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INFORMATION TECHNOLOGY IN A GLOBAL SOCIETY

Standard Level

Paper 2

19 pages

SECTION A

Area of Impact: Business and Employment

1. (a) Identify *two* online banking services, which the bank can provide for its customers. ***[2 marks]***

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

- information and advice (e.g. investments, different accounts)
- applications (e.g credit cards)
- pay bills
- transfer funds between accounts (your own or someone else's)
- buy investment stocks / bonds
- get account information (e.g. account balance, statements, transaction details, frequent payments etc.)
- wire transfer: transferring money to other banks in the same country or in another country
- apply for a mortgage / loans
- create an account.

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

(b) Outline *two* advantages for the customer of an online bank over a traditional bank. ***[2 marks]***

*Award **[1 mark]** for each advantage outlined up to maximum of **[2 marks]**.*

- longer hours of availability e.g. 24 hours, 7 days a week
- accessible from anywhere in the world
- convenient - accessible without leaving home/work place
- time saving – no travel or queuing
- transaction charges are lower or free
- different services provided by the bank could be available on the screen without customers having to ask bank employees
- money saved – no travel expenses or employees away from work.
- handicapped people do not need to get help and / or company to get to bank
- transactions are kept private as there is no interaction with people at the bank
- in countries where the action of going to the bank represents a security risk transactions can be done from a secure place like home or the office
- a statement of the account can be obtained without waiting for it to arrive via mail.

- NOTE: short answers such as "faster", "cheaper" or "24/7" are Not Enough without justification. "Available 24/7" is Just Enough.

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

(c) **Banks store customer's personal data**. **The bank must have a policy covering the storage and use of this data**. **Describe *two* rules that must be included in this policy**. ***[4 marks]***

*Award **[2 marks]** for each rule fully described up to a maximum of **[4 marks]**.*
*Award **[1 mark]** for each rule only identified.*

- customer is aware of what data is being stored ***[1 mark]*** + description (e.g. right to view stored data and to amend incorrect or out of date information) ***[additional 1 mark]***.
- the bank must have appropriate security procedures ***[1 mark]***, + to prevent unauthorised access (or describes hierarchical password system/bank's firewall /another appropriate procedure) ***[additional 1 mark]***.
- policy must be made available to customers ***[1 mark]*** + a description (e.g. available online or customers are given a printed copy when opening account) ***[additional 1 mark]***.
- data not released to third parties without the customer's consent. ***[1 mark]*** + description (e.g. circumstances under which data can be released are agreed upon set up of the account) ***[additional 1 mark]***.
- bank must ensure that data is correct and up to date ***[1 mark]*** + a description (e.g. validation on data entry) ***[additional 1 mark]***.
- bank should only keep data as long as it is needed for existing customers ***[1 mark]*** + a description (e.g. data deleted on closure of account) ***[additional 1 mark]***.
- customers must be told what the data is to be used for ***[1 mark]*** + description (e.g. purpose of data stored must be explained in form and customers must give their consent) ***[additional 1 mark]***
- there must be appropriate security procedures for the storage of data ***[1 mark]*** + a description (e.g. encryption of data) ***[additional 1 mark]***.

NOTE: Examiners use discretion over the examples used for description for second mark.

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

(d) Discuss *three* social and/or ethical concerns that customers should have about storage of their personal data. Evaluate your arguments. ***[12 marks]***

*Award up to **[3 marks]** for each way fully discussed up to a maximum of **[9 marks]**. Award **[1 mark]** if it is only identified. Award up to **[3 marks]** for evaluation.*

