unauthorised access) ***[1 additional mark]***

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

(d) Discuss *three* advantages of this computerised school library system compared with a manual system. Evaluate these advantages. ***[10 marks]***

For each advantage:
*Award **[1 mark]** for identifying the advantage.*
*Award **[1 additional mark]** for an expansion/description.*
*Award **[1 additional mark]** for adding a new dimension to the discussion*

*Award up to **[3 marks]** for evaluating the arguments*.
Evaluation can take place within an advantage up to a maximum ***[1 mark]*** per advantage or up to ***[3 marks]*** as a final summary at the end.

*The mark scheme provides for 12 possible marks. Tick every valid point but award to a maximum of **[10 marks]**.*

- the librarians are relieved of many labour intensive and mundane tasks ***[1 mark]***, description/expansion/example (e.g. no need to manually file catalogue/borrowing cards as this is done automatically by the database software) ***[1 additional mark],*** new dimension (e.g. this provides a greater level of accuracy as humans are prone to errors and cards can be misfiled and lost resulting in access denied to books) ***[1 additional mark]***
- teachers/students can access the catalogue from any computer linked to the Intranet ***[1 mark],*** description/expansion/example (e.g. there is no need to walk to the library to see if a book is available for loan as it can be reserved from a local computer) ***[1 additional mark],*** new dimension (e.g. this can have a negative effect on the library as people are less likely to browse and see new library displays) ***[1 additional mark]***
- stocktaking can be done efficiently and accurately ***[1 mark],*** description/expansion/example (e.g. using a barcode reader linked to the library network accuracy is virtually ensured provided the barcode has not been damaged) ***[1 additional mark],*** new dimension (e.g. stocktaking may be done more frequently and this has an impact on maintaining a well stocked library) ***[1 additional mark]***
- enquiries / lists can be created quickly with a simple search ***[1 mark],*** description/expansion/example (e.g. this means less work for librarians and reliable, timely notices/students or teachers can do searches and easily find resources) ***[1 additional mark]***, new dimension (e.g. the result of this is that there will be fewer overdue books and a better service for customers) ***[1 additional mark].***
- Saves storage space by replacing physical cabinets with electronic storage ***[1 mark],*** description/expansion/example (e.g. this gives extra space for study areas or more books) ***[1 additional mark]***, new dimension (e.g. data can be shared) ***[1 additional mark].***

- A backup can easily be made of all the library files ***[1 mark],*** description/expansion/example (e.g. it would not be realistic to do this with a manual card file where cards would each need to be photocopied) ***[1 additional mark]***, new dimension (e.g. if the library burnt down the stock list and list of borrowed materials could be retrieved allowing the library to restock and locate books on loan) ***[1 additional mark]***

If the candidate has written a full discussion of the advantages of a computerised over a manual system but not made any reference to a library then maximum 1 mark.

Do not accept less paper used ie advantage for the environment. On the contrary much more paper/printouts are produced.

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

Area of Impact: Health

3. (a) Identify *one* input and *one* output device used in robotic surgery. ***[2 marks]***

*Award **[1 mark]** for **one** input and **[1 mark]** for **one** output device identified up to a maximum of **[2 marks]**.*

Input
- high resolution three dimensional camera
- hand joystick-like controls.

Output
- monitor to display the operation taking place
- robotic arm to hold the instruments.

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

(b) Describe *one* capability and *one* limitation of the robot when used in surgery.
[4 marks]

*Award **[1 mark]** for **one** capability identified and award **[1 mark]** for **one** limitation identified up to a maximum of **[2 marks]**.*
*Award **[1 additional mark]** for the description of the capability and award **[1 additional mark]** for the description of the limitation up to a maximum of **[2 additional marks]**.*

Do not accept answers that are not related to surgery.

