

WELCOME TO AAQIL'S INFO2 AQA AS
LEVEL ICT REVISION GUIDE



This revision guide contains all the specific topics that you want to revise. This is made to absorb all the key fact and information. This booklet is more organised and have more genuine exam questions and answers which will help you to understand the feeling of the real exam. This revision guide has been tested and proved that it is better than the original text books given from school and the other cheap revision guide.

CONTENT

SECTION 1: ICT SYSTEMS AND THEIR COMPONENTS.....	3
EXAM QUESTIONS.....	4
ANSWERS.....	24
SECTION 2: ICT SYSTEMS AND THEIR COMPONENTS.....	5
EXAM QUESTIONS.....	6
ANSWERS.....	24
SECTION 3: PEOPLE AND ICT SYSTEMS.....	7
EXAM QUESTIONS.....	10
ANSWERS.....	25
SECTION 4: TRANSFER OF DATA IN ICT SYSTEMS.....	11
EXAM QUESTIONS.....	12
ANSWERS.....	27
SECTION 5: SAFETY AND SECURITY OF ICT SYSTEMS.....	13
EXAM QUESTIONS.....	15
ANSWERS.....	29
SECTION 6: PROCEDURES FOR BACKUP AND RECOVERY.....	16
EXAM QUESTIONS.....	18
ANSWERS.....	30
SECTION 7: THE USE OF ICT SYSTEMS.....	19
EXAM QUESTIONS.....	20
ANSWERS.....	30
SECTION 8: FACTORS AND CONSEQUENCES OF ICT.....	21
EXAM QUESTIONS.....	23
ANSWERS.....	32

SECTION 1: ICT SYSTEMS AND THEIR COMPONENTS

What is ICT? – Use of technology for the input, processing, storage and transfer of data and the output of information.

What is a system? – Three basic stages – Inputs, Processes and Output

- Photos from camera → Edited on computer → Improved pictures

Input is data that is entered via an input device such as keyboard.

Processing is the calculations, queries and other operations are performed on the data.

Output is the results of the processing that are sent to an output device such as a monitor.

ICT systems – where the output from the system goes directly to a human being or into another ICT system.

Components of ICT systems

- **People** – Involved at every stage of a development, with no ICT system able to function with the input of human interaction. Large organisations split work up between departments. These include sales, purchasing, finance and operations, with all levels using a form of ICT system.
- **Data** – System will not compute properly if it does not have the fundamental building block of data to build on. Can be input in a variety of ways, from keyboards, bar-code readers, scanners and cameras.
- **Procedures** – Codes of practice and rules as to how the ICT system can be used. Is governed by laws – Data Protection Act, Computer Misuse Act, Copyright, Designs and Patents Act and Freedom of Information Act. Correct procedure is followed to ensure data reliability is upheld and all information is kept safe.
- **Software** – Used to carry out processes. Office suites, video editing software, photoshop, etc.
- **Hardware** – Computer and hardware peripherals are dependent on the type of processing and output intended for a task. These include : storage space, processing power, output devices such as laser printers
- **Information** – Information is data that has been processed, in order to give it meaning. A chart or graph to show annual snowfall in a mountain range.

EXAMINATION QUESTIONS

SECTION 1: ICT SYSTEMS AND THEIR COMPONENTS

(1) What is an ICT system? (4 marks)

(2) Complete the following list of the components of an ICT system. (4 marks)

Data

Hardware

(3) Explain what is meant by Information and Communication Technology (ICT). (4 marks)

SECTION 2: DATA AND INFORMATION

- ICT systems input data which is processed to convert it to information.
- If good quality information is produced, it can be used by humans to aid the decision-making process.
- *“Having access to the facts is not the key; everyone receives more or less the same information. In fact, we are drowning in information, but often starved for knowledge. The trick is to filter out correct knowledge; to pull useful information from the endless sea of computerised data.” – Megatrends – John Naisbitt, 1982*
- A good information system will present each person with information that is useful to them, in a form that makes it easy for them to use.

What is data? – Raw facts or figures – sets of values. Data can arise in other format as well as text and numbers. It can also take in the form of moving images or sound.

Coding – when data is coded before storage and this changes original data into a shortened version by assigning a code. By assigning a code, it keeps the data short. For example: Gender: M or F for Male or female. Questionnaire answers: Y or N for Yes and No.

Encoding – Encoding is used by all computers to convert the data into machine-readable form.

ASCII is used to symbolize the characters as a binary number.

BAR CODES – It is a series of bars and spaces represents the code numbers which are read by a bar code scanner. It can read from different angles, upside down, automatic check for data entry errors, using validation. Another coding that is seen on most printed books is known as the ISBN. ISBN is similar to bar codes.

What is processing?

Processing is the work done by computers to convert it to information.

What is information?

Examination results in a bar chart, formulated from a schools database of its pupils.

What makes information valuable?

ACCURACY – Decisions, often important ones, are made when certain information is considered, so inaccurate information will mean key decisions may be made wrongly. It is very important that information is accurate.

UP-TO-DATE – Some information only has value within a specific timescale, for instance share prices can change several times in a minute, and so buying recommendations that are produced would change quickly and have no value at all once they were out of date.

COMPLETE – If a house is to be evaluated for insurance purposes, and a bit gets missing, then it will not be insured properly, due to missing information. Information must be complete so that it does not lose its value.

RELIABLE SOURCE – Individuals are encouraged to go to trusting sources like the BBC website or trusted newspapers or other recognised organisation.

RELEVANT – Information is only valuable to person if they have a use for it and its value depends on that potential use. For e.g. sales report that shows sales of individual staffs.

