GCE MARKING SCHEME

INFORMATION & COMMUNICATIONS TECHNOLOGY
AS/Advanced

SUMMER 2010

INTRODUCTION

The marking schemes which follow were those used by WJEC for the Summer 2010 examination in GCE INFORMATION AND COMMUNICATIONS TECHNOLOGY. They were finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conferences were held shortly after the papers were taken so that reference could be made to the full range of candidates' responses, with photocopied scripts forming the basis of discussion. The aim of the conferences was to ensure that the marking schemes were interpreted and applied in the same way by all examiners.

It is hoped that this information will be of assistance to centres but it is recognised at the same time that, without the benefit of participation in the examiners' conferences, teachers may have different views on certain matters of detail or interpretation.

WJEC regrets that it cannot enter into any discussion or correspondence about these marking schemes.

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ICT1

1. (a)	I mark for each specific use, advantage, disadvantage e.g. Expert using it to find information on network configuration / write small batch files in DOS Advantage: Fast to run / Needs very little overheads (memory / processor) Disadvantage: Need to know the commands / a lot of typing	3
1. (b)	I mark for each specific use, advantage, disadvantage e.g. Interface for a primary school pupil using a maths program Advantage: Fun to use / colourful / easy to use as do not need to know commands / easier to customise backgrounds fonts / intuitive etc Disadvantage: Needs a powerful processor / can run slowly DO NOT ACCEPT OPPOSITE ANSWERS or WIMP	3
2. (a)	1 mark for description 1 for example x 2 **Monitoring Progress** (spotting trends) - information obtained by market research being used to inform decision making. Example *Supermarkets check on the speed and accuracy of till assistants and can then decide whether to reward or reprimand.* **Targeting of resources to gain a competitive advantage**. Advertising and marketing a product should be aimed at people likely to buy it otherwise it is a waste of time and money. Information can tell an organisation how well it is doing compared to its competitors. Example can be worth 2 marks if concept of targeting resources is clear. Example 1: *Company decides to spend money on advertising in Area B to promote a particular product. ('… because they have noticed sluggish sales' may qualify for spotting trends mark)* Example 2: *Information from research is used to identify gaps in a particular market which can then be filled by developing a new product.*	2x2
2. (b)	Two of the following with appropriate examples (1+1) Designing/Creating Data Collection sheets e.g. Pay someone to create the forms. Takes time to trial the sheets before using for real. Data Collection e.g. New staff have to be employed to go and ask people questions. Training needed to show the team how to collect the data. Processing e.g. New software/hardware has to be written/purchased to allow the results to be obtained before the data gets out of date. Maintenance/Updating Staff have to be employed to keep the hardware running and to modify the software when legislation changes or bugs are found. Data Entry New staff have to be employed to type in the results of the data collection. OMR devices have to be purchased. It takes time for someone to type in the data which takes them away from another job.	2x2

3.	Rotate: allows the architect to see the design from all angles. Stress/strain: Allows the architect to see if there are any load bearing problems with the design before it is built. / Do calculations to see if the building is safe. Wire drawing: Outline design (perspective) requires less processing to display. Walkthrough: allows the architect to see in virtual reality what the inside of the building will look like.	4
4. (a)	Any three from: (If only 3 listed points 1 mark) Hardware – if the system has an old slow processor will take too long to process the data, cost of upgrading Software - Does the software put a big demand on the system - does it work with other software. Suitability of the OS if there is a need for quick up to date information, there is no point running it on a batch processing system Communication - Do the different devices talk properly to each other, does the final system fit in what was requested Testing - Has the system been checked in all sorts of situations. Maintenance procedures - Is there someone whose job is to ensure that the data and software is kept up to date. Proper backups. Other factors could be: Change in circumstances during development Speed of implementation Compatibility Poor communication with the user Abilities of the user Post-implementation procedures Cost Hardware support / reliability Memory and processor speed are **NOT** distinct points.	3
4. (b)	Any 2 with suitable example **Repetitive processing** / carrying out the same task to the same standard repeatedly (consistency), e.g. Processing the payroll run on a computer for a large organisation. **Data storage capacity /** Able to store an enormous amount of information in a small space, e.g. all the information on the pupils in a large school will fit on a hard drive compared to a huge number of filing cabinets. **Speed of searching /** Able to find information quickly, e.g. a police check will find information on a particular car almost instantly. **Accuracy and context /** Calculations are carried out accurately, e.g. in a spreadsheet if formula and data are correct then calculations will be correct. **Speed of data communications /** Messages sent out across the world instantaneously, e.g. an email can be sent from the UK to the USA within seconds. **The ability to produce different output formats /** Information can be produced in tabular or graphical format, e.g. a scientist producing a report will include data in a table and to make some of them easier to understand will produce some of them as graphs. **Ease of editing.** **NOT** to do with handwriting.	2x2

