**WJEC A2 ICT Past Paper Questions and Answers from 2006 to 2015**

**Topic 1 – Networks**

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| **Year** | **Question** | **Answer** |
| June 2006 | Other than cost or security issues, explain in detail **three** factors that could influence the choice of a computer network for a company. 2 × [2] | * **Size of organisation** – This determines the complexity of the network and whether a LAN or WAN is needed. Large organisations may have users in many different sites around the world so communication costs can be high.
* **Existing systems** – New systems will need to be compatible with the old system. Staff would have to have entire new training if a brand new system was introduced so the existing system may be used to keep costs down.
* **Performance required** – This determines the topology used and the sever needed. Performance is measured by: the use of online help, ecommerce systems need to be fast and the network will be reliable and available.
* **How the system will be used**
* **Network configuration**
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| June 2007 | Other than security and topology issues, discuss in detail **two** factors that will influence the choice of a network. [4] | **Size of the organisation:*** Needs can range from a small LAN to a global WAN.
* Some communications media are limited to the distance they have to travel.
* Amount of data processing required must also be considered

**Existing systems to integrate:*** More often networks are not developed from scratch but need to fit in with existing systems. Sometimes an extension is required e.g. when a new branch office opens.
* Therefore any new network must fit in with the operating systems and protocols of the existing.
* It must support any peripherals already in use e.g. bar code readers, printers etc.

**Cost of the network:*** Initial purchasing of equipment
* Installation and training
* Maintenance costs
* Size of the available budget will determine what can be done e.g. fibre optic cable is faster but is also more expensive. Wireless systems are flexible but need more maintenance

**How the system will be used:** * What type of applications do users require?
* Will they need large data storage?
* From where will they operate the network e.g. at home in office or remote access from different locations

**Performance and speed required** **Performance in terms of:*** Reliability, user friendliness
* Capacity
* Speed of processing.
* Different parts of the organisation may have different performance requirements. E.g. a realtime e-commerce system may require greater speeds and capacity and security than the in house payroll system
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| June 2006 | Two types of network that could be used are *peer to peer* and *client server*. Compare and contrast these **two** types of network. [4] | **Peer to peer system:*** Lower setting up costs
* Simpler to set up and/or maintain
* Does not rely on a single server
* Only suitable for small networks
* Data is not centrally stored
* Backup and security is not centralised

**Client server system:*** Generally quicker than peer to peer networks
* Security and backups are centrally managed
* Data is easily accessible to all users
* A server is required so it costs more to set up
* May need a network manager to run effectively
* If the central server crashes the whole network goes down.
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| June 2015 | A system analyst has been asked to update a company’s network. Discuss the relative advantages and disadvantages of peer-to-peer and client server network configuration he would include in his feasibility report. [6] | **Peer to peer:*** Cost saving – No server is needed, so all the computers can be the same.
* Lower operating costs – Less set up and maintenance costs.
* No network manager is needed – All users take responsibility for the network.
* No reliance on server – No need to worry about the server breaking down.

**Client Server:*** More expensive – Servers are more expensive to buy.
* Cost of set up and maintenance is higher.
* Need specialist knowledge – Need a person which technical knowledge to manage the network.
* If server breaks down the network is unusable.
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| June 2012 | Describe what is meant by the term *network topology*. [2] |

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| The physical configuration of network that demonstrates how the terminals are connected together. |

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| June 2007 | Networks can be arranged in several topologies.Draw and label a *star network*. [4] |  |
| Describe a suitable use for a *ring network*. [2] | A LAN such as:* Peer to peer network
* School site
* Large offices
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| June 2007 | Discuss in detail the advantages and disadvantages of a ring network. [6] | **Advantages of a Ring network:*** There is no dependence upon a central host as data transmission is supported by all devices on the ring. Each node has sufficient intelligence to control the transmission of data from and to its own node.
* Very high transmission speeds are possible.
* It is deterministic i.e. different performance levels can be determined for different traffic levels.
* Routing between devices is simple because messages normally travel in one direction.
* As data is in one direction it can transmit large volumes of data.

**Disadvantages of a Ring network:*** Systems depends upon the reliability of the ring repeater although it can be designed to bypass faulty repeaters. If one node malfunctions this can affect the operation of the network.
* Cabling costs
* Difficult to extend the ring.
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| Networks make use of intranets. Explain the function of an intranet and give an example of how it could beused. | An **intranet** is network set up entirely within a LAN and can only be accessed internally. **Examples:*** Web pages can be stored and accessed from anywhere on the network
* Email can be sent internally within the LAN.
* It can also be used for staff training or daily bulletins
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| June 2008 | Network topologies have different properties.Draw and label a ring network. [2] | http://www.bbc.co.uk/staticarchive/a5ed94c8c3d50b8e5f859dc5601d4d6a489a64b5.gifTerminal |

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| Jan 2010 | A company has moved into an old building and has decided to install a network.Compare and contrast the relative advantages and disadvantages of ring and star topologies. [6] | **Advantages of ring networks:**• The network is not dependent on a central computer• Each computer has the same access as the others so no one computer can ‘hog’ the network.• Faster speeds possible because of uni direction.**Disadvantages of ring networks:**• If there is a break in the connection (wire or wireless), then the whole network fails• Faults are difficult to locate• It is impossible to keep the network running whilst equipment is added or removed becausethere is only one path for the data to follow.**Advantages of star topology networks:**• Fault tolerant – if one of the cables fails, then the other computers can still be used• Load tolerant – extra computers can be added without much loss in performance because allcomputers have their own path to the hub• Easy to add extra computers – extra computers can be added without disturbing the network.**Disadvantages of star topology networks:**• Higher cost – the large amount of cabling needed makes it a more expensive topology• Dependence on the central hub, switch or router – if the device at the centre of the network• Fails, then the whole network will fail. |
| The company is considering using a wireless network.Describe **two** advantages and **two** disadvantages for the company of using a wireless network over a cabled network. [4] | **Advantages of Wi-Fi:**• Allows inexpensive LANs to be set up without cables• Allows people the freedom of working anywhere a signal can be received• Ideal for networks in old listed buildings where cables would not be allowed to be installed• Global set of standards – you can use Wi-Fi all over the world• Health and safety – tidier desktop with no trailing cables.**Disadvantages of Wi-Fi:**• Power consumption is high – which means laptops soon exhaust their rechargeable batteries• There may be health problems in using Wi-Fi• There may be security problems even when encryption is used• Wi-Fi networks have a very limited range (e.g. 150 ft)• Can get interference if wireless network signals start to overlap• Transmission speed slower than cable. |
| Jan 2014 | A network manager uses remote management when managing the network. Describe **six** tasks that the network manager could do using remote management. [4] | • See which users are using the network• Check on emails being sent when should be working• Check on which sites employees visit• Guide users through problems• Check on components to see if any failing• Check to see no unauthorised software loaded on machines• Log off users who have forgotten to do so• Clear printer queues at stations |

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| June 2009 | A business has thirty staff each of whom have their own stand-alone computer. The business isconsidering networking all these computers but is concerned at problems this may create.As an ICT consultant you have been asked to prepare a report for the company’s owners, outliningthe issues that networking the computers could bring.Your report should include:• The benefits and drawbacks of moving to a networked system• The factors involved in choosing a network• The extra communications facilities and possible changes in working practices that thisnetwork could provide. [20] | **Benefits:**• Data can be pooled and therefore accessed by a wide range of users.This helps to ensure data integrity.• Hardware resources such as printers and scanners can be shared. This is a much more cost effective solution than providing each user with their own set of peripheral devices.• Software resources can be shared. One version of the software can be purchased and installed centrally which cuts down on management needs.• Security is centralised and so improved. The network manager can control access by setting access rights and user permissions and by auditing computer use etc.• Back up procedures are easier to complete if centrally located and managed. Instead of each user being responsible for backing up their data, the network manager will take responsibility for running regular back-ups and recoveries.**Disadvantages:**• Setting up a network is more costly than running a group of standalone computers. In addition to the stations a central server is needed.• Networks are particularly vulnerable to viruses. If one machine is ‘infected’, it is easier for this infection to spread than would be the case in a standalone environment.• Network management requires a degree of specialist knowledge and this will mean employing a network manager for this purpose.• Networks are vulnerable to crashes and if the network crashes you cannot use any of the computers.• Networks require more maintenance. There are more things that can go wrong, cables can break, network files can be corrupted, the system can be jammed due to network traffic. Staff have to be employed to complete this maintenance.**Factors:**• Cost of the network. Fibre optic cable cabling offers faster transmission rates than other media but costs significantly more. One has to also take into account the ongoing maintenance costs.• The size of a network can vary depending on the size of theorganisation and can go from a small room containing one or two PCs to a global network.• How the system will be used. Are the users going to require a wide range of applications? Are they going to store a large number of data files? Where does the processing get done?• Existing systems. Can the current stock of PCs and peripherals be used on the new network?• Performance required. Speed of processing, reliability, userfriendliness, capacity• Security. Will they have to prepare for outsider access? etc.• Topology **Communications / Changes in working practices:**• Email and being able to transfer information between employees.• Video conferencing to get expert help on particularly tricky work• Internet access to research particular procedures or latestdevelopments.• Wireless access and its benefits• Ability to telework• Re-training of staff |