EXAMINATION QUESTIONS

SECTION 2: DATA AND INFORMATION

(1) Explain, with the aid of examples, the different forms that data can take. (6 marks)

(2)(a) *Define the term information. (2 marks)*

(2)(b) *State **three** factors that affect the quality of information. (3 marks)*

(3)(a) *Before this data is entered into a data processing system the customer's gender is coded as M or F and their age group is coded as 1, 2, 3 or 4. Why is this data coded before it is entered? (3 marks)*

(3)(b) *When the coded data is entered into a data processing system it is encoded. Why does the data need to be encoded? (1 mark)*

(4) You use the Internet to research information for an essay that you are writing. Explain, using examples, why there might be problems with using information obtained in this way. (6 marks)

SECTION 3: PEOPLE AND ICT SYSTEMS – DESIGN AND PURPOSES

ICT systems are designed with a purpose in mind, and also with the people operating them too. The client, end user and audience of a system each have different **requirements** of an ICT system.

The London Ambulance System, which failed the job, it was meant to do on the grounds of it being:

- Not being cost benefit
- Tested properly
- Up to the standards of the clients and end users
- Realistically targeted

Characteristics of users

- Experience
- Physical characteristics
- Environment of use
- Task to be undertaken
- Age

Some may be experts, some novices, preferences on hardware or interface they would like to use, different degrees of skill and experience.

Older users react more slowly to younger peeps, and so the ability to adjust the speed of cursor movement and the rate at which they to double click an icon can make a large difference to their confidence.

Environmental factors like quiet office software will need to be played through headphones. A system in a loud factory will need visible rather than audible output.

A task to be undertaken will affect the **user interface** in which the ICT system will show. A concept keyboard in a restaurant will help operatives better with orders. A graphic artist with a graphics tablet to better mimic movements of drawing aids.

How users interact with ICT systems

Most systems rely on keyboard, mouse and monitor for their interface, although as previous sections have shown, many other output devices can be used to suit particular circumstances.

Most common interface is GUI – Graphical User Interface – icons, pictures that are easily understood by the user and can be clicked using an input device. WINDOWS, ICONS, MENUS, POINTERS.

Menu driven interfaces can be useful in situations where the user needs to be restricted to a limited choice of actions.

Command line interfaces – It is used by expert users, because they are more difficult to learn than other types of interfaces. It relies on text based commands being inputted into the system. Do not make a heavy demand on system resources or memory.

Interface design for effective communication

Having a natural way of interfacing with computer system allows individuals to better operate computer systems.

Touch - simulators used for training can have sensitive gloves that respond to touch

Sight and hearing – multimedia tools such as sound and video can be used to demonstrate features of software

Help and support

Software training packages build on user's responses. Search facility or context sensitive help may be provided.

Positives and negatives of user interfaces

GUI – USER FRIENDLY MAKING SOFTWARE MORE INTUITIVE

May be frustrating for experienced users who need to access a command quickly but has to go through numerous levels of menus to get there.

Uses a lot of system memory and resources usually

CLI – Considerable a lot of expert knowledge to operate

Far less demanding in terms of system resources

Menu-driver interface – It restrict the options selectable by a user. It is good for a public ICT system as it gives only strict options. Used effectively with touch screen systems.

Working in ICT

Skills required for jobs –

- Good written communication skills – must have the ability to write technical documentation and end user guides.
- Good oral communication skills – can communicate effectively with users or colleagues. The ability to ask appropriate questions and respond to the needs of the end user, taking account of the skill level of the user to ensure the professional has a full understanding of the problem.
- Problem solving skills – analyse and solve problems is useful in many ICT jobs and working on a help desk and solving users' problems is an obvious example. Logic is essential for programmers and system designers so that interaction between a computer and a systems designer is effective.
- Patience – patience and approachability will allow ICT professionals to better allow their end user to understand the workings of their system, not getting them flustered or anxious about what is being produced
- Work flexible hours – seeing a task through to the end of time so that it gets done, and working extra hard when it gets urgent.
- Teamwork – teamwork skills are vital so that it share information with each other and support each other.

Characteristics of an effective ICT team

- Team leader must ensure that the team members work together in an organised and effective manner to ensure deadlines are met. Encouragement=motivation.
- Tasks are allocated to individuals who have the necessary skills to complete them

- Structure in place so that the practices of the organisation are followed –protocol is followed and documentation produced – specification, design, test plans, user guides.
- Monitoring of the task is being done to ensure the project is completed to schedule. Monitoring will ensure everyone is working at the same pace
- Costs are monitored to ensure project is to budget
- Focus should be on goals and user's requirements
- Balance should be made between those with the same according skills – programmers, analysts, designers
- Good communication skills with everyone

EXAMINATION QUESTIONS

SECTION 3: PEOPLE AND ICT SYSTEMS – DESIGN AND PURPOSES

(1)(a) Give **three** personal characteristics required for the IT technician to work effectively, and explain why you consider each of these characteristics would be essential for this job. (6 marks)

(1)(b)(i) As well as IT technicians and managers, there are many other jobs that are available to ICT professionals. Identify another job that would require an ICT professional. (1 marks)

(1)(b)(ii) Identify a personal characteristic and explain why it would be essential for the ICT professional that you identified in part 1(b)(i). (2 marks)

(1)(c) ICT professionals often work in teams. Describe, with the aid of examples, the characteristics of an effective ICT team. (8 marks)

(2)(a) You have been asked to design a mobile phone for older users. What would you need to consider when designing the user interaction with this mobile phone? (8 marks)

(2)(b)(i) Explain, giving reasons for your choice, what type of interface you would recommend for this phone. (4 marks)

(2)(b)(ii) Which types of interface would you **not** recommend for this phone and why? (4 marks)

(2)(c) These phones are to be marketed to younger people who have particular needs. What changes would you recommend to the interface? (4 marks)

(3) What characteristics of users should be considered when designing an ICT interface? (4 marks)

(4)(a) The Smith family has decided to have a family website. Mr. Smith will use specialist design software to produce the website. This software has a Graphical User Interface (GUI). *Explain what features of a GUI would make it suitable for Mr. Smith (5 marks)*