- data could be unreliable if it is entered incorrectly by bank staff / users ***[1 mark]*** + impact on customer fully discussed ***[additional 2 marks]*** e.g. interest rate is entered incorrectly and customer loses money.
- data could be unreliable if it becomes outdated ***[1 mark]*** + impact on customer fully discussed ***[additional 2 marks]*** e.g. customer address change is not updated and bank statement is sent to wrong address.
- the database could be insecure ***[1 mark]*** + impact on customer fully discussed ***[additional 2 marks]*** e.g. A hacker could gain access to the bank files and change or steal data.
- integrity could be violated if data is corrupted during an online transaction ***[1 mark]*** + impact on customer fully discussed ***[additional 2 marks]*** e.g. customer's balance is not correctly updated and money is lost or gained.
- who has access to the data stored in the system ***[1 mark]*** + impact on customer fully discussed ***[additional 2 marks]*** e.g. example of breach of privacy and impact on customer.
- data could become unreliable if system contracts a virus ***[1 mark]*** + impact and / or preventative measures (e.g. data is erased and customer contact is lost temporarily / effective virus protection system + firewall) ***[additional 2 marks]***
- concern that data will be given / sold to third parties (as in part (c)) ***[1 mark]*** + impact on customer / how they can be reassured it will not happen (e.g. unsolicited mail being received / bank gives customer chance to opt out of this by tick boxes on application form) ***[additional 2 marks]***
- what will happen to personal data if bank is sold ***[1 mark]*** + impact on customer fully discussed. ***[additional 2 marks]*** e.g. the new owner may have different policies, customers should be presented with new contracts / conditions and give their consent
- data stored by bank may be found by others using data mining techniques ***[1 mark]*** + impact on customer fully discussed ***[additional 2 marks]***.

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

SECTION B

Area of Impact: Education

2. (a) A teacher of French has booked the mobile lab for a lesson. Describe *one* use that her class could make of the Internet during the lesson. ***[2 marks]***

*Award **[2 marks]** for a fully described use. Award **[1 mark]** if the use is only identified.*

- investigate a topic on the Internet ***[1 mark]*** + expansion (e.g. downloading images for use in a project) ***[additional 1 mark]***.
- email contacts with a school in France ***[1 mark]*** + expansion (e.g. sharing images of each school) ***[additional 1 mark]***.
- using online educational resources in French ***[1 mark]*** + expansion (e.g. quiz; teacher-prepared presentation) ***[additional 1 mark]***.
- using online translation sites ***[1 mark]*** + expansion (e.g. back translation to check the quality of their writing in French) ***[additional 1 mark]***

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

(b) A science teacher has booked the mobile lab. Describe *one* use that his class could make of the equipment without network access. ***[2 marks]***

*Award **[2 marks]** for a fully described use. Award **[1 mark]** if the use is only identified.*

- data capture in a science experiment ***[1 mark]*** + expansion (e.g. using sensors; real-time graphs) ***[additional 1 mark]***.
- using subject-specific software ***[1 mark]*** + expansion (e.g. simulation of a dangerous experiment) ***[additional 1 mark]***.
- using application software ***[1 mark]*** + expansion (e.g. teacher prepared template, production of graphs, tables) ***[additional 1 mark]***.
- need to provide training for teachers (NOT STUDENTS) on how to use the mobile labs ***[1 mark]*** + expansion (e.g. find the time, the trainers and the place to provide training sessions to make sure teachers are comfortable with the use of mobile labs, know how to solve minor problems and know when to call for a technician) ***[additional 2 marks]***
- need to provide the teachers with equal opportunity of access to the labs ***[1 mark]*** + expansion (e.g. an online booking system is provided for the use of the labs or via telephone / email request) ***[additional 1 mark]***
- admin needs to be mindful of licensing requirements of software. ***[1 mark]*** + expansion (e.g. multi-user licence or site licence needs to be checked to ensure that it is valid for the new mobile labs. [additional 1 mark]
- mobile labs need wireless access points ***[1 mark]*** + expansion (e.g. the school needs to have a new set of access points to the network to allow mobile carts to be moved to different areas / classrooms). ***[additional 1 mark]***
- use of an Encyclopaedia in CD ***[1 mark]*** + expansion (e.g. students investigate scientific terms or concepts using a CD with Encarta) ***[additional 1 mark]***.