Capabilities
- robots can make precise cuts in the patient ***[1 mark]*** plus expansion/example (e.g. this eliminates problems caused by hand tremor in surgeons) ***[1 additional mark]***
- robots can work for long hours without tiring during a long operation ***[1 mark***], plus expansion/example (e.g. surgeons may tire but with a robot each procedure is as accurate as the last) ***[1 additional mark]***
- robots are more dexterous than a human surgeon ***[1 mark]*** plus expansion/example (e.g. more precise surgery involves smaller cuts and a faster recovery time for the patient) ***[1 additional mark].***

Limitations
- robots are programmed and cannot think for themselves ***[1 mark]*** plus expansion/example (e.g. they are not able to react to an unexpected event such as an unexpected reaction in the patient) ***[1 additional mark]***
- robots do not display judgement ***[1 mark]*** plus expansion/example (e.g. they can't make decisions based on past experience or knowledge of a past operation) ***[1 additional mark].***

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

(c) Describe *two* extra features that would be needed for the robot in surgery to be described as an expert system. ***[4 marks]***

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

Do not accept answers that are not related to surgery.

- A knowledge base derived from experts ***[1 mark]*** plus expansion/example (e.g. this would contain information about the operation and surgical procedure) ***[1 additional mark].***
- An inference engine which uses user input, the knowledge base and applies logic ***[1 mark]*** plus expansion/example (e.g. based on the user input and knowledge base this would give advice such as where to make the incision) ***[1 additional mark].***

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

(d) Discuss *one* economic concern, *one* reliability concern and *one* other concern for patients undergoing robotic surgery. Evaluate the relative significance of these concerns ***[10 marks]***

For each concern:

*Award **[1 mark]** for identifying the concern.*
*Award **[1 additional mark]** for expansion / description of the concern.*
*Award **[1 additional mark]** for adding a new dimension to the discussion.*

*Award up to **[3 marks]** for evaluating the arguments.*
*Evaluation can take place within a concern up to a maximum **[1 mark]** per concern or up to **[3 marks]** as a final summary at the end, maximum **[1 mark per concern]**.*

*The mark scheme provides for 12 possible marks. Tick every valid point but award to a maximum of **[10 marks]**.*

Answers may include:

- robotic surgery may incur extra costs to the patient ***[1 mark]***, description/expansion/example (e.g. although fewer surgeons may be needed robots are expensive to purchase and repair) ***[1 additional mark]***, new dimension (e.g. who pays for the robots – the government, the hospital or is the patient billed or e.g. issues relating to equality of access if there is an extra cost) ***[1 additional mark]***
- patients may be concerned about the reliability of the robot ***[1 mark]***, description/expansion/example (e.g. if there is a software bug then the robot could make a wrong incision resulting in health problems or even death) ***[1 additional mark],*** new dimension (e.g. this has legal impacts as a hospital may be sued for such a malfunction) ***[1 additional mark]***
- patients may have psychological concerns about a machine operating on them ***[1 mark],*** description/expansion/example (e.g. bedside manner is one important aspect in a doctor/patient relationship and this could be threatened) ***[1 additional mark],*** new dimension (e.g. this could be further compounded in the case of remote surgery as the surgeon is not present) ***[1 additional mark]***
- patients may be concerned about the privacy of their information as all the details of the procedure would be stored digitally ***[1 mark],*** description/expansion/example (e.g. security is a concern – where is the data stored and who has access to the data?) ***[1 additional mark],*** new dimension (e.g. solution for securing the data, policies that could be in place) ***[1 additional mark]***.

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

Area of Impact: Arts, Entertainment and Leisure

4. (a) Identify *two* different personal IT devices that support games. ***[2 marks]***

(*Do NOT answer this question using only brand names*)

*Award **[1 mark]** for each type of personal IT device identified up to a maximum of **[2 marks]**.*

- Personal Computer
- video Game Console
- hand held video games systems
- cellular telephone.

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

(b) Explain *two* health problems that could arise from excessive interaction with computerised games. ***[4 marks]***

*Award **[1 mark]** for each problem identified up to a maximum of **[2 marks]**.*
*Award **[1 additional mark]** for giving a reason for the problem up to a maximum of **[2 additional marks]**.*

- Repetitive strain injury ***[1 mark]*** due to excessive use of joystick/mouse/keyboard ***[1 additional mark]***
- eye strain/sore eyes ***[1 mark]*** due to long time exposure to monitor ***[1 additional mark]***
- epilepsy ***[1 mark]*** due to exposure to flickering lights ***[1 additional mark]***
- lower back/neck pain ***[1 mark]*** due to poor posture/lack of breaks ***[1 additional mark].***

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

(c) Describe *two* situations where the convergence of two technologies has led to the development of computerised games. ***[4 marks]***

