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IN A GLOBAL SOCIETY

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SECTION A

Area of Impact: Business and Employment

1.   **(a)   Identify** *two* **non-work-related activities office workers could perform using the Internet during business hours.**   *[2 marks]*

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

- checking sports results
- online gambling
- online trading of stocks and shares
- reading online newspapers
- accessing pornographic materials
- playing online games
- sending/receiving personal e-mail
- personal banking
- chat / messaging
- downloading music
- looking for a job
- shopping on line
- planning holidays.

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

(b)   Describe *two* **types of communication access a business could use to connect its local area network (LAN) to the Internet.**   *[4 marks]*

Award up to [2 marks] for each type of access fully described up to a maximum of [4 marks].
Award only [1 mark] for a partial description.

- ISDN connection *[1 mark]* using the telephone line to digitally transfer data
- DSL connection *[1 mark]* using the telephone line and modem to digitally transfer data
- ADSL connection *[1 mark]* with telephone line and modem to transfer data
- microwave transmission *[1 mark]* between antennas
- dial-up modem connection *[1 mark]* using the analogue telephone line.

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

(c) **Describe *two* information technologies employers could use to monitor office workers' non-work-related Internet use.** *[4 marks]*

Award [2 marks] for each information technology fully described up to a maximum of [4 marks].
Award only [1 mark] for a partial description.

- employees' e-mail is captured *[1 mark]* and read or searched for keywords (*e.g.* CV, sex)
- employees' keystrokes are monitored *[1 mark]* and sent to a manager to control
- a proxy log is kept of all Internet sites accessed by employees *[1 mark]* and contains information regarding the sites accessed
- screen capture or screen viewing software is used by the network manager *[1 mark]* to randomly check employees' work on their monitors
- "history" file of the Internet browser is opened and viewed
- packet sniffing.

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

(d) **Discuss *three* social *and/or* ethical issues resulting from non-work-related Internet use by office workers. Evaluate your arguments.** *[10 marks]*

Award up to [4 marks] for each social and/or ethical issue fully discussed up to a maximum of [10 marks].
Award only [1 mark] for each social and/or ethical issue if it is only stated.

- office workers waste time on personal matters rather than completing their work
- wasted time by office workers cost the company considerable money
- policies and regulations to govern Internet use have to be developed and implemented to control office workers use
- office workers may surf to undesirable sites which can be traced back to the business through TCP/IP addresses and cause embarrassment to the company
- cookies form undesirable sites may allow the collection of information from business computers which invades the privacy of the company
- use of chatroom by office workers could lead to unauthorized access to business systems and allow a breach in security
- employees may use this facility to solve in the office any personal problems with banking or purchases in a few minutes without having to ask for permission to leave the office resulting in an advantage for the company and the worker
- many employees have been using the Internet at work for non-work-related activities so because of this, companies have started to monitor employees computer activities causing "bad feelings" in employees who may feel that they are not being trusted
- the cost to the company in extra bandwidth used when employees are downloading music *etc*.
- slowing down of the network and problems for employees who might be using the Internet for work related activities because of intensive use of the Internet for non-work-related activities
- the extra space needed on the hard disc.

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

SECTION B

Area of Impact: Education

2.   (a)   **Identify *two* information technologies, other than a webcam, necessary to broadcast these images and sounds on a Web site.**   *[2 marks]*

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

- Web server
- permanent Internet connection
- system software to host the Web site
- Web authorizing software
- Webcam software
- Web authorizing - please accept web authoring
- video and sound compression software.

Do not accept:
- program to run a video on the screen (quicktime, windows media)
- sound card installed in the computer
- or similar.

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

      (b)   **Identify *two* different locations for webcams in a school, other than in classrooms, and describe a different purpose for each.**   *[4 marks]*

Award [2 marks] for each location fully described up to a maximum of [4 marks].
Award only [1 mark] for only a partial description.
Award [0 marks] if only a location is identified.
Award [0 marks] for a second purpose which is same as the first.