**Topic 2 – The Internet**

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| **Year** | **Question** | **Answer** |
| June 2006 | A pet shop wishes to offer customers an interactive on-line shopping service.Other than hardware, discuss in suitable detail, **four** requirements needed to implement such an interactive on-line shopping service. [4] | * Maintaining a company website/ need for trained staff
* Catalogue of stock, stock database
* Methods of secure payment / shopping trolley
* Database of customer orders
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| June 2006 | Give **two** advantages to the *customer* of on-line shopping. [2] | * **Greater choice** – can access goods from a global market
* **No need to travel** – makes it easier for those who live in rural areas as goods are ordered to the home
* 24 hour access
* Allows disabled to shop more easily
* Better prices
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| June 2006 | Give **two** advantages to the *business* of on-line shopping. [2] | * **Wider customer base** – It is a global market which means global customers
* **Takes pressure off staff** – Less staff are needed to manage the online store
* Cheaper as no need to pay high rates
* Offer wider choice due to ‘just in time’
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| June 2006 | Describe **two** possible problems when shopping on-line. [2] | * **Hidden costs of postage** – which will increase the delivery price
* **What you get is not what you see** – you cannot assess the quality of the product Customer worries over security
* Anyone can set up
* No longer a social activity
* Fraud
* Power cut
* Hidden costs and phone costs
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| June 2007 | Products can be purchased on the Internet using a company website.Describe **two** methods a customer could use to find the website. 2 × [2] | **URLs** Type in the exact address of the website into the address bar **Web crawlers /search engines** Type in a key word and select from given list **Boolean searches** Type in key words with AND and OR etc to give more precise list |
| June 2007 | Describe **two** methods a customer could use to quickly find information *within* the website. 2 × [2] | **Bookmarks / Hyperlinks**Predefined links which take you directly to part or the page**Hotspots**Click on an image of the product to find out more details of the product / go to product section**Key word searches**Type in a keyword and go directly to that section |
| Jan 2010 | Explain, by giving an example, how a file transfer protocol (FTP); could be used by an online organisation [2] | * FTP is a standard set of rules that have been established to allow the exchange of large files over the internet.
* They can be used for uploading a database of sales from one branch of the organisation to the head office.
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| June 2012 | A bank uses File Transfer Protocol (FTP). Give a use to the bank of using FTP. [1] | * Used for uploading a database of transactions/balances from one branch of the bank to the head office
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| June 2013 | Give **one** example of a *File Transfer Protocols* (FTPs) if it is used by an international company (1). | To distribute information (on their new sales catalogue) between the company and their customers and suppliers. |
| June 2014 | Give **one** example of a *File Transfer Protocols* (FTPs) if it is used by a global market research company(1). | To send account information between the company and their customers. |
| June 2015 | An organisation uses FTP. Give **two** specific uses an organisation can make of FTP and give **two** advantages for the organisation of using FTP. | **Uses:*** To upload a database of sales from one branch of the organisation to the head office as they always need to know what sales have been made.
* To distribute information such as a new sales catalogue between the company and their customers and suppliers.

**Advantages:*** You are not limited to file size unlike with email attachments
* Allows reliable transfer of files between platforms.
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| Jan 2001 | Define and explain how a URL (Uniform Resource Locator) can be used to access information on the Internet. [2] | URL is the web address of a site / the address for a web page on the world wide web / the recognised method for referring to resources on the internet / the unique address for a file that is accessible on the Internet. You simply type it in / click on it to go directly to the website you want. |
| Jan 2001 | Define and explain how a Web crawler can be used to access information on the Internet. [2]  | A web crawler is a program that automatically browses all web pages (in a systematic manner). It provides data about web pages in order to produce an index (database/list) which can be used by a search engine to enable fast searches. |
| Jan 2001 | Define and explain how a Boolean search can be used to access information on the Internet. [2] | A Boolean search is a search using the operators AND, OR or NOT. Using AND narrows a search by combining terms; it will retrieve documents that use both the search terms you specify, (e.g. Portland AND Oregon) |
| June 2007 | The Internet can be used to access many types of online distributed databases.Explain, *using a suitable example*, what is meant by a distributed database. [2] | * Where a series of computers are networked together and they each work on solving the same problem . Each computer shares data processing, storage and bandwidth in order to solve a single problem.
* For example, the Search for Extraterrestrial Intelligence (SETI) research into radio signals. This is a scientific effort seeking to determine if there is intelligent life outside Earth. SETI, listens for artificial radio signals coming from other stars.
* A hotel chain may store details of guests booking on its local network but because each hotel is networked a distributed database can be used and staff in one hotel can see booking in another hotel and managers can monitor booking across the whole chain.
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| Jan 2010 | State the advantages and disadvantages of distributed computing. [4] | **Advantages:*** Allows the local processor to be used to share processing when not being used for other activities
* Data used locally can be stored locally and network traffic kept to a minimum
* If data lost on central site it could be reduplicated from local site
* Allows sharing of data and of the results of processing of the data.
* New locations can be added to the database without the need for rewriting the entire database.

**Disadvantages:*** Issues with the security of data spread out on so many different computers
* Issues with communication breakdowns.
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| June 2007 | Landscape gardeners can use *wireless* technology to access a library of garden designs heldon a database in their office.Describe in detail **two** *other* applications which use wireless technology. [2] | * Wireless PDA's used by Doctors at the scene of an accident can accessing patient records.
* Wireless networks may be used as part of a LAN e.g. a mobile bar code reader in a warehouse transmitting data to a shop or HQ.
* A delivery driver using a hand held device to confirm deliveries with a central database.
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| June 2008 | Southland Council has found the need for an Intranet.Define the term ‘Intranet’ and describe a benefit of using this Intranet. [2] | An intranet is network set up entirely within a LAN and can only be accessed internally (like local closed internet).**Benefits:*** Internal email for users
* Storage and access to draft internal council papers
* Quick consultation
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| June 2008 | Describe **two** methods a councillor could use to quickly find information on the Intranet. [4] | * **Hotspots** – This is usually the logo of the company that is at the top of every page. If the user clicks on it, it takes them back to the homepage.
* **Keyword searches** – The user needs to type in the key words that they are searching for. The Intranet should then display all of the results that have the user’s key words in.
* Bookmarks / Hyperlinks
* Predefined links which take you directly to part of the page
* Click on an image of the item to find out more details on the article / go to a particular
* area of council business
* Type in a keyword and go directly to that section
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| June 2009 | Recently the government urged internet service providers to ban websites which promote illegalactivities.Discuss the legal, moral and ethical issues raised by this request. [8] | * **Censorship / freedom of speech** – people have the right to say what they want.
* **You should not use the internet to promote illegal activities;** by allowing them there you are promoting them.
* **Certain people and children can be wrongly influenced** by this type of material and do things that the wouldn’t otherwise do.
* **By driving them from main sites you are making them more attractive** and more people will then look at them.
* **Who has the right to censor the internet?** Will the government go on to ban information that puts them in a bad light?
* **Is it practical to do it?** Who is going to police it and resource the enforcement?
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| Jan 2010 | Explain, by giving an example, how a on-line databases could be used by an online organisation [2] | It would give the product, customer and order information is readily available to the company from anywhere and customers can place their orders/check stock/etc over the internet. |

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| June 2008 | Evaluate the impact that e-commerce has had on businesses and their customers. [14] | **Reasons of use:**• They can advertise. It enables people to find out what they do and what they sell.• People can email them with enquiries; orders; requests.• They can reach an international audience.• Technology has advanced and now made a lot more possible.**Services:**• Companies can advertise goods and services only• Companies sell goods and services e.g. Tesco home shopping, buying music, making customised t-shirts• Subscription services which sell information e.g. MetOffice weather data, research papers, legal cases database• Interactive sites which encourage feedback on products• Auction sites such as Ebay**Advantages to customers:**• There is no travelling – it can be done from home so saving in costs and time• Allows disabled people to do more shopping• Can be done 24/7• Much quicker to do a price comparison• Can find obscure goods not available locally**Advantages to businesses:**• Overheads cut. Large savings on shops, warehouse and office space• Wider customer base• Customers can be kept in touch with by email and informed of new products.**Disadvantages:**• Credit card fraud• Fake websites - goods do not exist• Copycat websites to extract bank account info• Fewer shops on the High Street• Lack of social interaction• Increase in delivery vansOther effects• Code of conduct• Security issues• Firewalls• Job loss• Change in working practices |
| Jan 2011 | Parents of young children are very concerned about the lack of control of the internet. Discuss, using suitable examples, their likely concerns. [8] | * **As there is no control** over people who put information up on the internet, unless special software is used, children can easily gain access to pornographic or violent images and be corrupted.
* **Lack of policing** of the internet means that information is not checked to ensure that it is correct, very hard for children to be able to check the accuracy of the information.
* **Laws** cover the production or distribution of pornographic material but as much of the material comes from other countries, where it might be legal, not much can be done to stop it.
* **Real worry is that paedophiles** use the Internet for distributing pornographic pictures of young children and they also can use it to lure children into meetings with them after they have spoken to them in chat rooms.
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| Jan 2012 | Discuss the advantages and disadvantages of *dialup* an *broadband* connections when using the Internet. [4] | **Dial Up:*** Using a dialup modem is very slow and limits its use / a download on dialup can take hours compared to download on broadband.
* Dialup can be used on a phone line.
* If only a light user dialup might be cheaper as only have to pay when you are using it, broadband you pay a monthly subscription whether you use it or not.