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

- PC and the Internet ***[1 mark]*** and description/expansion/example (e.g. a computer linked to the Internet can be used for multi-player games) ***[1 additional mark]***
- cellular phone and the Internet ***[1 mark]*** and description/expansion/example (e.g. a WAP enabled phone can be used to download games from the Web) ***[1 additional mark]***
- PC and TV ***[1 mark]*** and description/expansion/example (e.g. participating in an interactive game through a TV show) ***[1 additional mark]***
- PDA and the Internet ***[1 mark]*** and description/expansion/example (e.g. Web enabled PDA can be used to download games from the Web) ***[additional 1 mark].***

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

(d) Discuss *one* positive effect on social relationships and two negative effects on social relationships caused by the playing of computerised games. Evaluate these effects.

[10 marks]

*Award **[1 mark]** for identifying each effect up to a maximum of **[3 marks].***
*Award **[1 additional mark]** for an expansion / description of each effect up to a maximum of **[3 marks]**.*
*Award **[1 additional mark]** for adding a new dimension to the discussion of each effect up to a maximum of **[3 marks].***

*Award up to **[3 marks]** for evaluating the arguments.*
*Evaluation can take place within an effect, up to a maximum **[1 mark]** per effect or up to **[3 marks]** as a final summary at the end.*

*The mark scheme provides for 12 possible marks. Tick every valid point but award to a maximum of **[10 marks]**.*

Positive effects on social relationships of the playing of computer games (award marks for only *one* positive effect)

- Shy people have the opportunity to get engaged with others (other players) ***[1 mark],*** description/expansion/example (e.g. no need to meet personally but behind the safety of a computer screen) ***[1 additional mark],*** new dimension (e.g. relationships are created where no other type of activity would allow - meet others from different age groups / countries) ***[1 additional mark]***
- Potential employers may identify good computer users ***[1 mark],*** description/expansion/example (e.g. meeting frequent players may enable the meeting of very able computer users who might be contacted for development of new games) ***[1 additional mark],*** new dimension (e.g. very able computer users –game players – may be given the opportunity to develop new games) ***[1 additional mark]***

Negative effects on social relationships of the playing of computer games (award marks for a maximum of *two* negative effects)

- There is less opportunity for personal social relationships ***[1 mark]***, description/expansion/example (e.g. children substitute personal interaction with online computer interaction / long hours of night play leave a person too tired to engage in activities during the day with others ***[1 additional mark]***, new dimension (e.g. less developed personal social skills for relations between family and friends) ***[1 additional mark]***
- Players may be exposed to unsuitable players online ***[1 mark],*** description/expansion/example (e.g. internet supports anonymity of participants) ***[1 additional mark]***, new dimension (e.g. this may lead to real life meetings with bad consequences) ***[1 additional mark]***
- Players will relate only to one type of people – other players – closing too much the circle of different relationships ***[1 mark],*** description/expansion/example (e.g. addiction for games may prevent people from performing other activities with people with other skills) ***[1 additional mark]***, new dimension (e.g. this may lead eventually to isolation / less offer of job opportunities) ***[1 additional mark]***

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

Area of Impact: Science and Environment

5. (a) Describe *one* advantage of obtaining the data as a table of figures in tab separated format instead of as a graph.. ***[2 marks]***

*Award **[1 mark]** for the advantage identified.*
*Award **[1 additional mark]** for the description of the advantage.*

- the data can be processed by various applications ***[1 mark]*** – such as a spreadsheet ***[1 additional mark]***
- can be used in models ***[1 mark]*** for predictive purposes ***[1 additional mark]***

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

(b) Explain the purpose of *two* items of hardware that are required at the sampling stations along the rivers. ***[4 marks]***

*Award **[1 mark]** for each item of hardware identified up to a maximum of **[2 marks]**.*
*Award **[1 additional mark]** for giving a reason for the purpose of each item of hardware up to a maximum of **[2 marks]**.*

- radio transmitter ***[1 mark]*** to communicate with the satellite ***[1 additional mark]***
- a/d converter ***[1 mark]*** to convert the sensor's signals into the digital form required for processing ***[1 additional mark]***
- sensor (level/depth) ***[1 mark]*** to convert physical data into electrical signal / capture data ***[1 additional mark]***