N.B. Both purposes have to be different.

- school parking lot: monitor safe driving practices of students
- library: monitor theft of books
- hallways: monitor behaviour, safety and crowding conditions
- entrance to the school: monitor the admission of visitors to the school
- school canteen: to monitor appropriate behaviour while eating
- school playground: to monitor appropriate behaviour, in particular to ensure bullying does not occur
- bathrooms: monitor behaviour, students hide to smoke, harassment
- tutors / teachers interview rooms: to ensure that students are treated properly by teachers / to have proof of misbehaviour or lack of respect of students towards teachers.
- science labs: for security reasons to be able to act quickly in case there is an emergency with fire, gas, chemicals or any other.
- staff room: for security to check for unauthorized visitors.

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

(c) **Identify *two* groups of stakeholders and describe a different benefit**
for each which results from having webcams in a school. *[4 marks]*

*Award [2 marks] for each group of stakeholders with a description of a benefit up to a
maximum of [4 marks].*
Award only [1 mark] for only a partial description.
Award [0 marks] if only a group of stakeholders is identified.
Award [0 marks] for a second description which is the same as the first.

N.B. Both benefits have to be different.

- parents: observe truancy of their children from school
- visitors or prospective parents, or prospective students: learning more about the activities available in the school
- administrators: observe classroom activities without disturbing the class
- intruders: can familiarize themselves with facilities in the school
- school governors / school board officials: monitor school activities and check that school policies are being carried out
- local police / social services and attendance monitors: observe students who leave the school and control truancy
- teachers: they would feel backed up in case a student / parent tries to put up a story that wasn't true of what happened in class / interview the teacher
- teachers: able to trace student who damages, steals equipment
- students: may watch a class when they are absent, may follow a sports event
- students: feel safer.

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

(d) Discuss *three* social *and/or* ethical impacts of this course of action on students. Evaluate your arguments. *[10 marks]*

Award up to [4 marks] for each social and/or ethical impact fully discussed up to a maximum of [10 marks].
Award only [1 mark] for each impact if it is only stated.

N.B. All answers must refer to impacts on the students.

- privacy of students is invaded because their actions in the classroom can be observed at all times
- teaching methods may be observed by administrators without the teacher knowing (*only if this is stated as an impact on students*)
- students can be held accountable for their behaviour and whereabouts at all times
- video footage from the webcam could be recorded and used without the students' knowledge (*please do not accept if this is not stated as an impact on the student*)
- video footage from the webcam could be used in legal instances to verify a student or teachers' attendance in a class at a specific time
- ill students absent from school can keep up with what they have missed
- students behaviour or attitude may change - they will behave better or they may participate less if web cam is inside a classroom
- students will feel protected, - no more bullying or harassment.
- strangers may use the web cam information from the web site if it is not password protected

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

Area of Impact: Health

3. **(a)** **Describe *two* ways a doctor can use telemedicine. For each way identify the technology used.** *[4 marks]*

Award up to [2 marks] for each way fully described up to a maximum of [4 marks].
Award only [1 mark] for a partial description.

- sending a digital image (*e.g.* X-rays, CAT scan, pathology slide) via an e-mail attachment *[1 mark]* and description of use
- using video conferencing software and hardware (camera) for a real-time consultation between a patient and doctor in different parts of the country/world *[1 mark]* and description of use
- operating a remote peripheral device to perform a medical investigation *[1 mark]* and description of use
- operating a remote robotic device to perform telesurgery *[1 mark]* and description of use
- promoting the use of e-mail with his patients to ask questions that do not require an immediate answer. (Patients in rural areas may have access to e-mail from their local post office whenever they go into town.)
- participating in a forum or e-mail group with other doctors to discuss a topic
- setting up an online 24 hour health consultation centre (web site and e-mail)
- use of telemedicine technology by doctors to advise other doctors carrying out a procedure or consultation via e-mail, video conferencing, messaging.