**Broadband:*** Broadband not available everywhere.
* Broadbands fast download time means that you can use it to listen or watch films or music.
* Broadband does not tie up your phone line.
* Search engines work faster with broadband so takes less time to find information.
* Broadband always on so it much quicker and safer to keep anti-virus, etc up to date. / Don’t have to waste time connecting to the internet
* Broadband can make cheap phone calls via the internet
* Broadband makes video conferencing possible.
* Broadband allows more devices/computers to be connected to the internet at the same time
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| Jan 2012 | Mobile access to the Internet has led to changes in *work patterns*. Describe the advantages and disadvantages, for the worker of mobile access to the Internet. [5] | **Advantages:*** Can access e-mail, surf the internet from wherever you are (on the move)
* Can work more productively because you can do things at once, without having to go back to the office
* Can easily modify your plans – flights, trains, hotels
* Increase in real time collaborative working / voice conferencing / video conferencing
* Can work anywhere in the home or office (teleworking)

**Disadvantages:*** Affects home / work balance
* Can be very expensive if use a mobile phone for the access
* Many black spots / poor connectivity
* Increased security problems from hacking
* Battery life on mobile devices
* Network overload at peak demand
* Some attachments cannot be opened / worked on
* Work progress hampered by distractions
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| Jan 2013 | *“Nobody really owns the Internet or tries to control it.”* Discuss with suitable examples, whether you think that this statement is true or false. [8] |

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| * **Users -** The Internet is for everybody so it is therefore up to the users of the Internet to check the material’s accuracy.
* **Content -** There is little control over the content of the material on the Internet, although some governments have started to control what can be seen. – Censorship / inciting violence / blacklist.
* **Access -** There is also no control over the people who can access the material on the Internet. – Privacy / Plagiarism / Hacking.
* **Policing -** The lack of ‘policing’ of the Internet also means that the information is not checked to make sure that it is accurate. Not monitored. Spreading rumours. Illegal downloading of music / films / action starting to be taken to prosecute.
* **Material -** There are a lot of pornographic images / videos on the Internet. There are laws covering the production and distribution of this material but as much of this material comes from other countries, where the material is perfectly legal, there is not much that can be done to stop it.
* **Children -** The main worry adults have is that young children could accidentally access this material. This means that unless special software (net nanny/ blocking) is used, children can easily gain access to pornographic or violent images. Even with a software filter it is hard to be completely sure material is excluded. Increased risk of stalking / grooming / paedophiles / cyber bullying / misuse of social media.
* **Banning sites -** If a site is banned it could make it more popular.
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| June 2011 | The use of the internet causes major moral, social and ethical issues. Discuss using appropriate examples these issues and the effect that they are having on modern society. [18] | **Social Issues:*** **Privacy issues** – Social networking sites and ecommerce sites erode a user’s privacy.
* **Gaming addiction** – Children can spend hours playing computer games and their school work can suffer as a result.
* **Effects upon communities** - corner shops may close due to the growth of ecommerce.
* **Lack of social interaction** – people don’t go out and talk to other people.

**Moral Issues:*** **Inappropriate websites** – People are able to view inappropriate material such as pornography.
* **Accuracy of information may be incorrect** – People may deliberately set up websites with information that is incorrect and people may rely on this information thinking it is correct.
* **Electronic bullying** – pupils sending nasty emails to each other, etc.

**Ethical Issues:*** **Plagiarism** – Individuals may copying material without attributing the source of the information, such as buying exam answers.
* **Sending spam** – E.g. sending the same advertising email to millions of people.
* **Using someone else’s wireless connection without permission** – This results in slow connection for legitimate users.

**Examples:*** **Censorship** - No-one owns the Internet. It is international. Material which would be illegal if published in hard copy form is freely available on the Internet e.g. racist propaganda, bomb making instructions, pornography. Some say the Internet should be censored but who will do the censoring and how can centralised control be implemented.
* If you ban sites will they become more appealing so people will search for them more avidly.
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| June 2013 | “*The growth in social networking sites and other entertainment sites has led to many concerns about the privacy, security and abuse of personal data on the Internet*.”Describe using suitable *different* examples, some of these concerns. [18] |

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| **Data issues:*** Put a lot of private data on a social networking site / Data has to be given to setup homepage on social networking site.
* People tend to share more data than they should as it is their best friend.
* Data such as dob, Mother’s maiden name, address, phone number etc are given and can be abused
* The access to personal data is, in itself, morally questionable.

**Privacy and security issues:*** People might see your data /Anyone could see your data you don’t wish to
* Concerns about the level of safeguarding within social networking sites, as there is no real way of checking who you say you are.
* Use of alter-egos can be dangerous in that friendships that develop on social networking sites could, in the very worst cases, lead to paedophilia /stalking/grooming and child pornography.
* Examples in newspapers of people being refused employment, sacked because their social networking sites show them engaging in ‘questionable behaviour’.
* Some people will say that this is a valid use of freely available information; others may say that this is an invasion of privacy and that what you do in your private life is of no interest to your employer.
* But what if it is a teacher? And it is corrupting the attitudes of their pupils.
* You can set your security settings high
* People do not read their terms and conditions
* Can sell personal data on to third parties
* Abuse/ Crime issues cause and if extended consequence
* Information can also be used for identity theft such as creating false passports / driving licences
* This info can be used to order goods and services in your name and could contain enough information to answer your secret question.
* Hacking -Could mean that bank details could be hacked or computer infected by virus.
* Phishing scams – get bank details Spreading Virus
* Addiction to gaming
* Twittering can get you into trouble
* Pop up adverts from third parties could contain viruses/spyware

**Uses/Advantages of social networking:*** Enthusiasts believe that it is the easiest and quickest way possible to make friends and widen it across the world.
* This may have positive cultural benefits but has taken over face-to-face conversations.
* Like email they offer the opportunity to avoid personal embarrassment that could arise when actually talking to people.
* Allows people who have similar interests to get together.
* Seems that long term relationships and even marriages are happening.
* Useful for keeping in contact with family and friends if you live far apart.
* Useful for short written communication, sharing of photos, videos.
* Now say because of it everyone in the world is within 4 contacts of any other person
* Much easier to branch out and form friendship groups than email.
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| June 2014 | According to a survey, the average 21 year old has: • spent 5000 hours videogaming; • sent 250,000 email messages; • spent 10,000 hours on a mobile phone. Discuss using appropriate examples the benefits and concerns these activities cause for modern society. [18] | **Gaming** Types of service: Buy a disc or online gaming sites some of which some are free but others you have to pay a subscription. **Advantages** **of gaming:**• Play people all over the world/make new friends • Enhanced ‘real life’ experience • Team Building skills • Improved co-ordination • Problem solving skills **Disadvantages** **of gaming:**• Gambling addiction – gambling can cause many social problems and it is on the rise with the ease with which bets can be made using the Internet • Addiction to computer games – many children spend hours playing computer games and their social skills and schoolwork can suffer as a result • Social isolation. Some people never go out and do not develop social skills they have cyber friends rather than real ones. e.g. you can work, shop or bank from home without ever having to mix with others./ difficult to socialise• Some get addicted to online gambling/poker losing thousands of pounds • Incitement to violence – recent school shootings have been blamed on violent video games **Email**Email Messages send from one computer to another across a network **Advantages of Email:**• You can send attachments with email including text sound and video • Electronic messages are editable and business people can work on documents and plans together without the need to travel/collaborative working • Emails do not need to be printed they save on paper and storage space. • You can use your address book to group send to people at the same time and at the same cost as one telephone call • Email messages are sent and received almost instantly and is much faster than conventional post• Messages can be sent anywhere in the world much cheaper than conventional post / Free accounts • Customise emails with signature and standard messages such as disclaimers • Emails have legal status now 18 **Disadvantages of email:**• Cyber bullying – in chat rooms, by e-mail, in blogs, by text message is a problem especially for the young • Distribution of material malicious rumours or news of a sexually or racially offensive nature about the fellow workers/ Abusive emails to colleagues • Using e-mail to give bad news (e.g. redundancy, demotion, firing, etc.) when explaining face to- face would have been better • Have to accept advertising • Junk email can fill mailbox • They have security e.g. Often the mechanism by which viruses are spread /Popups spreading viruses • Phishing is an attempt to obtain important personal data from you in an attempt to commit crimes involving stealing from your bank account or setting up false bank accounts with your identity • Pharming is when you share your personal data with a fake website after being • redirected from a legitimate trusted website • Spam is unsolicited emails which are sent to you as a form of advertising. All phishing uses spam email in an effort to get the data they require • Extra large attachments can slow down significantly and block access to urgent emails • Sending spam (i.e. the same advertising e-mail to millions of people) – people waste time deleting spam if the spam filter allows it through • Companies monitoring staff use of the Internet and e-mail. Some organisations will even read personal e-mails Mobile phones Services available;(Max 1) **Mobile Phones (advantages):**• Text messages (Not abusive texts) • Voice mail • Alarm clock/time • Reminders/ to do list • Change ring tone • Record greeting message • Display photos/ pictures on screen • Radio • Some can receive the Internet • Booking tickets • Apps • Betting  |

**Topic 3 – HCI**

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| **Year** | **Question** | **Answer** |
| June 2010 | The Human Computer Interface is an important part of an ICT system. Name **four** factors which must be taken into account when designing a good user interface. Explain why **each** factor is important. 4 × [2] | 1. **Consistency of signposting and pop up information -** e.g. Every ‘Next’ should be in the same place using the same icon.
2. **Navigation around the program should be clear consistent and easy to follow -** Clear navigational structure**.** e.g. It speeds things up if there is a similar route through the programs (if it is clear) asusers do not have to keep learning things / Helps users learn their way around thesystem.
3. **Layout appropriate to the task -** There should be standard ‘feel’ to software**.** e.g. Large/minimal text for a child to minimise reading which builds up user confidence & Doing a repetitive task such as entering holiday bookings means you have lessguidance on the screen.
4. **Customisable to suit the needs of the user -** e.g. Makes it more efficient if the user can change items to suit their work preference.
5. **Differentiation between user expertise** – type of user. e.g. HCI needs to differentiate between non-technical and technical users. Technical users do not need a set of steps to get to a place, a travel agent who is using a system daily does not need guidance as they do the same steps daily.
 |
| June 2007 | Describe a sensible use and benefit of a HCI Touch sensitive screen. [2] | * **Shop POS** – don't have to remember prices, no typing /more accurate
* **Public information system** such as in museums no need for a mouse or keyboard which could get stolen or broken easily
* **Disabled use** – overcomes difficulties with spelling/dyslexia
 |
| June 2007 | Describe a sensible use and benefit of a HCI biometric device. [2] | **Use:** Retina scan/iris recognition to gain access to room or thumbprints to take out a library book. **Advantages:** They are useful because it is individual and difficult to copy and you can lose smart cards but not physical features. |
| June 2007 | Name an application which uses a *voice interface* and discuss any problems associated with the use of voice interfaces. [3] | **Use*:*** *E.g.* Voice control in car navigation systems.**Problems:** Have to train computer to recognise voice which takes a long time, delays in getting commands recognised. |
| June 2008 | Describe a sensible use and benefit of a HCI voice. [2] | **Use:** Slow typist dictating an essay directly into the computer & handicapped person dictating work into a computer.**Advantages:** Allows people without arms to enter work into a computer, allows people with poor co-ordination to work faster, allows people in work which uses their hands to dictate commands to a computer. |
| Jan 2010 | Examine the different needs of an expert user and a novice user and describe how they can be met when designing the HCI. [5] | **Novice:*** The novice user’s priority will be ease of learning/intuitive and easy access to help.
* The expert user will want to get the job done in the least possible time.
* Novice user will need clear navigation structure.
* Novice user will use wizards which are not as flexible as setting it out yourself.
* Colour scheme making it easier to use