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

(c) Explain the use of *two* other items of physical data that can be collected by the data logging stations along the rivers. ***[4 marks]***

*Award **[1 mark]** for each item identified up to a maximum of **[2 marks]**.*
*Award **[1 additional mark]** for giving a reason for the item up to a maximum of **[2 additional marks]**.*

- temperature ***[1 mark]*** impact on icing conditions / fishing etc ***[1 additional mark]***
- flow rate ***[1 mark]*** impact on flooding / water supplies ***[1 additional mark]***
- pH / other chemical item ***[1 mark]*** indication of pollution ***[1 additional mark]***

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

(d) In the past, data about rivers was collected manually.

Discuss *two* advantages and *one* concern for the USGS using automatic monitoring systems along the rivers and then entering the information into a centrally located database. Evaluate these issues. ***[10 marks]***

For each advantage/ concern
*Award **[1 mark]** for identifying each advantage/concern up to a maximum of **[3 marks].***
*Award **[1 additional mark]** for an expansion / description of each advantage / concern up to a maximum of **[3 marks].***
*Award **[1 additional mark]** for adding a new dimension to the discussion of each advantage / concern up to a maximum of **[3 marks]**.*

*Award up to **[3 marks]** for evaluating the arguments.*
*Evaluation can take place within an issue up to a maximum **[1 mark]** per issue or up to **[3 marks]** as a final summary at the end.*

*The mark scheme provides for 12 possible marks. Tick every valid point but award to a maximum of **[10 marks]**.*

<u>Advantages for the USGS (award marks for a maximum of *two* advantages)</u>

- The USGS offers up to date information and ready to be used ***[1 mark]***, description/expansion/example (e.g. information captured by sensors and introduced into a computer system may be used for accurate predictions) ***[1 additional mark]***, new dimension (e.g. dangerous situations may be identified on time) ***[1 additional mark]***
- The USGS offers reliable information as information entered automatically by the equipment instead of manually is less prone to mistakes ***[1 mark]***, description/expansion/example (e.g. human error may be frequent when typing information that may have been previously recorded on paper) ***[1 additional mark]***, new dimension (e.g. information with errors is of little use for predictions) ***[1 additional mark]***
- USGS may be considered a more reliable / trustworthy institution ***[1 mark]***, description/expansion/example (e.g. because the equipment / methods of data capture offer reliable data the institution may raise its value in the people awareness) ***[1 additional mark]***, new dimension (e.g. other investments may be promoted for a reliable institution) ***[1 additional mark]***
- USGS can charge for providing additional services with the data collected ***[1 mark]***, description/expansion/example (e.g. USGS may offer the service of the study of the data for individual company needs) ***[1 additional mark]***, new dimension (e.g. investors may decide to ask for these services and allow the USGS to acquire new equipment to improve the general functioning of the data capture) ***[1 additional mark]***

<u>Concerns for the USGS (award marks for a maximum of *one* concern)</u>

- USGS may be worried that the data may be unreliable ***[1 mark]***, description/expansion/example (e.g. the recording equipment may malfunction and bad results may pass unnoticed) ***[1 additional mark]***new dimension (e.g. members of the

public may make wrong decisions as a result of bad data leading to economic loss as the result of a flood) ***[1 additional mark]***

- USGS may be worried that the data stored / transmitted is not secure ***[1 mark],*** description/expansion/example (e.g. others / hackers may try to tamper the stored / transmitted data) ***[1 additional mark]*** new dimension (e.g. this may lead to lack of prevention of dangerous incidents) ***[1 additional mark]***
- USGS may be worried about the expertise of the people ***[1 mark],*** description/expansion/example (e.g. people who work with the new equipment and the handling of data need to be trained) ***[1 additional mark]*** new dimension (e.g. this may lead to a change in employment opportunities inside USGS / new policies for training of personnel.) ***[1 additional mark]***
- USGS may be worried about the cost of the new systems / maintenance ***[1 mark],*** description/expansion/example (e.g. automatic data capture equipment have to be maintained and may be expensive) ***[1 additional mark]*** new dimension (e.g. qualified personnel and equipment with modern technologies may mean that the USGS will have to charge for a service that was free before.) ***[1 additional mark]***