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

(c) Describe *two* problems that the school administration may face by introducing mobile computer labs. ***[4 marks]***

*Award **[2 marks]** for each fully described problem, up to a maximum of **[4 marks]**. Award **[1 mark]** if a problem is only identified.*

- need to provide access facilities to take the cart to the classrooms ***[1 mark]*** + expansion (e.g. easier to take students to a fixed lab than move a cart to different floors) ***[additional 1 mark]***.
- need network access ports in all areas ***[1 mark]*** + expansion (e.g. cheaper and easier to have ports centrally located) ***[additional 1 mark]***.
- danger of damage to fragile equipment being moved around ***[1 mark]*** + expansion (e.g. added expense of maintenance/replacement) ***[additional 1 mark]***.
- cost of equipment and maintenance ***[1 mark]*** + expansion (e.g. school has a limited budget money spent on computers may be better spent on something else) ***[additional 1 mark]***.
- additional security problem ***[1 mark]*** + expansion (e.g. more opportunity for casual theft; monitoring whereabouts more difficult) ***[additional 1 mark]***.
- additional need for technical support ***[1 mark]*** + expansion (e.g. need to provide technician to move around the school to support mobile lab) ***[additional 1 mark]***.
- need to provide training for teachers (not students) on how to use the mobile labs ***[1 mark]*** + expansion (e.g. find the time, the trainers and the place to provide training sessions to make sure teachers are comfortable with the use of mobile labs, know how to solve minor problems and know when to call for a technician) ***[additional 2 marks]***.
- need to provide the teachers with equal opportunity of access to the labs ***[1 mark]*** + expansion (e.g. an online booking system is provided for the use of the labs or via telephone / email request) ***[additional 1 mark]***.
- admin needs to be mindful of licensing requirements of software ***[1 mark]*** + expansion (e.g. Multi-user licence or site licence needs to be checked to ensure that it is valid for the new mobile labs.) ***[additional 1 mark]***.
- mobile labs need wireless access points ***[1 mark]*** + expansion (e.g. the school needs to have a new set of access points to the network to allow mobile carts to be moved to different areas / classrooms ***[additional 1 mark]***.

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

(d) Many issues may arise from the use of mobile labs. Discuss *three* distinct issues that may affect the students' education. Evaluate your arguments. ***[12 marks]***

*Award up to **[3 marks]** for each issue fully discussed up to a maximum of **[9 marks]**. Award **[1 mark]** if an issue is only identified. Award up to **[3 marks]** for evaluation.*

*NOTE: Full marks for this question can only be achieved by relating the answers to the use of **mobile** labs. Award a maximum of one mark for any valid issue referring to the general use of computers and the Internet in education. In this general case you can still award evaluation marks in the normal way.*

- simpler and quicker access than moving the class to a lab ***[1 mark]*** + effect on students' education ***[additional 2 marks]*** e.g. immediate access to online resources for research.
- encourages more teachers to use the technology in their classes ***[1 mark]*** + effect on students' education ***[additional 2 marks]*** e.g. students stay in their own places and class environment (less disruption) / teachers feel more at ease in their own room.
- easier for teachers to have some students using computers, others working differently ***[1 mark]*** + effect on students' education ***[additional 2 marks]*** e.g. mixed activity classrooms allow more versatile and effective learning environment.
- lesson time could be lost due to technical failure ***[1 mark]*** + effect on students' education ***[additional 2 marks]*** e.g. lack of mobile technical support (must relate to mobile situation as regular labs still have technical problems).
- increased access to technology ***[1 mark]*** + effect on students' education ***[additional 2 marks]*** e.g. small school – no space or money for dedicated computer lab mobile lab provides access to technology or allows to student to experience new forms of technology e.g. WiFi.
- The use of mobile labs may require the use of lesson time to get ready to use the laptops. ***[1 mark]*** + effect on students education ***[additional 2 marks]*** e.g. students will have shorter lessons as lesson time may be lost due to preparation to use laptops and the extra time needed to shut off the system and put them in the cart (or time used for security procedures to prevent loss of equipment – register users, count parts, etc).

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

Area of Impact: Health

3. (a) Describe *one* type of broadband connection. Explain why broadband access is needed in this case. ***[4 marks]***

*Award **[1 mark]** for the name of a broadband connection and/or **[1 mark]** for a brief description of the technology that makes it work*
*Award up to **[2 marks]** for a full explanation of the need (see below).*

[4 marks]

Types of broadband

Name	Brief Description
Fixed Line	ADSL, DSL, Cable
Satellite:	Is a receiver/transmitter that orbits the earth and receives signals from earth stations, which it amplifies and sends back to earth.
Wireless	Utilises WiFi technology to support a broadband connection

Explanation of need for broadband
Explanation of broadband - Broadband transfers data at a faster rate ***[1 mark]***.
This is needed to transfer the video images of the patient and doctor ***[1 mark]***.