(4)(b) *Mr. Smith is not an expert in the use of the design software and will need help and support. Discuss how appropriate help and support could be provided for the users of this software. (12 marks)*

(5)(a) A national supermarket chain surveyed their customers and found that 10% of shoppers who left a store without making a purchase said that excessive waiting time at the checkout was the reason for their decision. The chain has decided to introduce self-service checkouts. The self service checkout would be used by a variety of customers. Discuss what should have been considered when designing the **interaction** for users of the self-service checkout. (8 marks)

(5)(b) The self-service checkout makes use of a Graphical User Interface (GUI). Explain why a GUI enables effective communication between users and the self-service checkout shown. (6 marks)

SECTION 4: TRANSFER OF DATA IN ICT SYSTEMS

What is an ICT network?

Networks are made up of thousands of different computing devices and transmission media. These include LANs and WANs, those that could reach people in a set area or over countries, respectively.

Intranets and Extranets

Internal within a school or business where individuals can send data to each other without sending it to everyone in an organisation. Internal e-mail within the intranet allows users to send messages quickly. A private computer network that only does connected to it can access.

An extranet is a part of an organisation's network that can be made available to outside users; however, this has obvious security implications.

Characteristics of a network

P2P

A network is a simple connection between two computers linked together so that they can share some files and a printer. If more than two computers are involved then a hub can be used to provide the connectivity. A peer-to-peer network can use all the computers in a network, connected to it as workstations, and so it is cheaper than a client-server network.

Client-server networks

In bigger organisations, servers are used for people to access resources required to their job. In this type of network, the server is connected to a network switch that joins multiple computers together at the data link network protocol layer. Each client's workstation will need the according operating system. The application software is either installed on the servers or on the workstations themselves. Client-server networks have some advantage over P2P. They can be managed and backed up centrally and it is easier to concentrate resources such as security and maintenance on one main computer.

Use of communication technologies

The Internet – It is a large group of interconnected computers around the world that allow the sending and retrieval of information from one computer to another.

The World Wide Web – It is a collection of multimedia resources accessible via the Internet.

Standards

De facto – No formal agreement, law or provision put in place for a particular hardware or software, but is the one that has become common practice to use. **E.g.** the GIF format for images on the web, or the use of Windows OS is de facto standards for some businesses.

De jure – It is legally binding industry standard that all manufacturers must adhere to. For e.g. Wi-Fi, developed by the Institute of Electrical and Electronic Engineers (IEEE) to Minimises compatibility issues.

EXAMINATION QUESTIONS

SECTION 4: TRANSFER OF DATA IN ICT SYSTEMS

- (1) Explain what is meant by the terms the *World Wide Web* and the *Internet*. Your explanation must show that you understand the difference between the two terms. (3 marks)
- (2) Explain, using examples, the need for standards when transferring data. (4 marks)
- (3)(a) Give **three** benefits of using computer networks. (3 marks)
- (3)(b) *Intranets and extranets are networks. Describe their characteristics.* (4 marks)
- (4) Discuss the reasons why people away from the home and their workplace make use of wireless networking and any problems they might experience when using it. (8 marks)
- (5) Describe the characteristics of the Internet and the World Wide Web. (4 marks)
- (6) You need to upload and send some pictures from your digital camera via the Internet to your Uncle who lives in New Zealand. Standards exist that allow pictures to be uploaded and sent in this way. Explain why these standards are needed. (4 marks)

SECTION 5: SAFETY AND SECURITY OF ICT SYSTEMS

It is more important in today's 21st century to protect the digital and online information we save about ourselves. Data stored by organisations is binded by the laws of the Data Protection Act of 1998. The introduction of the computer for data processing has increased the need for automated tools for protecting data stored on computers.

Threats to ICT systems

Internal threats

Employees – Over 50% of threats caused to ICT systems are caused by employees within the business. Bradley Manning and SIPRNet when working for army and gave files to Wikileaks.

Human error

Having passwords stuck to monitors to remind peeps about the passcode to get in. Employees with malpractice and crime. In November 2007, misplacement of DVDs with child benefits data on it.

Viruses

External and internal threats as those with removable media can infect a system, or externally, through the Internet.

Spyware

Data that is stored on internal computer systems is sent to an external source without you even knowing and certainly without your permission. Passwords for internet banking might be stolen, perhaps by the monitoring of keystrokes. Networked computers can spread infection quickly and easily by hackers.

Reasons

- Satisfaction
- Personal gain
- Financial gain
- Sabotage

Types – Data access – gain control of data during transmission

-Service threats – stop the data being used by the organisation it belongs to by disrupting the normal running of the software.

Means of control of threats

Data encryption – scrambling data and then re-scrambling at the intended destination

How are ICT system protected?

Hardware – simply locking doors, securing computers to surfaces

Software – setting access rights, installing network security software, logging peoples' account activity, data encryption, anti-virus, firewalls

Procedures – Should be made clear in induction training what employee responsibilities are in regards to data security. Having penalties and tapped wrists when people are bad-boys and

girls. Employees must follow Company's ICT code of practice. They must change password regularly for security reasons.

Legislation

Data Protection Act 1998 – companies must first register with Information Commission about what data is to be held. Data subjects have the rights to:

- See what data is being held about them
- To have any errors corrected
- To refuse to allow data to be processed for third parties
- To refuse to allow sensitive data to be processed
- to complain to the data commissioner about abuse of data
- To claim compensation if damage has been caused by misuse of the act.

Data Protection Commissioner must:

- Enforce and oversee the Act
- Raise awareness of the Act
- Investigate complaints

Computer Misuse Act 1990 – The unauthorised entry into a computer system is punishable as it is a criminal offence.