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

(b) **Describe *two* software methods necessary to protect data used in telemedicine.** *[4 marks]*

Award [2 marks] for each software method fully described up to a maximum of [4 marks].
Award only [1 mark] for a partial description.

During transfer of patient information
- encryption – during transfer of data *[1 mark]* and description of purpose.

During storage of data at the remote location
- password protection *[1 mark]* and description of use
- firewall protection to protect data from illegal access by outside sources *[1 mark]* and description of use
- virus protection to prevent files being damaged or deleted by viruses *[1 mark]* and description of use
- backup software in case of hackers or hardware failure *[1 mark]* and description of use.

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

(c)   **Discuss *three* social *and/or* ethical issues resulting from telemedicine.**
         Evaluate your arguments.   *[12 marks]*

*Award up to [3 marks] for each social and/or ethical issue fully discussed up to a
maximum of [9 marks].*
*Award [1 mark] for an evaluation/weighing up of each social and/or ethical issue up to
a maximum of [3 marks].*
Award only [1 mark] for each issue if it is only stated.
Award a maximum of [12 marks] for the question.

- patients' lives could be saved by fast access to advice from a remote medical expert
- cost saving for hospitals as they can employ fewer specialists, cost saving in travel
  for patients
- privacy of patients could be in danger unless strict security measures are in place.
  These measures should include protection from unauthorized access and protection
  from data loss *e.g.* due to viruses
- patients' lives could be in danger if the data is not guaranteed to be reliable
- patients' lives could be at risk if integrity of data is not guaranteed. Who has write
  access, who updates the patient records?
- patients' lives could be at risk if authentication measures are not in place to establish
  the identity of medical experts
- telemedicine could provide greater accessibility to medical information for those in
  remote areas. It could also disadvantage those places where the technology is not
  available
- patients' lives could be at risk if standards and policies have not been created to
  ensure compatibility of electronic records between local and remote locations.
- training will be necessary for the medical staff involved in telemedicine. This could
  create new challenges and new job opportunities or could lead to redundancy for
  those who aren't able to be retrained
- legal issues may result if different laws apply in the patient's locality and the remote
  doctor's locality
- less face to face interaction between doctor and patient may diminish the quality of
  care
- errors in transmission could result in errors in diagnosis
- patients can continue to contact their own doctor, and not a stranger, when
  travelling.

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

Area of Impact: Arts, Entertainment and Leisure

4.   **(a)   Outline *two* reasons why adult game players would prefer to pay for playing games in a PC room rather than playing games on their own home computer.**   *[2 marks]*

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

- in the short term it is cheaper to pay the admission and play the games in the PC room than buy the computer games for home
- there is greater variety of games in a PC room than in most homes
- not all of the games which are used in the PC room in multi-user versions exist in single user versions
- players can play against other players with whom they can interact later face-to-face
- the high-end hardware capabilities in the PC room exceed most home computers
- adults would prefer to pay to avoid having the games at home where their children would use them
- PC rooms may be booked to organize championships
- there are no interruptions in PC rooms, like phone calls
- game room has an atmosphere of excitement, tension *etc*.
- security - avoids chance of virus, hackers invading home PC - may occur when visiting gaming sites - PC room can take care of this.

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

(b)   Describe *two* ethical responsibilities of the owners of PC rooms with regard to children.   *[4 marks]*

Award [2 marks] for each ethical responsibility fully described up to a maximum of [4 marks].
Award only [1 mark] for only a partial description.

- owners must make certain that children who are under age are not admitted to PC rooms *[1 mark]* and description of reason or example
- owners must make certain that children are not playing games which are not recommended for their age *[1 mark]* and description of reason or example
- owners should control the amount of time children spend in the PC room *[1 mark]* and description of reason or example
- owners should make certain that children can only play games within acceptable sound levels *[1 mark]* and description of reason or example
- block adults sites on Internet as children in games room are not under supervision of parents
- owners should provide noise reduction zones for children to use - provide designated areas for children, where sound from games is not loud, no smoking, different layout of computers.