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

(b) Describe *two* other possible uses of videoconferencing in healthcare. ***[4 marks]***

*Award **[2 marks]** for a fully described use, up to a maximum of **[4 marks]**. Award **[1 mark]** if the use is only identified.*

- discussions between doctors and other medical personnel about patient results ***[1 mark]*** + expansion (e.g. sharing graphical information like X-rays) ***[additional 1 mark]***.
- education for trainee doctors ***[1 mark]*** + expansion (e.g. specialists could give lectures, demonstrations like operations) ***[additional 1 mark]***.
- specialists can talk inexperienced doctors through a procedure in an emergency situation ***[1 mark]*** + expansion (e.g. use video to demonstrate the technique and audio to convey the speech) ***[additional 1 mark]***.
- allowing a doctor who is unable to attend a conference to still participate ***[1 mark]*** + expansion (e.g. web cameras would be used to show all participants at the meeting.) ***[additional 1 mark]***.
- patient support groups using videoconference through healthcare centre to share experiences ***[1 mark]*** + expansion (e.g. Alzheimer's care groups) ***[additional 1 mark]***

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

(c) Discuss *one* advantage and two concerns relating to the use of videoconferencing to conduct psychological consultations. Evaluate your arguments. *[12 marks]*

*Award up to **[3 marks]** for each impact fully discussed up to a maximum of **[9 marks]**. Award **[1 mark]** if it is only identified. Award up to **[3 marks]** for evaluation.*

Advantages

- patients can stay at home and still use the system ***[1 mark]*** + expansion ***[additional 2 marks]*** e.g. benefit of no travel and not being away from family.
- access to highly trained psychologists/psychiatrists in another location ***[1 mark]*** + expansion ***[additional 2 marks]*** e.g. patients in remote areas who are unlikely to have access to specialist care could access specialists anywhere in the world.
- patients can have access to a consultation in a private environment ***[1 mark]*** + expansion ***[additional 2 marks]*** e.g. not being seen entering a psychological clinic, sitting in the waiting room with other patients, being overheard.

Concerns

- costs of hardware, software, connection ***[1 mark]*** + expansion ***[additional 2 marks]*** e.g. who pays? Is the cost added to the fees?
- patients may be less at ease in this situation compared with face to face contact ***[1 mark]*** + expansion ***[additional 2 marks]*** e.g. poor technology could result in jerky movements making the patient less at ease.
- privacy of the consultation may be at risk ***[1 mark]*** + expansion ***[additional 2 marks]*** e.g. what security is in place to protect the data, who has access, what are the implications for this data being available to other people?
- patients may suffer if the service is unreliable due to faulty hardware/software/connection ***[1 mark]*** + expansion ***[additional 2 marks]*** e.g. a patient with an acute psychiatric complaint may be denied access to help.

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

Area of Impact: Arts, Entertainment and Leisure

4. (a) Identify *two* other features present in 3G phones. ***[2 marks]***

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

- video calling (see and be seen by the person you are calling)
- internet navigation
- MP3 music downloads
- personal organiser features (e.g. calendar, phonebook, email, agenda etc.)
- communication technologies (e.g. bluetooth)
- download videos from phone provider
- video recording using the camera
- games
- downloading ring tones / program to compose ring tones

(b) Outline *two* ways that a camera phone can ensure that privacy is not violated when a picture is being taken. ***[2 marks]***

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

- an audible click for others to hear
- a light flashing when picture is taken
- a synthesised voice could warn you

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

(c) Describe *two* IT processes which may be used when processing digital photographs. ***[4 marks]***

*Award **[2 marks]** for each process fully described up to a maximum of **[4 marks]**.*
*Award **[1 mark]** for each process only identified.*

- image manipulation/enhancement/editing ***[1 mark]*** + expansion (e.g. rotation of image, brightness, etc.) ***[additional 1 mark]***.
- file type conversion ***[1 mark]*** + expansion (e.g. GIF to PDF to compress file size) ***[additional 1 mark]***.
- upload image to computer ***[1 mark]*** + expansion (e.g. direct from camera using USB lead) ***[additional 1 mark]***.
- print hard copy ***[1 mark]*** + expansion (e.g. using docking device connected to printer) ***[additional 1 mark]***.