**Expert:*** Expert user knows the commands and will find it quicker than clicking through a series of windows
* Increased number of ways of performing the same operation.
* Shortcuts which the experienced user can use rather than going through a series of menus .
 |
| June 2011 | Describe the factors that should be taken into account when designing an appropriate layout of an HCI that would be used by a young child learning how to read. [4] | • Have a minimum amount of text on screen• Use child friendly font/size of font• Use bright colours to attract the child’s attention• Have an uncluttered appearance• Involve minimal use of the keyboard / alternative input devices• Use speech synthesis / sound so that they can hear the words• Animation/videos to keep their interest• Instant feedback on their responses• Interactivity e.g. quizzes, educational games• Visual prompts e.g. pictures of a cat |
| June 2015 | Describe **five** examples of how a suitable HCI can meet the needs of disabled users. [5] | * **Change background colour -** Use of correct colour schemes to help people who have dyslexia.
* **Puff-suck switch -** Use of specialist input devices such as those which use blow pipes that activates the computer.
* **Braille keyboard –** This allows the user to enter text into the computer.
* **Visual messages -** Rather than beeps or warning noises for users who are deaf so that they know what they have don’t correctly/incorrectly.
* **Speech recognition** **-** rather than keyboards for users who cannot use keyboard or mouse.
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**Topic 4 – Working with ICT**

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| **Year** | **Question** | **Answer** |
| Jan 2010 | Many organisations have a code of conduct to deter their employees from misusing their ICT facilities. Describe what a code of conduct is. [2] | An employee code of conduct consists of rules drawn up by the senior management or their advisors that set out what an employee is/is not allowed to do in the course of their employment. |
| Jan 2011 | Explain how the hospital management can enforce the code of conduct. [2] | By enforcing the penalties and reminding all staff of their responsibilities of breaking the code and the consequences such as: informal (verbal) warnings, written warnings etc. |
| June 2015 | A financial institution has a ‘code of conduct’ for all its employees who use its ICT systems. Describe **five** guidelines it should contain, other than the consequences of breaking the code. [5] | * **Responsibilities –** Staff must be responsible for the security and the integrity of the resources under their control.
* **Abiding by current legislation –** Staff must follow the three laws and failure to do so could result in a criminal prosecution by the police.
* **Permissions on data access –** Employees should not access data or files unless their permissions allow it.
* **Security defining rules –** Such as non-disclosure of passwords and non-disclosure of company data to any third party.
* **Respecting rights of others –** Staff must respect things like: chat rooms, blogs and emails.
* Warning about monitoring
* Protecting hardware and software from malicious damage
* Complying with licensing agreements
* Authorisation
* Rules about personal use
 |
| Jan 2010 | Describe **three** ways in which an employee can misuse the organisation’s ICT facilities andgive **two** possible penalties for misuse. [5] | **Misuse:**• **Introduction of viruses** – by downloading games, not scanning portablemedia, not keeping virus scanners up-to-date, etc.• **Misuse by employees of the ICT facilities**, e.g. using telecommunications for own purposes (e.g. phone calls, e-mail, videoconferencing, etc.) and using printers for personal use.• **Distribution of material that is racially or sexually offensive** – for example, sending offensive jokes by e-mail or text messages, circulating offensive images over the organisation’s network, etc.• **Misuse of data for illicit purposes** – for example, using e-mails and text messaging to bully someone at work or school/college.• **Blackmail**, computer fraud or selling to other organisations.**• Violating terms of copyright** or software agreements thus causing the company to face legal action from software suppliers or other affected organisations.**Penalties:**• Informal (verbal) warnings• Written warnings• Dismissal• Prosecution |

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| June 2007 | Discuss in detail the impact these new ICT systems could have upon *jobs* and *work patterns*. Illustrate your answers with **three** distinctly different examples in **each** case. 3 × [2] | * **Teleworking –** working from home using computer networks saves on transport cost time etc.
* **Video conferencing –** allows remote meetings
* **Lost jobs –** unskilled manual jobs such as filing clerks. Call centres replacing bank clerks Call centres have caused many people to lose jobs as they have been moved abroad where labour is cheaper leading to ICT 'sweat shops'.
* **New skills required / retraining** – acquire skills to use databases spreadsheets emails, programming etc.
* **New jobs** – systems analysts, programmers.
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| June 2007 | Discuss **three** potential *health issues* which might occur with the introduction of these new ICT systems and describe measures the organisation could take to prevent them. 3 × [2] | * **RSI** **-** (repetitive strain injury) caused by prolonged working at computers or computer games - Ergonomic keyboards ; wrist and foot supports: correct chair positioning.
* **Eye Strain -** Non flickering screens; Screen filters to remove glare; correct lighting in the room
* **Back problems -** Adjustable chairs; foot supports: tilting screens. Take regular 15 minutebreaks and walk around the room.
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| June 2015 | Discuss the advantages and disadvantages videoconferencing brings to an organisation or its employees. [5] | **Advantages:** • Much cheaper as they do not have to pay for transport costs/accommodation for employees • Experts not wasting time travelling • Meetings can be called at short notice without too much planning • Short meetings can be conducted where it would not be feasible for people to travel long distances for such short meetings • Allows people to work from home (teleworking) and still ‘meet up’/ have meetings • Allows staff to attend meeting while out of the country /on holiday • Can give you a better visual image of the product • General facial expressions/ body language can be seen over the telephone **Disadvantages:**• COST: The cost of specialist/dedicated videoconferencing equipment is expensive to buy, install and maintain • QUALITY: Although documents and diagrams in digital form can be passed around, an actual component cannot; e.g. cannot feel the quality of materials. Physical nuances/body language can be missed. • SIGNAL: Poor image and sound quality (Must be qualified) e.g. restricted bandwidth/failure of connection/buffering/lag/image quality is seldom as you would get with a tv, owing to have to compress and decompress signals over the communication link / need for a good/strong/fast internet connection for it to work |

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| Jan 2010 | *‘The increase in bandwidth has resulted in an increasing number of people being able to work from home using computer networks, often referred to as teleworking.’*Discuss, with the aid of suitable examples, the advantages and disadvantages to employees andorganisations of such methods of working. [8] | **The advantages of teleworking for the employee:**• Teleworking makes it easier for people to live and work where they choose, as it is possible for some staff to work from home (less stressful).• It reduces traffic congestion and carbon dioxide emissions and is therefore ‘greener’ / this has an environmental benefit since there is no commuting to work.• Not having to travel to work saves time/money.• Flexibility of working hours.**The disadvantages of teleworking to the employee:**• Home costs such as heating, lighting increase• Employee may feel isolated• Some employers may pay teleworkers less as there is more competition for jobs• No workmates to go out with• Boundary between home and work is lost• Loss of status for some staff – no plush offices, etc.• May not be a quiet place in the house to work• Passed over for promotion**The advantages of teleworking to the employer:**• Smaller offices are needed• Fewer backup staff need to be employed (e.g. cleaners, caretakers)• Staff less likely to spend time off sick• Reduced office overheads (electricity, gas, insurance, etc.)• Staff may be more amenable to working flexible hours• Retaining skilled workers / maternity• Employ workers from a wider pool of talent• Comfortable environment can lead to greater productivity**The disadvantages of teleworking to the employer:**• Change to organisational structure may be needed• Hard to determine how hard staff are working• Harder for managers to manage the work• Increased number of sites for ICT equipment may cause more security risks• Employers usually pay for the employees’ ICT equipment• More difficult to hold meetings• Health and Safety checks needed on employee home |

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| June 2007 | Employees must be aware of both legal and moral issues relating to the use of ICT systems.Explain the differences between *legal* and *moral* issues with respect to codes of conduct of employees in the organisation. Illustrate your answers with **three** distinctly differentexamples. 3 × [2] | 1. **DISINFORMATION**

Not supplying customers with up to date and relevant information/ concealment of information **Legal Issues** *E.g - Estate Agent -* Properties Act covers legal conveyancing **Moral example** *E.g - Estate Agent -* A property developer not telling his client the property has subsidence problems or a violent history **Legal Issues** *E.g - Hardware and software sales -* Trades Descriptions Act covers suitability of purpose **Moral example** *E.g - Hardware and software sales:** Not fully informing potential customers or clients of all available facts concerning products or services
* Prohibit salespersons from selling hardware and software soon to become obsolete
* Ensure salesmen do not pressurise unwilling customers to accept loyalty cards.
1. **PRIVACY**

Informing data subjects of their legal rights and the processes for complying with those rights **Legal Issues** Data Protection Act **Moral example** * An employee using company data to create mailing lists for his own private business
* Monitoring company emails. Electronic monitoring systems can be used to track emails. A systems technician might open other people's emails to detect misuse or simple to be nosey.
1. **EQUITY**

Information poor and information rich societies. **Legal Issues** Patent laws /Trade laws **Moral Example** * Ownership and access to information can often determine which organisations will be successful and which will fail.
* As these technologies have to be paid for the richer organisations can afford the technology whilst poorer organisation cannot. Consequentially, the rich organisations get richer and the poorer ones get relatively poorer and the gap between them gets greater, e.g. subsidising food production in Europe or putting taxes on imports to prevent the poorer countries obtaining access to richer markets.
1. **INTELLECTUAL PROPERTY RIGHTS**