- 1) Unauthorised access to computer material
- 2) Unauthorised access with the intent to commit a further crime
- 3) Unauthorised modification of computer material

Level 1 – maximum prison of 6 months or £2000 or both

Level 2 & 3 – prison sentence of at the most, five years

Action to deal with misuse

Preventive measures

- Training employees about their responsibilities as workers of a company
- Including user names and passwords
- Firewalls
- Anti-virus software

Copyright, Designs and Patents 1988

The actual creation of the software. The coding of a piece of software is protected and it is bound by the laws of the Copyright, Designs and Patents Act.

EXAMINATION QUESTIONS

SECTION 5: SAFETY AND SECURITY OF ICT SYSTEMS

(1)(a) In relation to the use of ICT systems, and using an example for each, describe what is meant by malpractice and crime. (4 marks)

(1)(b) Measures can be taken to protect ICT systems. Explain what measures you would take to protect an ICT system and why you would take them. (12 marks)

(2)(a) *Using pirated software, which is not licensed, is a crime. What is the name of the current legislation which makes it illegal to use unlicensed software? (1 mark)*

(2)(b) *You are a data subject and will have personal data stored about you by different organisation. Explain, using examples, what is meant by a data subject and personal data. (6 marks)*

(2)(c) *Discuss the issues that concern people regarding the privacy and security of data in ICT systems. (10 marks)*

(3) Describe, using an example for each, what is meant by an internal threat and an external threat to an ICT system. (4 marks)

SECTION 6: PROCEDURES FOR BACKUP AND RECOVERY

It is very important in the business world because if data get corrupted, then there is something to fall back on.

Backup strategies

- What needs to be backed up?
- How often needs back up?
- When does the backup happen?
- Which back up media to use?
- Who will be responsible?
- Where will the data be stored?

What needing to be backed up is dictated by the size of the organisation and the value of the data.

What type? - 3 different types of back up available

Full backup – literally, all the data in one go, at the same time. Good if there is not enough time to do back-up quickly and you have limited resources. Can take a while to do so, a full back-up is done weekly or monthly.

Differential backup – Only data that has changed since the last back-up gets done. The back-up file can sometimes get larger than a full backup file if done too many times. This type of backup takes longer than incremental.

Incremental backup – save all the files that have changed since last backup, be it full backup, differential or even incremental. Slow restore method.

How often?

How often the data changes and how much the organisation is prepared to lose. There is the possibility of losing a day's worth of information if a hard drive gets corrupt when the data changes from the previous night, into the next. Companies use RAID drivers that save data onto multiple discs in a process called "mirroring." The failed drive in the "disc array" would simply be hot-swapped for another, without the network having to shut down. Good for mission critical servers as service can remain continuous.

When?

Overnight when the data files are not in use. Program and system files rarely change so can be backed up once they change.

Types of storage media used in back-up

Magnetic tape – cheap, large volume, fast write speed, slow to find archived data.

Hard disks – more affordable, high capacity and easy to use. Low access times

Optical discs – data can be accessed directly, leading to quick recovery times. Only 700MB so home backup not industrial. Standard at home are CD writers.

Remote backup service – advent of broadband means upload times have gotten smaller, if at risk of natural disaster, data can be transferred quickly **off-site**. Security risks if information is going through the “air.”

Recovery

People having the responsibility of ensuring data gets backed up – administrators having a recovery disaster plan in place that will make getting data back easier.

Where stored?

It can be stored off-site, safe remote location away from original PC or server. Secure location that a thief could not access.

Continuity

The need to recurrently back up data somewhere. This makes things worse if this doesn't happen. Back-ups need to have an uninterruptable power supply.

Disaster recovery plan (DRP) should be put in place in order for:

- Trading to resume quickly
- Give people confidence in a company
- Retain customer who might change companies

EXAMINATION QUESTIONS

SECTION 6: PROCEDURES FOR BACKUP AND RECOVERY

(1) Many organisations such as retailers are expanding their e-commerce operations and need ICT systems that are available 24 hours a day every day of the year. It is important for their customers that the ICT systems are kept working. E-commerce operations have specific needs for the backup and recovery of their systems. Describe how these needs could be met. (10 marks)

(2) *Loss of data because of a system failure on a home computer network can be a serious problem. Discuss what factors you would need to consider when backing up data stored on your home computer network in order to prevent such data loss. (8 marks)*

SECTION 7: USE OF ICT SYSTEMS

What can ICT provide?

Fast, repetitive processing – perform calculations quickly, at high speeds where complex sets of variables are involved.

Vast storage capacity – much smaller physical space but means of technology provided ways of storing shit electronically and in large volumes – Census data

Improved search facilities – Search and combine data that would otherwise be impossible - for e.g. Doctors looking up for patient in a database instead of rifling through lots of personal paper data.

Improved presentation of data – presented in a greater variety of ways, and through a greater set of output methods.

Improved accessibility – It is available to people in a variety of formats such as Internet

Improved security – Data is a lot more secure such as encryption of data possible

Appropriateness of ICT systems

Limitations – it may be cost effective to choose an alternative method of solving a problem, other than using ICT. GARBAGE IN GARBAGE OUT (GIGO), ICT cannot model opinions.

Types of processing

Batch – data is collected in groups or batches before processing. There is not that much interaction between user and computer, can be done overnight. It is a periodic thing like weekly, monthly, even yearly type of process. Scheduled timed processing, involving large quantities of data.

Examples: payroll system – pay is calculated, put on wage slips then given out as an output. Power supply bills – readings grouped, processed when all have arrived, bills issued.

Interactive – when there is an interaction between user and computer system – user reacts to prompts on computer screen. Real-time processing with data processed at the same time it is input and output is also immediate.

Example: a kid looks up ISBN number of book in library database and sees if it's currently checked in or out, on-screen, instantaneously.