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

(c) **Describe** *two* **advantages for game developers which could result from the increased number of PC rooms.**   *[4 marks]*

Award [2 marks] for each advantage fully described up to a maximum of [4 marks].
Award [1 mark] for only a partial description.

- development of games pushes the development of new technology in terms of better hardware, software and networks *[1 mark]* and description
- games which are seen to be successful in PC rooms may be adapted to home computers *[1 mark]* and description
- more revenue is generated to support further development *[1 mark]* and description
- game developers can use PC rooms as marketing opportunities to find out what their customer like
- game developers are given the chance to get exposure for their products - people will try games in PC rooms and then be encouraged to buy their own copies.

Do not accept advantages for game retailers that are not directly linked to game developers.

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

(d)   Discuss *three* **social** *and/or* **ethical problems which could result from the excessive expansion and use of PC rooms.   Evaluate your arguments.**   *[10 marks]*

Award up to [4 marks] for each social and/or ethical problem fully discussed up to a maximum of [10 marks].
Award only [1 mark] for each social and/or ethical problem if it is only stated.

- increased addiction to computer games in PC rooms by game players
- owners will pressure young people to enter the PC room to play games
- peer pressure to play games
- game addiction can result in loss of personal money
- danger that PC rooms are used to baby-sit children while parents work
- since there is a link between violent computer games and violent acts in society, there could be an increase in violent crime
- instances where the specialized computers are not ergonomically designed excessive game playing can result in health problems
- increased isolation of game players from social interaction leading to a deterioration in social and interpersonal skills
- temptation of children to stay away from school (during the day), or neglect their homework (in the evenings after school).

Do not accept answers on health issues on the lines of obesity and sedentary life styles.

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

Area of Impact: Science and Environment

**5.   (a)   Describe the hazards caused by disposal of *two* types of computer   *[4 marks]*
components.**

*Award up to [2 marks] for each type of computer component and hazard fully described
up to a maximum of [4 marks]. Award only [1 mark] for a partial description.*
*Award only [1 mark] for the identification of the computer component and a partial
description of the hazard.*
Award [0 mark] if no computer component is identified.
*Award up to [2 marks] if only one hazard is described for two types of computer
components.*

Disposal of the following computer components:
- printed circuit boards which contain heavy metals (*e.g.* antimony, silver, chromium, zinc, lead, tin and copper)
- lead soldering in printed circuit boards and other electronic components
- batteries, switches, and flat-screen monitors contain mercury
- non-biodegradable plastic components in casing.

Result in the hazard: pollution of groundwater from disposal in landfills causes health
problems for people and animals:

Disposal of the following computer components:
- wires burned to get copper (and steel) causes dioxin exposure
- broken glass from computer monitors (cathode ray tubes) causes toxic phosphor dust in the air

Result in the hazard: toxic compounds go into the air causing health problems:

Disposal of the following computer components:
- using acid baths and burning to collect bits of precious metals (*e.g.* gold, platinum) from microchips and motherboards.

Result in hazard: workers inhale toxic gases (*e.g.* acid fumes, chlorine and
sulfur-dioxide).

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

(b) **Describe** *two* **ways of reducing problems caused by disposal of hazardous computer components.** *[6 marks]*

Award [3 marks] for each way fully described up to a maximum of [6 marks].
Award [1 mark] for stating the way.
Award [1 additional mark] for a partial description.
Award [1 additional mark] for a complete description of the way of reducing problems or an example.

- recycling components *[1 mark]* and description
- take-back programmes where a producer takes back a product at the end of its useful life *[1 mark]* and description of the programme
- legislation to require manufacturers to improve the design of their products in order to avoid the generation of waste *[1 mark]* and description of an example
- upgrading rather than replacing *[1 mark]* and description
- donating the computer for reuse *[1 mark]* and description
- dispose through an authorized hazardous waste collection organization *[1 mark]* and description
- applying large fines when components are not disposed of properly to make people consider proper disposal methods.