Ownership rights to data. **Legal Issues** Copyright Laws / Patent laws prevent copying **Moral examples** * If you put an idea on the Internet do you own it?
* If you see a design on the Internet can you sell that design to a company?
* If you scan in the text of the book and put it on the Internet for all to be freely read; are you breaking the law?
* Can you sue someone in another continent who sells you a report on you which is full of factual errors?
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**Topic 5 – Security Policies**

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| **Year** | **Question** | **Answer** |
| June 2006 | Discuss in detail the potential threats to data and the possible consequences of accidental or deliberate destruction of data. Illustrate your answer with distinctly different examples in **each** case. [10] | **Threats:*** **Natural disasters** – e.g. earthquakes, floods, volcanoes, tidel waves etc
* **Fire** – precautions need to take place to minimise threats. Such as: no smoking and power sockets should not be overloaded
* **Faulty hardware** – software can contain bugs that can cause damage or loss of data.
* **Hardware theft** – If a computer is stolen then the hardware, software and data will be lost
* **Hacking** – once a hacker has gained access to an ICT system they can gain access to personal data in order to commit black mail
* **The spread of viruses** – connection to the internet increases the risk. Anti-virus software should be installed on all computers
* **Denial of service attacks** – This is the intentional depriving of resources for an organisation which mean that orders may not be taken
* **Power loss** – No data can be access if the computer has no power

**Consequences:*** **Loss of money** - If the business loses too much money then the whole organisation may have to close altogether which could cause unemployment.
* **Loss of reputation** – Organisations will not look good if they cannot look after data properly and so customer will lose trust in the business.
* **Legal action** – The DPA is designed to keep personal data safe and organisations who fail to do so will face prosecution.
 |
| June 2006 | Discuss **four** methods which could be used to prevent the deliberate destruction or misuse of data. 4 × [2] | * **Controlling access to computer rooms** – This means that only legitimate staff can enter the room
* **Encryption** - secures integrity of transmitted data
* **Proxy servers** – can be used to limit or block access to certain web addresses. It may be used to ensure that employees follow the code of conduct
* Establish firewalls
* Use virus scanners
* **Password systems** – this will create a hierarchy of access and create access levels
* **Security of document filing systems** – Printouts should be locked away in a filing system when not being used and personal data should be shredded before being up into a wastepaper bin.Methods to define security status and access rights for users
* Methods for physical protection of hardware and software
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| June 2012 | Discuss in detail **three** *different* types of potential threats to data. For each type of threat, describe the possible consequences of the destruction of data. You need to use **distinctly** different examples to illustrate your threats. [9] |

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| **Threat** | **Example** | **Consequence** |
| Terrorism  | Cyber attacks to slow down or prevent online services  | Loss of reputation  |
| Criminal Vandalism /sabotage | Attacks on firewalls by viruses to destroy data  | Loss of business and income  |
| Theft  | Hacking into data to steal company private details  | Legal action  |
| Natural disasters  | Floods, earthquakes  | Costs of recovering data  |

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| June 2015 | Discuss **five** possible operational procedures for preventing misuse of data. Use distinct examples to illustrate your procedures. [10] |

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| Screening potential employees | * Ensure staff are controlled
* Fit employee to the task
* CRB checks
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| Routines for distributing updated virus information and virus scanning procedures | * Ensuring virus signatures are updated daily and distributed around the network when a station logs in
* Establish firewalls
 |
| Define procedures for downloading from the Internet, use of removable media, personal backup procedures | * Staff codes of conduct
* Penalties for misuse
* How often done, have they got to use special machines, etc
 |
| Establish security rights for updating web pages | Websites need to have security so that only authorised staff can make changes and these rights are assigned according to user IDs and passwords. |
| Establish a disaster recovery programme | * Who does what and when, including checking the standby equipment
* Backup plans, i.e. how often
 |
| Set up auditing procedures (Audit trails) to detect misuse | * Who/what /when
* Contiguous investigation of regularities
* Query any transaction out of the ordinary
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| June 2007 | Explain, giving a *different* example in **each** case, how **both** a *bank* and the *customer* can minimise data entry errors when filling in the online forms. [2] | **Customer - Verification procedures** * Read data in forms carefully before submitting e.g. when purchasing online
* Double entry keying e.g. when creating passwords for accounts

**Bank -Validation procedures** * Range checks; presence checks; check digits; format checks; input masks etc
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| June 2007 | The bank must protect data from accidental loss or malicious damage.Discuss the security measures the bank needs to introduce to prevent:accidental loss due to human error.  | *Prevent overwriting:** Put the write protect notch on your disc
* Make hard discs read only
 |
| June 2007 | Discuss the security measures the bank needs to introduce to prevent:accidental loss due to a fire or flood [2] | **Accidental destruction of files due to fire, terrorism, floods** *Backup systems must be described* * Keep back up files – offsite - and in fireproof containers
* Use an online tape or disc streamer which automatically backs up data on a network
* Use grandfather father son security system in batch processing systems. e.g. payroll
* RAID systems – mirror discs (Redundant Array of Inexpensive Disc)
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| June 2007 | Discuss the security measures the bank needs to introduce to prevent:accidental loss due to malicious damage by unauthorised users. [2] | **Prevention of hacking (unauthorised access)**:1. **Define security status and access rights for users** - All authorised users should be given user names and passwords. This will limit unauthorised access to the network***.***
2. **Hierarchy of Passwords -** Identification of user name, authorisation by using a password. This allows what files you can see and what your allowed to do.
3. **Firewalls** – This is a special environment set up to trap a hacker logging in over remote connections. It authenticates messages coming into the network and verifies the legitimacy of the user to enter the network.
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| June 2009 | A national building society wants to ensure that its financial systems are secure against fraud, asthey are used to transfer money and financial information.*Other than needing a code of conduct*, describe **four** factors that should be included in an ICTsecurity policy for this company. [8] | * **Physical security**– Locking the building/rooms where the computers are kept, making sure that if it is a wireless network appropriate security is used.
* **Prevention of misuse**– firewalls to prevent hacking, appropriate username and passwords.
* **Audit trails** for detection, so that access can be traced and to see who has done what.
* **Continuous investigation of irregularities**– always checking logs looking for anything out of the ordinary.
* **System Access**– establishing procedures for accessing data such as log on procedures, firewalls.
* **Personnel administration**– vetting, etc.
* **Operational procedures**including disaster recovery planning and dealing with threats from viruses.
 |
| Jan 2010 | A local doctor’s practice uses a network to manage patient records, appointments and all its financial functions. The Practice Manager is worried about the confidentiality of the patient records.Explain why the practice should have a security policy and give **two** examples of what this should contain, other than user accounts and logs. [4] | The Data Protection Act puts an onus on the practice to keep this information secure because of its potential for misuse.**Includes:*** **Rules on Passwords and user IDs** - this will create a hierarchy of access and create access levels.
* **Firewalls** - This is a special environment set up to trap a hacker logging in over remote connections. It authenticates messages coming into the network and verifies the legitimacy of the user to enter the network.
* **Encryption** - secures integrity of transmitted data.
* **Physical security measures** – E.g. Controlling access to computer rooms by using scanners means that only legitimate staff can enter the room.
* **Backup and restoration strategies** – E.g. what type of medium will be used, what type of backup, how often it will be backed up, where the backup is stored.
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| Jan 2010 | Describe the use of user accounts and logs as a way of ensuring the confidentiality of patient records. [3] | User accounts and logs can be used to do audit trails. They keep a record of who has done what on the network.Auditing keeps records of:* **Who** (usernames) logged on.
* **What** details of files accessed / details of changes made / details of from which machine / details of programs they used.
* **When** the times they logged on and off.

Auditing is used to identify abuses of the systems by authorised staff and also to investigate instances of unauthorised access (i.e. by hackers). Managing user accounts by allocation of access levels to users. |
| Jan 2010 | Describe the factors an organisation needs to consider when producing a risk analysis. [4] | * **Identify potential risks** - Most organisations have a corporate information technology security review which looks at the computer processed information with a view to identifying the risks of unavailability, errors and omissions, abuse, unauthorised disclosure and to determining their potential implications. E.g. viruses / fire / natural damage / hacking / systems failure / fraud.
* **Likelihood of risks occurring** - Each risk will need to be examined from the point of view of the security and the loss assessed and its likely occurrence. E.g. some things such as power cut are inevitable but explosions much less likely.
* **Consequences** - The aim is to identify those systems crucial to the organisation and to look at the possible consequences of loss of such systems. E.g. resources (staff, equipment, etc) need to be directed towards recovering the data / may have to pay compensation / financial loss due to loss of business through not being able to sell mortgages, etc. / embarrassment/ prosecution / loss of integrity / bankruptcy / cost of replacing equipment.
* **How well equipped is the company to deal with the threat -** Organisations will need to look at how well they are equipped to deal with potential threats and how much they are prepared to spend to minimise the risk. E.g. use of firewalls / use of anti virus.
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| June 2008 | A large college has invested heavily in their ICT system for administration.The college is undertaking a risk analysis. Identify a problem that could arise if steps are not taken to minimise the risk, discuss its possible impact and describe in detail a suitable strategy to overcome it. [4] | **Example Problem:**Staff unaware of who actually is in college this could be verydangerous if there is a fire or looking for an at risk pupil.**Steps:**Have a backup system which staff could have emergency access to lookup information. |
| June 2010 | Identify a problem that could arise if steps are not taken to minimise the risk in a health organisation, discuss its possible impact and describe in detail a suitable strategy to overcome it. [4] | **Example Problem:*** Staff unaware of who actually is in their buildings this could be very dangerous if there is a fire or looking for an at risk patient.

**Strategy:*** Have a backup system on paper or off site which staff could have emergency access to, to look up information.
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| Jan 2013 | A bank is reviewing its disaster recovery programme. Other than *risks*, explain with reasons **three** factors, which should be included in a disaster recovery programme. [6] | The plan will usually cover the following: **Cost*** Set up a budget for it
* Hardware can be replaced how much money have they got
* Software can be re-installed. (or de-bugged by the programming department).