Transaction processing – allows many users to access and update a system at apparently the same time. Work quickly with a large amount of different transaction taking place.

Example: Passengers booking seats at a travel agent and to find out if seat is free, needs to look up on the database. Require immediate up-to-date information that is constantly updated on screen. Once booked, the flight information must be sent and saved to not allow **double-booking**.

EXAMINATION QUESTIONS

SECTION 7: USE OF ICT SYSTEMS

(1)(a) Explain the type of processing that would be suitable for each of the following ICT systems.

Generating and sending out monthly bills (2 marks)

(1)(b) Internet banking (2 marks)

(1)(c) Instant messaging (2 marks)

(2)(a) Explain why the following types of processing are suitable. Transaction processing for recording withdrawals from ATMs. (2 marks)

(2)(b) Batch processing for producing the staff monthly payroll in a large company. (2 marks)

(2)(c) Interactive processing to allow the use of wizards in software packages. (2 marks)

(3) The Head of the English department at a school needs some advice in order to modernise the way her department organises, stores and makes use of its teaching resources. The department uses a wide range of resources including books, printed and electronic worksheets, presentations and films. Using your knowledge of what ICT can provide explain, with examples, what advice you would give her. (12 marks)

(4) Members like to be able to access social networking sites at any time of the day or night. Discuss the ways in which the social networking provider could undertake backup and recovery operations whilst ensuring continuity of service. (10 marks)

SECTION 8: FACTORS AND CONSEQUENCES OF ICT

Factors influencing the use of ICT

Cultural – ICT can affect the way we communicate with each other, view cultural material such as movies or music, produce art, music and film. The Use of banking systems to take out money, use of IM software and e-mail, teleworking makes socialising and communicating face-to-face a lot more difficult to achieve. In another cultural sense, sharing music, art and images using Youtube and MySpace has made this a lot easier.

Economic – Investing in new ICT systems means that businesses can trade more efficiently, as they upgrade. Not investing in ICT systems means that businesses will find it difficult to trade or not even exist at all.

Environmental – Using technology like video-conferencing and teleworking means less people have to travel, saving people's carbon footprints and their money. Unwanted equipment, however, needs to be recycled more efficiently. WEEE directive allows for the recycling.

Reduce, Reuse, Recycle.

Ethical – One item often found in a company's code of practice might relate to the use of the Internet. The use of e-mail for private use, accessing inappropriate sites and the Internet for personal reasons, for example; booking a holiday

Legal – The Data Protection Act requires data to be kept secure, for example, credit card numbers, which can be a problem for organisations that provide online shopping. Many companies use an **intermediary** such as **Pay Pal** but have to pay a **fee** to use the service.

Social – ICT affects the way society works and the ways in which people interact with each other. A person working away from the office using teleworking has become a popular way of being in the office, but not actually being in the office. For example; Mobile phones, Text messaging, Use of e-mail, Webcams across the world, Online shopping, Leave messages via voicemail, Online banking and NHS direct

Consequences of the use of ICT

Individuals - MySpace and Facebook are becoming popular substitutes for actually socially interacting with people. They waste valuable time and company resources when individuals use them, when they should actually be doing something more productive.

Employment – old jobs have disappeared, with plenty new jobs being created in the ICT sector. Call centres are an example of this. Just-in-time strategy means that communication systems involved in, let's say construction, means that all people need to be constantly updated on the whereabouts of materials and where the project is in terms of construction.

Computers in society

The uses of ICT for individuals to get by in their lives are growing.

E-Learning – Using the internet to do a degree, online learning systems, intranet in a school to hand in work in electronically, and have it assessed. Good for those people who cannot attend a traditional school.

E-government – The use of ICT to determine policies, online voting, and government legislation is used to protect ICT systems. Setting up of www.direct.gov.uk which now allows people to directly sort out car tax, buy fishing license or driving stuff.

E-commerce – major players now need a high street or physical store AND an online representative of their business. Amazon deals with their products directly online, and with people like British Airways always constantly updating theirs.

Access to information

Speed of access, reliability of information and wide access of information can make access the information available to people endless. Information can be much easier to update.

Consequences of the use of ICT

The increase usage of computers in society comes an increasing risk of over dependence on them, believing that computers will work in an efficient manner and nothing will go wrong with them. The first risk is the fact that there may be some kind of failure within the program itself, causing the program to run inefficient manner or not at all.

EXAMINATION QUESTIONS

SECTION 8: FACTORS AND CONSEQUENCES OF ICT

- (1) What are the implications of e-commerce for society? (8 marks)
- (2) *The use of ICT can be influenced by economic factors. Give **two** other factors that can influence the use of ICT. (2 marks)*
- (3) How is the use of ICT affected by concern for the environment? (6 marks)
- (4) Social networking websites are popular with many people. The ethical use of these sites can be a matter for concern. Describe the ethical issues that might arise as a result of the use of social networking sites. (6 marks)

SECTION 1: ICT SYSTEMS AND THEIR COMPONENTS

(1) What is an ICT system? (4 marks)

- *An ICT system is one that involves input (1), processing (1) and output (1) where the output goes directly to a human being (1)*
- *An ICT system consists of data (1), people (1), procedures (1) and hardware (1)*
- *An example of an ICT system is a company payroll system (1) where the input would be the hours worked (1), the processing would be calculating the pay by multiplying the hours worked by the hourly rate (1) and the output would be the wage slip (1)*

(2) Complete the following list of the components of an ICT system. (4 marks)

Data
Hardware
People
Procedures
Software
Information

(3) Explain what is meant by Information and Communication Technology (ICT). (4 marks)

ICT means the use of technology for the input of data (1), storage of data (1), processing of data (1) and output of information. (1)

SECTION 2: DATA AND INFORMATION

(1) Explain, with the aid of examples, the different forms that data can take. (6 marks)

Data must be numeric (1) to allow calculations to be performed (1) e.g. the sum of two values is 15 (1). Data can take the form of text (1) e.g. a file containing a word processed letter (1). Data can be in the form of moving images (1).