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

(c) **Discuss** *three* **issues resulting from the practice of developed countries donating old computers to developing countries. Evaluate the overall impact.** *[10 marks]*

Award up to [3 marks] for each issue fully discussed up to a maximum of [9 marks].
Award only [1 mark] for an issue if it is only stated.
Award up to [4 marks] for a full evaluation and weighing up to a maximum of [10 marks].

- developing countries with few computer resources are provided with computers
- developing countries are in effect, "given" hazardous waste when the PCs become obsolete
- developing countries have to provide additional funds to accomodate/use the donated computers (*e.g.* electricity, storage, purchase of software)
- developing countries have to provide technical support for the use of the computers
- developing countries will need IT trainers and training in order for the computers to be used
- no worldwide legislation exists (*e.g.* legislation has been passed in EU countries banning export of hazardous materials to developing countries, China passed laws banning e-waste importation which caused corruption)
- developing countries which export old computers are not liable for any of the damage that is caused
- people from developing countries who would not have access to computers will now have them and with them access to the Internet and this could change local customs *e.g.* craft manufacture but could also give exposure to local craftsmen.

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

Area of Impact: Politics and Government

6.   (a)   **Apart from a computer, identify *two* things required to place a vote online.**   *[2 marks]*

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

- modem
- ISP or an Internet connection
- web browser
- logon ID/password
- an instructions manual or the URL.

Do not accept components of a standard PC.

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

(b)   **Describe *one* method by which the voter's authenticity can be established.**   *[2 marks]*

Award [2 marks] if the method is fully described.
Award only [1 mark] for a partial description.

- logon ID and password *[1 mark]* and description of uniqueness (*e.g.* the voter is sent the information)
- digital signature *[1 mark]* and description how it establishes authenticity
- biometrics *[1 mark]* and description how it establishes authenticity

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

(c)   **Evaluate *two* benefits of online voting.**   *[4 marks]*

Award up to [2 marks] for each benefit fully evaluated up to a maximum of [4 marks].
Award only [1 mark] for each benefit if it is only stated.

- cost saving for the government by not needing to employ staff at polling booths *[1 mark]* and evaluation
- time is saved in determining results so new government can start work *[1 mark]* and evaluation
- time saving for voters (*e.g.* no need for postal votes in isolated areas, no travel time needed to go to polls) *[1 mark]* and evaluation
- less paper is needed, an environmental advantage *[1 mark]* and evaluation
- people can vote from areas distant from a polling station *[1 mark]* and evaluation
- people are more likely to vote if they can use the convenience of the Internet at home *[1 mark]* and evaluation
- accuracy of a computer counting results compared with manual counting - It is harder to cheat the system with evoting compared with manual counting

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

(d)   **Discuss *three* social or ethical issues resulting from online voting.**
  Evaluate your arguments. Do not repeat issues discussed in part (c).   *[12 marks]*

*Award up to [3 marks] for each social **and/or** ethical issue fully discussed up to a maximum of [9 marks]*
*Award [1 mark] for the evaluation of each social **and/or** ethical issue up to a maximum of [3 marks].*
Award only [1 mark] for each issue if it is only stated.
Award a maximum of [12 marks] for the question.

- reliability of hardware/software (*e.g.* system down, bugs, viruses, *etc.*).
- privacy of the voters (*e.g.* how can voter be certain that their vote is kept secret, who has access?)
- equality of access (*e.g.* aged, disabled people who do not have Internet access etc.)
- changes in employment (*e.g.* reducing need for election day staff/counter-balanced by increase in IT-related jobs)
- cost in infrastructure/training (*e.g.* who pays for capital investment in infrastructure/training?)
- online voting may increase participation of the electorate
- people trained to teach how to use the system would have to be present in voting centres.

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