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

(d) Many social and ethical issues are raised by the use of camera phones. Discuss *one* economic issue, *one* privacy issue and *one* other issue. Evaluate your arguments. ***[12 marks]***

*Award up to **[3 marks]** for each issue fully discussed up to a maximum of **[9 marks]**. Award **[1 mark]** if it is only identified. Award up to **[3 marks]** for evaluation. One issue must be economic, one issue must be related to privacy, plus one other issue (repeats of privacy, economic are acceptable).*

Economic issues

- effect on phone manufactures finances ***[1 mark]***, huge start-up investment needed and potential large profits fully discussed ***[additional 2 marks]***.
- users of camera phones are likely to incur larger phone bills ***[1 mark]***, sharing images is likely to become as popular as texting but is significantly more expensive - fully discussed ***[additional 2 marks]***.

Privacy issues

- very easy to take pictures without a person's knowledge ***[1 mark]***, right to object, right to approve picture once taken, religious reasons for image privacy, etc. ***[additional 2 marks]***.
- subject of picture should have control over recipients of picture ***[1 mark]*** e.g. teenager doing something doesn't want parents to know about (smoking, etc.) - fully discussed ***[additional 2 marks]***.

Other issues

NOTE: Third issue could be a second economic issue, a second privacy issue or any other issue

- intellectual property rights - who owns it? ***[1 mark]***; pictures of celebrities being used without their permission - fully discussed ***[additional 2 marks]***.
- editing images/authenticity issue ***[1 mark]***, pictures of celebrities could be edited - fully discussed ***[additional 2 marks]***.
- effect on manufacturers of digital cameras ***[1 mark]*** people using 3G phone as a camera will not need to buy a digital camera. ***[additional 2 marks]***
- affordability of 3G phones ***[1 mark]*** 3G phones are very expensive to buy and use creating an extension of the digital divide – fully discussed ***[additional 2 marks]***
- cheating in an exam ***[1 mark]*** taking a photo of exam questions and / or answers and sending them to a colleague / other student – impact fully discussed ***[additional 2 marks]***.

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

Area of Impact: Science and Environment

5. (a) Describe *two* different uses of information technology in cars today. ***[4 marks]***

*Award **[1 mark]** for identifying each relevant use, and a further **[1 mark]** if it is fully described.*

- a navigation system - satellites pinpoint the position of the car ***[1 mark]*** + expansion (The driver enters his destination and this is compared with the car position with reference to a digital map of the area) ***[additional 1 mark]***.
- biometric sensors authenticate the driver ***[1 mark]*** + expansion (e.g. a sensor reads the finger prints, and compares them to a database of authorized users, and only then opens the door / starts the car) ***[additional 1 mark]***.
- proximity sensors on the car bumpers ***[1 mark]*** + expansion (e.g. they sense the distance between the car and the nearest obstacle and give the driver visual and audio warnings) ***[additional 1 mark]***.
- logging into a network using wireless communications ***[1 mark]*** + expansion (e.g. driver can log in and retrieve email via Voice Recognition Software ***[additional 1 mark]***.
- engine Management systems ***[1 mark]*** + expansion (e.g.: will monitor the performance of the engine and regulate functions such as the injection of fuel)
- ***[additional 1 mark]***.
- recording and saving driver's preferences ***[1 mark]*** + expansion
- (e.g. the driver is able to record his preferences like seat position, mirror tilt, seat belts length, and the computer is able to record this information for several possible drivers (wife and husband)) ***[additional 1 mark]***.
- automatic rain sensing windscreen wipers ***[1 mark]*** + expansion (e.g. turn on and off and even adjust their speed to match amount of rain) ***[additional 1 mark]***.
- automatic side view mirrors ***[1 mark]*** + expansion (e.g. mirrors that tilt down when the car is put in reverse to focus driver's attention on the back bumper) ***[additional 1 mark]***.

NOTE: Do NOT accept mobile phones.

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

(b) Describe *two* advantages of the technologies described in part (a) for the driver of the car. ***[4 marks]***

*Award **[1 mark]** for identifying each advantage, and a further **[1 mark]** if it is fully described*.