(2)(a) Define the term information. (2 marks)

Information is processed data (1) which gives it context or meaning (1)

(2)(b) State **three** factors that affect the quality of information. (3 marks)

The quality of information can be affected by:

- How up-to-date the information is
- How accurate the information is
- How relevant the information is

(3)(a) Before this data is entered into a data processing system the customer's gender is coded as M or F and their age group is coded as 1, 2, 3 or 4. Why is this data coded before it is entered? (3 marks)

Data is coded before it is entered into an ICT system so that it can be validated more easily (1). When it is stored it takes up less space (1) and this means a lot more forms can be stored on the same disk (1).

(3)(b) *When the coded data is entered into a data processing system it is encoded. Why does the data need to be encoded? (1 mark)*

Data is encoded when it is entered to convert it into a form that the system/computer understands (so that it can be processed effectively) (1)

(4) You use the Internet to research information for an essay that you are writing. Explain, using examples, why there might be problems with using information obtained in this way. (6 marks)

The information could be out of date (1) because the website has not been updated (1), for example census figures from 1991 are being used to predict housing requirements in 2011. (1) The information might be wrong or not be accurate. (1) A photograph that I download might be subject to copyright (1) so I must acknowledge the source. (1)

SECTION 3: PEOPLE AND ICT SYSTEMS – DESIGN AND PURPOSES

(1)(a) Give **three** personal characteristics required for the IT technician to work effectively, and explain why you consider each of these characteristics would be essential for this job. (6 marks)

- ***Good** written communication skills (1) in order to maintain existing documentation accurately (1)*
- ***Good** oral communication skills (1) in order to be able to explain effectively how to solve ICT problems when taking calls at the help desk (1)*
- *A **good** team worker (1) in order to contribute to departmental IT projects (1)*

(1)(b)(i) As well as IT technicians and managers, there are many other jobs that are available to ICT professionals. Identify another job that would require an ICT professional. (1 marks)

- *One example of a job that would require an ICT professional would be a Systems Analyst (1)*
- *Writing systems maintenance documentation is a job which would require an ICT professional. (1)*

(1)(b)(ii) Identify a personal characteristic and explain why it would be essential for the ICT professional that you identified in part 1(b)(i). (2 marks)

- *(For Systems Analyst) **Good** written communication skills (1) in order to write documentation that could be easily understood by the System Designer (1)*

(1)(c) ICT professionals often work in teams. Describe, with the aid of examples, the characteristics of an effective ICT team. (8 marks)

- **Appropriate** allocation of team member to task (1) play to strengths of team member (1) e.g. send a networking specialist to solve a problem relating to a network server (2)
- **Effective** team communication (1) so team members can explain tasks clearly to each other (1) e.g. using agreed methods of communication e.g. minutes and agendas via email (2)

(2)(a) You have been asked to design a mobile phone for older users. What would you need to consider when designing the user interaction with this mobile phone? (8 marks)

- *Users may have restricted vision (1) therefore large size of text should be available on both buttons and screen (1) to help them read it more easily (1)*
- *Users may have restricted dexterity e.g. arthritis (1) therefore big buttons should be available (1) to enable them to be pressed more easily (1). Also a voice activated interface could be provided (1) so they would not need to use their fingers as much (1)*
- *The type of user interface needs to be considered (1) because it should match the needs of the target user (1) e.g. an interface providing a limited number of options (1) would be suitable for older users as it is less confusing.*

(2)(b)(i) Explain, giving reasons for your choice, what type of interface you would recommend for this phone. (4 marks)

- A Menu driven interface would be suitable (1) because it is a simple interface which is easily understood (1). You can only choose from a set list of options (1) which will reduce user errors (1)
- GUI (1) because it has icons (1) where text might be too small (1) because the elderly often have poor eyesight (1)

(2)(b)(ii) Which types of interface would you **not** recommend for this phone and why? (4 marks)

A command line interface (1) would not be suitable because the user is unlikely to have the experience to use it (1) and commands have to be remembered (1) A GUI would also not be suitable. (1)

(2)(c) These phones are to be marketed to younger people who have particular needs. What changes would you recommend to the interface? (4 marks)

- *An icon could be provided for the camera (1) because younger people may use the camera feature frequently (1) which would enable them to get to it faster (1)*
- *If the phone has been designed for older people it (1) it could be used by younger people with physical impairment (1) without any changes (1)*

(3) What characteristics of users should be considered when designing an ICT interface? (4 marks)

Age (1) of the user should be considered when designing an ICT interface as older users may not be able to react as quickly (1). Experience (1) should be considered and physical characteristics (1).

(4)(a) The Smith family has decided to have a family website. Mr. Smith will use specialist design software to produce the website. This software has a Graphical User Interface (GUI). Explain what features of a GUI would make it suitable for Mr. Smith (5 marks)

Windows / Icons / Menus / Pointers (1). Windows allow switching between different views (1). Icons provide pictorial shortcuts to other features of the program (1). Menus provide a structure that displays a list of the available options (1). Using pointers allows objects to be dragged and dropped (1).

(4)(b) Mr. Smith is not an expert in the use of the design software and will need help and support. Discuss how appropriate help and support could be provided for the users of this software. (12 marks)

The first stage might be to read the software manufacturer's printed user-guide (1). Mr Smith could use on-screen help (1) to provide a search box (1). Tool tips might be available (1). Wizards could also be available (1) to explain complex features on a step by step basis to Mr Smith (1). The company may provide a website (1) which has a series of FAQ.s (1) on often asked topics. Telephone support from the software designers could be available (1) offering Mr Smith the opportunity of a one-to-one discussion with an expert (1). On-line discussion forums (1) could also be used. Third party books/magazines may also be available for the software (1).