**Backup procedures*** Establish a disaster recovery programme. This starts with a backup policy to secure the data so it can be recovered later.
* What backup medium should be used? Tape or disk/RAID systems depending upon the speed or money available to recover the data.
* Decide upon types of backup full, incremental or differential depending upon how many items of data are changed.
* How often should backups be taken? / Backups of all data should be made regularly. / This means that the worst case scenario is that the business has to go back to the situation of the last backup and carry on from there.

**Hardware/Software/Communications*** The total or partial loss of computing equipment or software.
* The complete or partial loss of telecommunications equipment or services.
* The complete or partial loss of the premises housing the IT equipment.
* The loss of essential services such as electricity, heating or air conditioning.

**Personnel, Responsibilities and Training*** The loss of certain key employees (e.g. losing all the qualified network staff in one go due to them choosing to form their own facilities organisation)
* The loss of maintenance or support
* Make one person responsible for backups so people don’t think others are doing it and it does not get done or do they use online backup companies or both
* Screening potential employees
* Routines for distributing updated virus information and virus scanning procedures
* Define procedures for downloading from the Internet, use of floppy discs, personal backup procedures
* Define staff code of conduct for using computer systems e.g. no abusive emails. No illicit use, etc.
* What response should staff make when the disaster occurs

**Procedures*** Produce procedures for minimising the risks / preventing the risk
* Test the plan on a regular basis to make sure it is still sufficient
* Establish physical protection system (firewalls, etc.)
* Establish security rights for file access and updating web pages
* Set up auditing procedures
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**Topic 6 – Database Systems**

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| **Year** | **Question** | **Answer** |
| June 2006 | Explain what is meant by a relational database. [2] | A large collection of data items and links between them, structured in such a way that it allows it to be accessed by a number of different applications programs.  |
| June 2010 | Explain what is meant by the term *data normalisation*. [2] | A staged mathematical process which removes repeated groups of data and inconsistencies. |
| June 2011 | Explain what is meant by a *primary key* [1] | A primary key is unique and used to identify a record/table and other fields depend on it. |
| Explain what is meant by a *foreign key.* [1] | A foreign key is a field of one table which is also the primary key of another table and it is used to establish relationships / links between tables. |
| Jan 2011 | Explain what is meant by data consistency [2] | **Using one file to hold a central pool of data.**A company may hold all its customer data in one file. This avoids the need to input data twice so that if data is changed in one file it won’t need to be changed in another and remains consistent. |
| Explain what is meant by data redundancy [2] | **Where you store an item of data more than once** (data is unnecessarily repeated).A company may hold its data in different files. This is wasteful because some data may need to be input twice and if data is changed in one it will need to be changed in the other. |
| Explain what is meant by data integrity [2] | **The correctness of the data.**The extent to which it truthfully and accurately represents the original information. In a relational database you only have to change the data in one table and all the other references will be updated. |
| Explain what is meant by data independence [2] | **The data and the applications/programs used to access it are independent/separate.**This means that:* new applications can be developed to access the data without changing the data
* new systems can still use existing data
* data cannot be redefined by any of the programs that make use of it
 |
| Jan 2012 | Describe what a *data warehouse* is and give an example of how a company might use it.[3] | **Definition:**A large database used to store an organization’s historical data which is used by a MISs to extract information to help managers make decisions.**Example:**Allows the company to see who has bought what items and then target them with special offers. |
| Jan 2011 | Explain what is meant by *data mining* and give an example of how a company might use it. [3] | **Definition:**Interrogating the data to find new patterns or trends in the data.**Examples:*** Fighting shoplifting in clothing stores – Jaeger used data mining to look at transactions and position of item in stores and found that most items were stolen near doors which led to increased CCTV, more prosecutions and recovery of goods.
* Identification of customer needs – Virgin Media uses data mining to segment and target customers most likely to buy new services or upgrades.
 |
| Jan 2012 | Explain what is meant by the term distributed database [2] | A distributed database has data stored on a number of computers at different locations but appears as one logical database. |
| June 2006 | A hospital uses a relational database management system for storing patient records. Staffand patients are allocated to wards.Give **two** suitable tables you could expect to see in this database, identifying many primary or foreign keys. [6] | STAFF (**Staff no**, Name , expertise, pager no, contact no, ***Ward no***) PATIENT (**Patient no**, Name, illness, admission date, consultant, address, contact, ***Ward no***) WARD (**WardId**, NumofBeds, **StaffId**) |
| June 2008 | A large medical practice uses a relational database management system for storing *patient*records and running their *appointment* systems. The practice has several *doctors* and many *patients*. Each *patient* can make one or more *appointments* with a *doctor*. The practice receptionist records which *patient* has made an *appointment* with which *doctor* and the timeand date of the *appointment*.Give **two** suitable tables you could expect to see in this database, identifying any **primary** or **foreign** keys. | PATIENT (**Patient Code**, Name, Address, DOB, Gender)APPOINTMENT(**Appointment Code**, **Patient Code, Doctor Code,** Time, Date, Room)DOCTOR (**Doctor Code**, Name, Room, Tel Num) |
| June 2009 | A school uses a relational database management system for storing pupil subject choices. A *pupil* may take many *subjects* taught by many *teachers*.Give **two** suitable tables you could expect to see in this database, identifying any **primary** and **foreign** keys. [8] | TEACHER (**Teacher Code**, Name, Room)PUPIL [**Pupil Code**, Name, Form, DOB, Gender]SUBJECT (**Subject Code**, **Pupil Code**, **Teacher Code**, Time, Day, Room) |
| Jan 2010 | A mail order company uses a relational database management system for storing details of orders.Stock and customers are allocated to orders.Give **two** suitable tables you could expect to see in this database, identifying any **primary** or **foreign** keys. [5] | STOCK [**StockID**, Stock name, Price, Size, **ManufacturerID**]CUSTOMER (**CustomerID**, Name, contact no, address1, address2)ORDERS (**OrderID**, Date, **StockID**, **CustomerID**) |
| June 2010 | A hospital uses a relational database management system for storing patient records. Staffand patients are allocated to wards.Give **two** other suitable tables you could expect to see in this database, identifying any **primary** or **foreign** keys. [6] | STAFF (**Staff ID**, Name, Contact no, **Ward no**)WARD (**Ward no**, Number Of Beds, **Staff ID**)PATIENT (**Patient no**, Name, illness, admission date, consultant, address, contact, **Ward no**) |

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| Jan 2011 | A village sports club uses a database management system to operate a membership and fixture system. *Members* normally register for more than one *sport*. *Fixtures*against other villages are arranged in a wide variety of sports involving a large number of teams.Give **two** suitable tables you could expect to see in this database, identifying any **primary** or **foreign** keys. [8] | SPORT[**SportID**, Sport name, Home venue]MEMBERS [**MemberID**, name, email, phone, DOB etc]FIXTURES [**FixtureID**, date, home/away, **SportID**, **MemberID**] |
| June 2011 | A public library in a large town uses a relational database for their book lending system. When a *borrower* takes out a *book*, the *loan* is recorded.Give **two** suitable tables, you would expect to see in this library loan system, identifying any **primary** or **foreign** keys. [7] | BORROWER [**BorrowerID**, Surname, Firstname]BOOK [**BookNo**, Title, Author, Genre, ISBN]LOAN [**LoanID**, **BorrowerID**, **BookNo**, StartDate, Length] |
| June 2012 | A DVD Rental Company uses a relational database management system for organising its lending. For simplicity, a person may only borrow one DVD at a time.Give **two** suitable tables you could expect to see in this database, identifying any **primary** and **foreign** keys. [7] | BORROWER [**BorrowerID**, FirstName, Surname, Borrower Type, Address1]DVD [**DVD\_ID**, Title, Genre, Classification]LOAN [**LoanID**, **DVD\_ID**, **BorrowerID**, DateOut, ReturnDate]  |
| June 2014 | A car hire company uses a relational database management system for organising its rentals. For simplicity, a person may only hire one car at a time. Give **two** other tables you could expect to see in this database, identifying any **primary** and **foreign** keys and at least two other fields in each table. [7] | CAR [**CarID**, Make, Model, Colour, Year of registration, Hire rate]CUSTOMER [**CustomerID**, Title, Firstname, Surname, Address1]HIRE [**HireID**, **CarID**, **CustomerID**, DateOut, ReturnDate] |
| June 2006 | Explain why relational databases are more secure than a flat file approach for storing patient records. [2] | * **Hierarchy of passwords** – allows people to access only the information necessary for them to perform their job.
* **Data is stored separately** to the programs that are used to access it.
* **Access rights to parts of the program** – restricts access to the part of the program which the user needs.
 |
| June 2006 | Hospitals use distributed medical databases. Describe the problems that could arise when using such distributed medical databases. [4] | * **More complex** hence more expensive to install and maintain – they cost more to install and maintain.
* **Increased security risk** from transfer
* **If one location fails** might hinder others – It relies on data communication lines so if the line fails then data may not be able to be accessed.
* **Could get data inconsistency** as large numbers of people can access the data.
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| Jan 2010 | Describe the advantages of a relational database approach over a flat-file approach in relation to data redundancy, data integrity and data consistency. [6] | **Data redundancy:*** It refers to the unnecessary duplication of data.
* In a flat-file database details about such information as customer details will be duplicated.
* In a well designed relational database there should be no ‘repeating attributes', no piece of data should be unnecessarily repeated*.*

**Data integrity:*** The integrity of data is the correctness, i.e. the extent to which it truthfully represents the original information.
* One of the problems of maintaining integrity arises when updating occurs, and every record has to be changed in a flat-file database, if one record was left unchanged the data would no longer be wholly correct.
* In a relational database you only have to change data in one table and all other references in any other table will automatically be changed*.*