- a navigation system is able to advice of better routes ***[1 mark]*** + expansion (e.g. this can help avoid a traffic jam, save driving time or help a driver who is lost) ***[additional 1 mark]***.
- working from the car using a wireless connection gives the driver more working hours ***[1 mark]*** + expansion (e.g. email can be accessed and responded to before arriving at the office saving valuable time.)
- using biometric to authenticate the driver provides more security / convenience ***[1 mark]*** + expansion (e.g. the driver saves the need for carrying keys / does not worry about losing keys / it deters theft of the car) ***[additional 1 mark]***
- proximity sensors will inform the driver of objects nearby ***[1 mark]*** + expansion (e.g. this will enable the driver to more easily park in small spaces / may avoid accidents by alerting the driver if he is too close to the car in front.) ***[additional 1 mark]***.
- the fuel injection system saves cost / protects the environment ***[1 mark]*** + expansion (e.g. it increases fuel efficiency of the car / reduces pollution to the environment) ***[additional 1 mark]***.
- the drivers preferences will be automatically detected by the car ***[1 mark]*** + expansion (e.g. the drivers seat, mirror position, length of seat belts will be automatically adjusted to previously recorded positions saving time consumed by trying to find the correct position of seat, mirrors, and seat belt and preventing uncomfortable driving) ***[additional 1 mark]***.

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

(c) Discuss *two* social / ethical considerations that a company would have to consider when providing this technology in cars for the use of their employees. Evaluate your arguments. ***[12 marks]***

*Award up to **[4 marks]** for each social or ethical consideration fully discussed up to a maximum of **[8 marks]**.*

*Award only **[1 mark]** for each considerations if it is only identified.*
*Award up to **[4 marks]** for an evaluation/weighing up.*
*Award a maximum of **[12 marks]** for the question.*

Social

- employees will be expected to work even when driving home or to work ***[2 marks]*** + expansion ***[additional 2 marks]*** e.g. increase in working hours can lead to stress/or being able to work in a traffic jam could alleviate stress.
- drivers can be distracted by listening/responding to emails while travelling ***[2 marks]*** + expansion ***[additional 2 marks]*** e.g. this increases the risk of accident and injury.
- there is increased cost for the company in purchasing/maintaining the equipment ***[2 marks]*** + expansion ***[additional 2 marks]*** e.g. this could be offset by fuel savings/fewer thefts/greater productivity of employees.
- engine management systems and navigation systems help reduce fuel consumption/ increase car performance ***[2 marks]*** + expansion ***[additional 2 marks]*** e.g. positive environmental impact, offset by production of the computerised components which involves emission of gases and replacing components which creates environmental waste.
- employees location may be identified ***[2 marks]*** + expansion (e.g. risk of invading privacy of employees – company should have a clear policy of how this information will be stored and guarantee there will be no invasion of privacy) ***[additional 2 marks]***

Ethical

- If the system crashes the data may become unreliable ***[2 marks]*** + expansion ***[additional 2 marks]*** e.g. who is responsible if the navigation system data is incorrect resulting in inconvenience or even lives at risk in an emergency.

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

Area of Impact: Politics and Government

6. (a) Explain *one* way this technology could be used to assist the traveller and *one* way this technology could be used to assist the government. ***[4 marks]***

*Award **[2 marks]** for each way fully explained up to a maximum of **[4 marks]**. Award **[1 mark]** for each partial explanation.*

Traveller

- making travelling safer ***[1 mark]*** + expansion (e.g. reduces the chance of identity theft using passports) ***[additional 1 mark]***.

Government

- tighter security ***[1 mark]*** + expansion (e.g. as the face scan is matched against a database of known criminals or terrorists) ***[additional 1 mark]***.

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

N.B *Facial scan is not a system used to replace the use of passports.*
It is not faster at passport control, all the Internet hits say it is slower.