(5)(a) A national supermarket chain surveyed their customers and found that 10% of shoppers who left a store without making a purchase said that excessive waiting time at the checkout was the reason for their decision. The chain has decided to introduce self-service checkouts. The self service checkout would be used by a variety of customers. Discuss what should have been considered when designing the **interaction** for users of the self-service checkout. (8 marks)

The physical characteristics of users should be considered (1) in order that the checkout can be accessed easily (1). For example, the input of PINs needs to allow for users with limited dexterity (1). Therefore the keypad has been designed with large buttons (1). They should consider what method(s) of help (1) should be provided if an inexperienced user is having difficulties using the self-service checkout (1). For example, a flashing light could alert a member of staff (1) or messages could be flashed up on screen (1).

(5)(b) The self-service checkout makes use of a Graphical User Interface (GUI). Explain why a GUI enables effective communication between users and the self-service checkout shown. (6 marks)

GUIs contain windows, icons, menus and pointers (1) Menus show the selections available (1) for example, selecting a method of payment (1) Icons pictorially represent their action (1) for example, a big red cross for cancel (1) Pointers allow the on-screen selection of options (1)

SECTION 4: TRANSFER OF DATA IN ICT SYSTEMS

(1) Explain what is meant by the terms the *World Wide Web* and the *Internet*. Your explanation must show that you understand the difference between the two terms. (3 marks)

- The World Wide Web is a collection of information held in multimedia form (1)
- The Internet is a global collection of linked networks (1)
- WWW is hosted by the Internet (1)

(2) Explain, using examples, the need for standards when transferring data. (4 marks)

Standards are needed so that many different types of device, for example different cameras (1) or mobile phones (1), can be connected to any computer system (1). A standard way of connecting would be to use the Universal Serial Bus (USB) (1).

(3)(a) Give **three** benefits of using computer networks. (3 marks)

One benefit of using a computer network is that backup of data is managed centrally (1). Another benefit is that network users are able to share hardware resources (1). A third benefit is that users can communicate easily with each other using email (1).

(3)(b) Intranets and extranets are networks. Describe their characteristics. (4 marks)

An intranet and an extranet both use the same protocols as the Internet (1). An intranet can only be accessed by the employees/members of an organisation (1). An extranet is part of an intranet that has been made accessible to people external to an organisation (1) for example the parents of pupils at a school (1).

(4) Discuss the reasons why people away from the home and their workplace make use of wireless networking and any problems they might experience when using it. (8 marks)

On the plus side, it is possible to connect to wireless networks in many public places (1) because of global standards (1). You can work anywhere there is a signal (1) On the minus side wireless networks may be sensitive to interference (1), and this may limit the range of accessibility (1). There may be problems with security (1) because data can be more easily intercepted when it is being transferred wirelessly. (1) A weak signal may cause the laptop battery to run down faster because of high power consumption (1).

(5) Describe the characteristics of the Internet and the World Wide Web. (4 marks)

The Internet is a series of interlinked networks (1) which cover the globe/world. (1) The WWW is collection of multimedia resources (1) which is hosted by the Internet. (1)

(6) You need to upload and send some pictures from your digital camera via the Internet to your Uncle who lives in New Zealand. Standards exist that allow pictures to be uploaded and sent in this way. Explain why these standards are needed. (4 marks)

The digital camera needs to use a standard so that it is able to connect to the computer (1) and transfer the images. (1) The pictures sent from the first machine need to be in a recognised format such as jpg (1) so that the receiving machine can display them correctly. (1)

SECTION 5: SAFETY AND SECURITY OF ICT SYSTEMS

(1)(a) In relation to the use of ICT systems, and using an example for each, describe what is meant by malpractice and crime. (4 marks)

Malpractice is not following an organisation's code of practice (1) example; a user walking away leaving their workstation logged on which may then be used by an unauthorised colleague (1). **Crime** is an illegal act (1) example; gaining unauthorised access to a bank's computer system with the intent to commit fraud (1).

(1)(b) Measures can be taken to protect ICT systems. Explain what measures you would take to protect an ICT system and why you would take them. (12 marks)

Use of a password to login (1) to prevent unauthorised access (1). The system ensures that the password is strong (1) so it cannot be found by using a password guessing program (1). Anti-spyware (1) and anti-virus software (1) to avoid corruption of data (1). Use of a firewall (1) to prevent hackers accessing the system (1). Using physical security, e.g. bolting laptops down (1) so they cannot be stolen (1). Use of removable hard drive to ensure that data is removed from the ICT system when not required (1).

(2)(a) Using pirated software, which is not licensed, is a crime. What is the name of the current legislation which makes it illegal to use unlicensed software? (1 mark)

The Copyright, Designs and Patents Act makes it illegal to use software which is not licensed (1).

(2)(b) You are a data subject and will have personal data stored about you by different organisation. Explain, using examples, what is meant by a data subject and personal data. (6 marks)

A data subject is a living person (1) who can be identified (1) e.g. a customer of a bank (1) Personal data is data that relates to me (1) and examples could be my medical records (1) or my bank details (1)

(2)(c) Discuss the issues that concern people regarding the privacy and security of data in ICT systems. (10 marks)

A failure of the system hardware (1) which could result in data loss (1). People are concerned that correct procedures should be in place (1). Theft of the data (1) which might happen because an unauthorised person has broken into the system through the network (1) or simply because someone has left their laptop in a car and it has been stolen (1). Also if data is not transferred electronically then it might be lost in the post on a DVD-R (1) which is not encrypted (1). Many people may have access to stored data and unless it is password protected (1) or protected by access levels (1) it may not be private (1).