**Data consistency:*** When data is held in more than one file it should be stored in a consistent way.
* A date field could be stored in file as a text field but in another field as a date/time field and the data would be incompatible. In a relational database because the attributes of any one entity are contained within one file, there is no risk of the same attribute being stored in a different format in a different file (e.g. spelling mistakes in names).
 |
| June 2006 | The use of video conferencing has now become important in the Health Service. With reference to appropriate examples, discuss **two** uses of video conferencing in the Health Service. [4] | * **Regional meetings** – can have meetings from different locations but they all come together at the same time. This means that short meetings can be constructed and it is less hassle for people to travel from far away.
* **Consultation at a distance** e.g. skin cases referred to experts – Doctors may video conference a skin specialist to get quicker diagnosis and faster treatment.
 |
| June 2007 | The data in a file is not normalised.Describe **two** different problemsassociated with data not being normalised. 2 × [2] | * Data is duplicated causing unnecessary waste of storage space.
* Data inconsistency - if data is stored more than once there may be differences or transcription errors.
 |
| Jan 2013 | Describe **two** *security issues* that apply to distributed databases and suggest **a different** method for overcoming **each** issue. [2] |

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| **Problem** | **Solution** |
| Computers are located on a number of sites so it is important to ensure only authorised users can access the system. | Can be achieved by using passwords to authorised users, and regularly updating the passwords to increase the levels of security. |
| Data regularly transmitted between different sites and so data may become corrupt or be tampered with during transmission. | Checks such as encryption of transmitted data are put in place in order to ensure that the data that arrives is both secure and accurate. |

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| Jan 2012 | Explain what is meant by the term distributed database and discuss their advantages and disadvantages in general terms. [6] | A distributed database has data stored on a number of computers at different locations but appears as one logical database.**Advantages:*** If data lost on central site it could be reduplicated from local site
* Allows sharing of the data and the results of processing the data
* New locations can be added to the database without the need for rewriting the entire
* database
* Faster response to user queries of the database
* Non-dependence on one central huge store of data
* Easy to backup and copy data from one server to another
* If one server fails then the other servers can be used
* Reduces network traffic as local queries can be performed using the data on the local server.

**Disadvantages:*** Software more complex than a centralised database system
* If data is transferred it presents more of a security risk from hackers
* As all the data is not stored in one location if a local site does not have adequate backup
* then this data might be lost to others.
* If data is stored and updated in more than one place there is an increased chance of data
* inconsistency.
* Heavy reliance on networks and communications which may not always be reliable
* Security issues particularly if sensitive personal data is being transferred
* If one of the links to a server failed then the data could not be obtained from that server
* Increased costs owing to the use of expensive communication lines.
 |
| June 2015 | Distributed databases are used by some hotel chains. Describe **two** benefits to a hotel chain of using a distributed database and describe **two** security issues associated with distributed databases for the hotel chain. Suggest a different method the hotel chain could use for overcoming each of these issues. [6] | **Benefits:**• If data lost on central site it could be reduplicated from local site. • Allows sharing of the data and the results of processing the data. • New locations (hotels) can be added to the database without the need for rewriting the entire database. • Faster response to user queries of the database. • Non-dependence on one central huge store of data. • Easy to backup and copy data from one server to another. • If one server fails then the other servers can be used.  |
| June 2008 | Research is ongoing on the use of Electronic Patient Records (EPR). Discuss the specific benefits that the EPR system would bring to medicine and the main concern about its use. [4] | * **Better survival -** If you were taken into any hospital anywhere in Britain they could call up your notes and see if you are, for example, on any medication at the moment. This can only lead to better diagnosis of patient’s problems and improve the chances of survival.
* **Investigations -** The computerising of the patient records would also create a huge database of all the people in Britain. This could also allow an epidemiological investigation to take place.
* **Comparisons-** People’s records could be compared to see what treatment worked and what other factors there may have been for some complex illness.
* **Trends** could be spotted at their early stage and remedial action taken to stop them quickly. This information would be available no matter where the hospital was or what the condition of it is.
* **National identity -** A database such as this can also be seen as a step towards a national identity programme where to get treatment one would have to have proof of nationality and proof of residence in this country.
* You would have to exist on the database before you could be dealt with. Immigrants, legal or otherwise would have to prove their adherence to these rules.
* **BUT** The main concern is big brother watching you or the danger of someone getting your data (hacking) and misusing it.
 |
| Jan 2010 | A mail order company uses a data warehouse to hold details about customers and their transactions.Explain how the data warehouse and data mining could be useful to a mail order company. [4] | **Data Warehousing - Advantages:*** The mail order company generates huge quantities of data

stored in a consistent order to make interrogation more productive.* Data is non-volatile and time invariant (archive data).
* Used to support organisational decision making.

**Data Mining - Advantages:*** It is a speculative process / investigates potential patterns
* Presumption is that dormant within the data are undiscovered patterns / groupings / sequences / associations.
* Software uses complex algorithms to search for patterns.
* Returned information can be tested for plausibility.
* Data if of value can be processed into a report to help decision making.
* Could allow company to find a previously unknown relationship between regions of the country and food preferences and they can then target special promotions.
 |
| June 2011 | The Council’s library service uses a data warehouse to hold details about all library loans throughout its area. Holding this large central store of data allows the library staff to use data mining.Explain the advantages data warehousing might give the library service. [3] | **Advantages:*** Allows the council to store information about every book.
* Allows the council to see who has borrowed books and when.
* Can use it to plan future changes or developments in their library system.
* Allows the library system to use data mining.
* Speeds up searching at the local library.
* Allows the library to find the mostpopular book and buy more.
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|  | Give **two** examples of how library staff might use data mining. [3] | * Librarians can gather information about the lending habit of individual members and then use this to plan future acquisitions of books or videos or use this to change opening hours.
* Look at book lending habits of particular branches to determine future purchases.
 |
| June 2014 | A car hire company uses a relational database management system for organising its rentals. For simplicity, a person may only hire one car at a time. Describe how the car hire database structure could be improved to allow a person to hire more than one car at a time. [1] | * Add a link table/form.
* Make it a one to many relationship.
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**Topic 7 – Management of Change**

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| **Year** | **Question** | **Answer** |
| June 2011 | Describe **three** of the changes which are likely to be a cause of stress to the staff and the worries each might bring. [6] | • **Job losses or fear of job losses** - new system may replace staff who performed manual processes e.g. filing, etc • **Having to learn new skills** /(Don’t know how to use system) - older staff may be stressed by appearing to look stupid in front of younger staff who have the skill • **Fear of change of organisational structure** /Relocation - loss of authority by being bypassed by younger staff or having to move location which could make the journeyto work harder.• **Change in work patterns** - split shifts or change of hours or night work, 24/7• **Change in internal procedures** - may make staff take on extra responsibilities for no extra money |
| Describe, using examples, **two** things that management could do to lessen any worries that the staff might have about the introduction of the new system. [4] | • **Appropriate training/retraining** – to ensure all staff understand the new system and wondering what to do.• **Explanation of the advantages** – so that staff can see how they will benefit by making the job easier/ more interesting / answer any queries.• **Spell out the implications of the new system** (meetings)– to help stop rumours which give people stress / allow staff to express worries.• **Opportunity to learn new skills** – enable staff to improve their job prospects.• **Involvement in the development of the new system** – so that the staff can have a system which is straightforward to use.• **Keeping social groups together** / not disrupt working relationships – less stress / work together as a team. |

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| Jan 2012 | Following a company takeover, the introduction of new ICT systems has a big impact upon the workforce and working patterns. These changes have to be carefully managed. Describe in detail **four** different *consequences of change* caused by the introduction of new ICT systems. [4] | 1. **The new skills required and old ones not required**

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| **Retraining** |
| **Required** | **Not required** |
| Computer programmers | Typists - Many people now word process their own documents. |
| Network managers | Filing clerks data is now stored in databases andaccessed across networks. |
| Computer engineers | Internal post clerks - Many now contact each othervia emails. |

**2. Organisational structures change*** Boundaries between old departmental organisation will become blurred and staff will often be asked to take on new tasks and maybe lose some e.g. a sales person will be asked by a customer about the balance of their account. Before this would have to be referred to the accounts department but now the salesperson would access the account information via the network.
* Staff working groups may be split up affecting friendships
* Departments get restructured which means previously senior personnel get demoted whilst younger staff get promotions.

**3. Work patterns are altered*** Reacting to global markets means being operational for 24 hours a day.
* Flexible working hours e.g., telesales work when people are home from their work

**4. Internal procedures are changed*** Some staff that were internal administrators are now asked to deal with customers directly
* Traditional jobs are dome quickly so they may have to undertake new duties. These changes can cause stress if staff are not involved in decisions about their jobs or given the proper training.