(b) Describe *one* other way of using information technology to authenticate a traveller apart from biometrics. Compare this method with biometric scanning. ***[4 marks]***

Award ***[2 marks]*** *for the way fully described.*
Award ***[1 mark]*** *for only identifying the way.*
Award up to ***[2 marks]*** *for comparing and contrasting this method with biometric.*
[4 marks max]

- a password or pincode could be used ***[1 mark]*** + description (e.g. Password or pincode is entered into terminal by passenger at security checkpoint and checked against a database) ***[additional 1 mark]***.
    - this would be more cost effective than biometrics ***[1 mark]*** + expansion (e.g. , can easily be forgotten or stolen) ***[additional 1 mark]***.
- a smart card could be used ***[1 mark]*** + description ***[additional 1 mark]***
    - smart card reading is still time consuming, requires a card ***[1 mark]*** + expansion (e.g. unlike biometric identification it can easily be lost or stolen) ***[additional 1 mark]***.
- laser Card could be used ***[1 mark]*** + description ***[additional 1 mark]*** an optical memory card that has the card owner's information including fingerprints – used by the US for Mexican citizens who will cross their border temporarily (called "Laser Visas")
- RFID tags could be used ***[1 mark]*** + description ***[additional 1 mark]*** a small object that may contain personal information, digital photo and fingerprints and could be attached to the passport. RFID tags contain antennas to enable them to receive and respond to radio-frequency queries.
    - equipment to read this card is needed. This does not prevent identity theft as the tag may be stolen and information changed, at password control this information would have to be checked against a data base to confirm identity of a password holder. It could also represent a danger to password holder as it can be read from a distance by third parties.

Do not accept answers that do not use I.T.
Reward other acceptable answers only with the approval of your team leader.

(c) Describe *two* other situations, apart from airport control, where biometrics could be used by the government for authentication. ***[4 marks]***

*Award **[2 marks]** for each situation fully described up to a maximum of **[4 marks]**.*
*Award **[1 mark]** for each situation only identified.* ***[4 marks max]***

- a security camera at an event ***[1 mark]*** + description (e.g. faces in a crowd can be scanned and matched against a database of known criminals ***[additional 1 mark]***.
- voting booths at elections ***[1 mark]*** + description (e.g. voters' faces could be scanned and checked off against a database of people eligible to vote ***[additional 1 mark]***.
- police investigations ***[1 mark]*** + description (e.g. suspected criminals could be face scanned and matched against a database of known criminals ***[additional 1 mark]***.
- security control at military base OR government building OR logon at government computer terminal (not rewarded as separate answers) ***[1 mark]*** + description (e.g. people requesting permission to enter would be checked at the entrance and gate and information matched against a database of people who should not be allowed in.) ***[additional 1 mark]***.
- the government can use biometrics in firearms stores ***[1 mark]*** + description (store computers would have access to a government data base of people who should not be sold firearms – firearm purchasing control) ***[additional 1 mark]***

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

(d) Discuss *two* ethical impacts that should be considered before this facial recognition system is implemented. Evaluate your arguments. ***[8 marks]***

Award up to ***[3 marks]*** *for each ethical impact fully discussed, up to a maximum of* ***[6 marks]***.
Award only ***[1 mark]*** *if each ethical impact is only stated.*
Award up to ***[2 marks]*** *for evaluation.*
This could include an analysis of the issues and/or an evaluation of their impact.
[8 marks max]

- face scans are not totally reliable ***[1 mark]*** + expansion ***[additional 2 marks]*** e.g. they can be open to error due to changes in features (hair style, glasses) leading to wrong identification. The impact could be wrong identification leading to embarrassment or even sending the wrong person to prison.
- face scans involve storage of private information about an individual ***[1 mark]*** + expansion ***[additional 2 marks]*** e.g.
  the person may not be aware that this information is stored:
  the information may be used for purposes other than those intended.
  impact - embarrassment if a person's whereabouts are disclosed to family/friends.
  impact – in extreme cases blackmail.
- face scan information must be held securely ***[1 mark]*** + expansion ***[additional 2 marks]*** e.g. unauthorised access could be gained by hackers who could modify the data leading to false information about an individual.
- staff training is needed ***[1 mark]*** + expansion [additional 2 marks] incompetent staff could cause system not working properly and embarrass people with false accusations/let terrorists in.

  N.B *Wherever we talk of "let terrorists in", it could equally be "apprehend criminals trying to leave."*

- Face scans may present cultural problems ***[1 mark]*** + expansion ***[additional 2 marks]*** e.g. impact discussed – staff should be advised about the different possibilities and regulations for different cultures, Muslim women could feel offended if requested to have their face scanned without their head scarf.

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