(3) Describe, using an example for each, what is meant by an internal threat and an external threat to an ICT system. (4 marks)

An external threat comes from outside the system (1) for example a virus which is downloaded from the Internet (1) An internal threat to an ICT system could be from an employee who has authorisation to use the system (1) who reveals his password to a colleague (1)

SECTION 6: PROCEDURES FOR BACKUP AND RECOVERY

(1) Many organisations such as retailers are expanding their e-commerce operations and need ICT systems that are available 24 hours a day every day of the year. It is important for their customers that the ICT systems are kept working. E-commerce operations have specific needs for the backup and recovery of their systems. Describe how these needs could be met. (10 marks)

Location of the backup should be considered (1). Who should be responsible for the back up (1). Type of backup (1). A removable hard drive could be used as the medium for the backup (1). Use of RAID spreads the data over several disks (1) and allows for automatic recovery if a disk fails this supports continuity of service (1). Large companies may have complete duplicate computer systems in different locations (1) and if one system fails then processing is carried on by the other (1). Consider how often the data should be backed up (1) for example, every hour which would minimise disruption to the e-commerce service (1).

(2) Loss of data because of a system failure on a home computer network can be a serious problem. Discuss what factors you would need to consider when backing up data stored on your home computer network in order to prevent such data loss. (8 marks)

The medium that will be used to backup the data must be considered (1) As this is a home network a DVD-R may be suitable (1). The frequency of the backup must be considered (1). This will depend on how often the data changes and for a home network once a may week might be sufficient (1). The backup media will need to be organised and suitably labelled (1). They will also need to be stored safely perhaps in a locked drawer in another room away from the main system (1). The type of backup will need to be considered (1). For a home network a full backup may be the easiest to carry out (1)

SECTION 7: USE OF ICT SYSTEMS

(1)(a) Explain the type of processing that would be suitable for each of the following ICT systems.

Generating and sending out monthly bills (2 marks)

*Batch processing (1) would be the most suitable because the **output** is only required monthly (1)*

(1)(b) Internet banking (2 marks)

- *Transaction processing (1) would be the most suitable because it would ensure that the bank account is updated immediately (1)*
- *Interactive processing (1) would be the most suitable because the customer gets immediate feedback from the bank's website (1)*

(1)(c) Instant messaging (2 marks)

Interactive processing (1) would be the most suitable because it would provide a conversational mode of operation (1)

(2)(a) Explain why the following types of processing are suitable. Transaction processing for recording withdrawals from ATMs. (2 marks)

Each withdrawal is processed as it is received (1) meaning that the account balance would always be up to date (1)

(2)(b) Batch processing for producing the staff monthly payroll in a large company. (2 marks)

Many similar wage slips would be processed together at regular intervals (1) because the output is not required immediately (1)

(2)(c) Interactive processing to allow the use of wizards in software packages. (2 marks)

When using a wizard, the user provides answers to prompts supplied by the software and the software provides suitable responses to solve the problem (1) allowing the user to be taken through a complex procedure step-by-step (1)

(3) The Head of the English department at a school needs some advice in order to modernise the way her department organises, stores and makes use of its teaching resources. The department uses a wide range of resources including books, printed and electronic worksheets, presentations and films. Using your knowledge of what ICT can provide explain, with examples, what advice you would give her. (12 marks)

ICT can provide vast amounts of storage space (1) so that the paper worksheets could be scanned and stored in a much smaller space (1). Details of all the resources could be stored using database management software (1) which would provide better accessibility (1) because it could be searched very quickly (1) for a particular resource. Improved methods of presentation (1) could allow the presentations and films to be shown at the same time on many student workstations (1). The electronic resources could be made secure (1) by using passwords to restrict access to them (1). Different resources could be combined in different ways (1). New worksheets can easily be prepared (1) because ICT provides improved accessibility to information via the Internet. (1)

(4) Members like to be able to access social networking sites at any time of the day or night. Discuss the ways in which the social networking provider could undertake backup and recovery operations whilst ensuring continuity of service. (10 marks)

As the website is in use all the time, some form of continuous backup (1) would be the most appropriate. An online backup service using the Internet (1) could be used using a specialist company. (1) Data would be continuously copied to the backup company meaning that it would be immediately available for recovery (1). There would be a very large amount of data to backup so the type of backup (1) would need to be considered.

An incremental backup (1) that only backs up the data that has changed since the last backup would be suitable. (1) This could be carried out every hour. (1) The social network provider would need to make certain that suitable hardware (1) and trained staff (1) were available for the recovery process.

SECTION 8: FACTORS AND CONSEQUENCES OF ICT

(1) What are the implications of e-commerce for society? (8 marks)

Change in employment patterns (1) businesses need fewer traditional shop-floor staff because no retail premises required (1) but need ICT trained staff to support the e-commerce (1). Less pollution /smaller carbon footprint (1) fewer journeys made as customers don't need to visit shop(s) (1). Society has to support treatment of more gambling addicts (1) on-line gambling available 24/7 (1). Lack of social interaction (1).

(2) The use of ICT can be influenced by economic factors. Give **two** other factors that can influence the use of ICT. (2 marks)

Two factors that affect the use of ICT are cultural factors (1) and social factors (1).

(3) How is the use of ICT affected by concern for the environment? (6 marks)

The need to dispose of used equipment safely (1) because they contain toxic chemicals (1) has meant that there is a greater need to recycle waste ICT equipment (1) Use of energy efficient computer equipment (1) in order to reduce the carbon footprint (1) Do not print out e-mails (1)

(4) Social networking websites are popular with many people. The ethical use of these sites can be a matter for concern. Describe the ethical issues that might arise as a result of the use of social networking sites. (6 marks)

Probably one of the major ethical issues is that you do not know who you are talking to (1) or making friends with. It could be anyone pretending to be a person of your own age (1) who attempts to adversely influence you. (1) Another ethical issue concerns the use of personal data, (1) which might be sold on to third parties for marketing purposes. (1) Another issue would be cyber-bullying. (1)