**5. The workforce (fears introduced by change)*** Fears of redundancy with lost jobs. Staff wages is the biggest cost to companies. Less staff are often needed to do the same amount of work once computers are introduced.
* Fear of looking ridiculous. Older members may feel their lack of ICT skill and knowledge may make them look incompetent.
* Changes in location. Office space requirements are reduced so need smaller premises with reductions in rents, rates, utility bills. New premises may not be in original location causing problems with journeys to work, Sometimes they are relocated to different cities which could lead to either loss of job or relocation expenses. E.g. some jobs may go abroad to call centres.
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**Topic 8 – MIS**

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| **Year** | **Question** | **Answer** |
| June 2010 | Describe what is meant by a management information system (MIS). Include in your answer **one** example of how an MIS can be used. [5] | **Definition:**MIS are organised collections of people, procedures and resources designed to support the decisions of managers.**Example:*** A head teacher in a school analysing those pupils who are falling behind in their work as evidenced by test results and whose attendance is poor so that interviews with parents can be arranged.
* A production manager of a company using the MIS to make predictions as to how many of a certain product to make based on the sales from the same quarter in previous years.
* Looking at pupil attendance figures to try and see if there are patterns and to ensure that less pupils truant.
* Looking at exam results to try and find strategies to improve their target figures, etc.
* The manager of a nationwide parcel delivery service may use an MIS to look at the distance each vehicle has to travel to make the decision on whether they need a new depot.
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| Jan 2010 | An effective Management Information System (MIS) has become very important to organisations. Compare and contrast the factors which make the difference between an effective MIS and a poor MIS, using appropriate examples. [8] |

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| **Good Features of MIS:** | **Poor Features of MIS:** |
| **Accuracy of the data –** The data used from the transaction systems that supply the data to the management system must be accurate. | **Complexity of the system –** The system should not be too complex from a visibility point of view. MIS needs to be simple so managers can complete they day-to-day work. |
| **Providing data in an appropriate form –** Mangers will need the data presented according to their requirements. | **Lack of management involvement in initial design –** ICT specialists usually take control of the development of the MIS, even though their business knowledge is much weaker than the managers. |
| **Avoid information overload –** MIS must not produce any superfluous information as this can waste time and sometimes the essential information is harder to use or find. | **Inappropriate hardware and software –** the hardware and software may affect the speed information can be extracted and if it is too slow managers will only use the system as a last result. |
| **Allow individual project planning –** The information from MIS can be used to help plan new branches. | **Inadequate initial analysis –** If the initial analysis is done by someone inexperienced, it may result in incomplete information and an dysfunctional MIS that us unable to perform a key task. |
| Flexibility of data analysis | Lack of professional standards |
| Accessible to a wide range of users and support a wide range of skills and knowledge | Lack of management knowledge about computer systems and their capabilities |
| Improve interpersonal communications amongst management and employees | Poor communications between professionals |

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| June 2011**AND**June 2015 | More and more organisations are now using Management Information Systems(MIS). Describe using appropriate examples **four** factors that can lead to an effective MIS. [6]**OR**Organisations find that having an ineffective Management Information System (MIS) can be counter-productive. Describe, in detail, **four** factors that can help prevent a MIS being non-effective. [4×2] | **Accuracy and relevancy of the data:*** The data used from the transaction systems that supply data to the management system must be accurate.
* Avoid information overload by not producing any data that is not needed as this can waste time and make the information harder to use.

**Flexibility of the system:*** Managers of different sections have different requirements and the MIS must be able to cope with this.
* Managers of different parts of the business such as marketing and finance have vastly different needs.
* Allows individual project planning.
* Managers can set up their queries own quickly
* Providing data/information in an appropriate form (not format)
* Managers will need the data presented in the easiest form for them to interpret, some will want it in tabular form and some in graphical.

**Accessible to a wide range of users:*** Can be used by managers who have a range of ICT skills and knowledge.

**Give information when required:*** Timing is critical as there is no point in giving good information after the date it is needed for.
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**Topic 9 – System Development Life Cycle**

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| **Year** | **Question** | **Answer** |
| Jan 2011 | The first step in producing a new computer system is to investigate the existing system and produce a feasibility report.Describe **three** different ways a systems analyst can gather information about the existing system. [4] |

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| **Method** | **Advantages:** | **Disadvantages:** |
| **Interviews** | * Interviews with managers normally reveal how the departments work and any current problems.
* Normally will say how they want the new system to work and what information they want.
* Operational staff can supply fine detail on how the current system works
* Interviewers to get the correct information out of people.
 | * Very time consuming as a lot of people have got to be contacted.
* Needs good interpersonal skills.
 |
| **Observation** | Sit and watch how somebody does their job at present so that one can understand what they do, how and what information flows, the processes that are performed and any time delays, crashes or interruptions. | * Can be time consuming and span several weeks before you can see everything.
 |
| **Inspection of records** - include organisational charts, manuals, reports, minutes of meetings and all documentation. | * Studying the paper based information produced by the company at the moment.
* Allows one to see what information is currently held and the way it is communicated between different departments or customers and the company.
 | * There may be gaps in the information that is needed.
 |
| **Questionnaires** | * Ideal way to collect information as you do not have to waste time talking to people and can stick to the important points without digressing.
* Economical to reproduce and distribute
 | * Problem is that people forget to fill them in and hence an incomplete picture.
* Response rate from posted surveys is often poor.
* Respondents may misunderstand some of the questions.
* Cost involved in hiring people to ask others to fill in questionnaires and collect.
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| June 2010 | Having investigated and analysed a system, a systems analyst will then have to consider which changeover strategy he is going to suggest for the implementation.Describe and evaluate **two** *alternative* changeover strategies the analyst could use. [6] |

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| **Method** | **Advantages:** | **Disadvantages:** |
| **Direct changeover** – stop using the old system one day and start using the newsystem the next day | Requires **fewer resources** (people, money, equipment) and is simple,provided nothing goes wrong. | Element of **risk** particularly if the hardware and software are cuttingedge. If the system fails then it can be disastrous to the business. |
| **Parallel changeover** – Old ICT system is run alongside the new ICT system for aperiod of time until all the people involved with the new system are happy it is workingcorrectly. | Used to **minimise the risk** in introducing a new ICT system. The old system is then abandoned and all the work is done entirely on the new system. | * Lots of unnecessary work (as the work is being done twice) and is therefore **expensive** in people’s time.
* It also adds to the amount **planning** needed for the implementation.
 |
| **Phased conversion** – A module at a time can be converted to the new system inphases until the whole system is transferred. | IT staff can deal with problems caused by a **module** before moving on tonew modules. | Is only **suitable** for systems consisting of separate modules. |
| **Pilot conversion** – This method is ideal for large organisations that have lots of locations or branches where the new system can be used by one branch and then transferred to other branches over time. | Implementation is on a much smaller and **manageable** scale. | Takes **longer** to implement the system in all the branches. |

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| Jan 2011 | Describe the purpose of the feasibility report and what should be included in the report. [4] | **Definition:**The summary of an initial investigation to look at the likelihood of being able to create a new system with stated aims and objectives at reasonable cost. The document is used by senior managers to assess whether it is worth continuing with the project.**Should include:**• User requirements should be identified (aims and objectives).• Definition of the scope of the present system (outline current system).• Major data processing functions and processes (data flow).• Identification of problems with the current system.• Cost benefit analysis of the new system / Consider cost implications in terms of human resources, consultancy fees, training requirements, hardware upgrading, payment to third party providers, licences and fees, etc• Details of existing hardware and software. / Consider technical issues including: do they have equipment to implement; do they have in-house technical expertise; are there compatibility issues with existing systems• Consider operational issues including: impact on day to day work; what training will be required; will re-structuring be necessary; other logistic and practical issues• Potential improvements / benefits on the new system• Conclusions /Is it worth proceeding. |

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| Jan 2012 | During the *design* phase of the *system development life cycle* many issues need tobe considered. Other than *design of hardware*, describe in detail **four** features orprocesses which should be considered when designing a new computer system. [8] |

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| **Features** | **Consideration** |
| Design of input methods | This will include the design of forms (data capture / on-screen / switchboard) used to input data. |
| Design of processes | E.g. queries, macros, calculations |
| Design of output | E.g. reports / specialist documents such as invoices, payslips, etc. |
| Design of networks and transmission issues | E.g. topology, type of cable, protocols, etc. |
| Security processes and procedures | E.g. registering with the Information Commissioner, where data is stored, access levels, design of backup procedures, etc. |
| Design of data and file structures that will allow a useable system to be built | This will include the design of fields and table structure for a relational database. |
| Design of information systems that will allow users to get relevant information out of the system | This will allow them to make appropriate decisions. |
| Personnel issues | Staff will need training, departments may need reorganising and the skill level of the user needs to be assessed. |

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| June 2012 | A systems analyst is called in to give advice after a new ICT system is implemented.Describe, using examples, **four** *maintenance issues* that could have arisen. [8] |

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| * Identification of errors - bugs because the system has not been fully tested
* Security issues - being targeted by viruses or hackers
* Changes in the business environment - downsizing/expansion changing role of the company
* Changes in legislation - VAT rates
* Efficiency/dissatisfaction with software - not doing what is required
* Efficiency/dissatisfaction with hardware - system processing too slowly
* Upgrading the system - new technology (hardware or software) available
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| June 2011 | After the new system is working, it will have to be maintained. Describe **three** different methods of system maintenance, illustrating each method with an appropriate distinct example. [6] | **Perfective maintenance*** Improving the performance of the software.
* Examples: Configuring the network management software to improve performance such as improving access times to data, speed at which reports are produced.
* Software may need to be modified to improve the user interface upon feedback from users who are finding it more difficult to use than it needs to be.
* Developing on-line tutorials and more help screens to help new staff learn the software.
* The software provider provides upgrades which will improve the performance of the software.

**Corrective maintenance*** Bugs in the software which were not discovered during testing may need correcting.
* Example: A piece of software may crash when being used with another piece of software.
* Software may present a security risk which needs correcting.
* Problems with reports not being printed out properly.

**Adaptive maintenance*** Software may need to be changed owing to the changing needs of the business or organisation.
* Example: Software may need altering so that it is more flexible in supplying the managers with information which was not envisaged at the time of development.
* Changes to values such as the percentage rate of VAT or changes to income tax rates will result in changes to the software.
* The organisation expands so the software needs to be altered so it is able to cope with an increased number of users.
* Adapting the software to work with newly developed operating systems software or new hardware.
* A new virus threat/hacker threat means that the software will need to be adapted to protect against this.
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| Jan 2010 | Over time, users may become dissatisfied with their ICT system. Discuss why this might be the case. [4] | • The full range of user requirements has not been met, so the system does not live up to user expectations.• Change in business needs means system cannot deal with new demands placed on it.• Failure to supply users with the information they require.• User interface causes many user problems with increased help-desk use.• Problems with the software or system crashing owing to lack of rigoroustesting.• Network performance or speed of access to stored data becomesunacceptable as more users are added to the system.• Modifications to the system are needed regularly and the system needsreplacement with a new one.• Too much time is spent updating to the new system.• The cost of user support is too high. |