5. (a)	Verification is a (human) check ensuring that data has been copied correctly from one medium to another (entered correctly) and validation is a (computer) check to ensure that data is sensible and reasonable.	2
5. (b)	Any two from the list with the appropriate example *Validation* **Presence** – Customer has to enter all the starred fields before the program will allow you onto the next screen (relevant field has to be named) **Format** – Ensures that the right pattern of characters have been entered i.e. 2 letters followed by 6 numbers for a stock code **Range** – That there are no silly dates entered such as 30th of February for date of birth or date of delivery. **Data type** – No letters entered into a number field for quantity of goods. **Fixed value** - List of choices for title such as Mr, Mrs, Ms, Dr, etc **Check digit** – Checks that the account number is possible under the system by doing some Maths on it. **Length Check** - *Verification* **Proof reading** – Reading over what you have entered to make sure it is correct, i.e. asking people to be sure before progressing. **Double entry -** Being asked to type in your password twice, to ensure no mistakes are made. *To get maximum marks candidates have to discuss both a validation and a verification method.*	2x2
6. (a) 6. (b) 6. (c)	A query is when you interrogate (search, sort, filter) a database to find some information. It could be used to find out which patient has an appointment tomorrow. This is the way in which the database provides information in an appropriate format for the user (outputting result of query). For example, a consultant might want a report on how effective a particular treatment has been and can be displayed in graphical form. This is when you get information from another application or you transfer information into another application. For example, when you transfer information on a patient from a surgery database into a hospital database or vice versa. (Must be the idea of transfer from one software package to another.)	2 2 2
7. (a)	To get all 3 marks there must be at least 1 advantage and 1 disadvantage. Only need one set of hardware such as laser printer and scanner which can be accessed from any machine. Can do a central back up of all the data. Can easily access any files from any of the machines. / Two or more people can access the same document at the same time. Parents can more easily monitor what their children are doing on the network. Central installation of software such as anti-virus. Disadvantage Extra money needs to be spent on cabling the whole house. Health problems associated with wireless networks. A lot of mess and disruption if the whole house needs rewiring.	3

7. (b)	Allows access to online shopping, if you realise that you need more shopping after a shop closes. You can now order 24/7 and it will be delivered first thing next day. Can videoconference (ip phone call) with family and friends making it easier to keep in touch. Files/photos can be shared with people in other countries instantly. Or one of these equally developed: Online banking Can telework Better communications Entertainment Access to huge store of information Facility plus expansion gains two marks Accept multi-use as a benefit (a bare list for 1 mark, a qualified list for 2 marks)	2
8. (a)	To get full marks candidates have to discuss at least two methods (max 3) and at least one benefit and one drawback. Candidates could compare manual with electronic and make points which cover the different electronic methods OR they could look at the different electronic methods. Either approach should be rewarded. One mark for each relevant point. e.g. Manual Method - writing marks for a registration group Benefit have a permanent record Drawbacks harder to process lots of work needed to get absence figures. OMR Radio tags Admin software on PC Wireless (Bromcom) Smart cards Biometrics Benefits Improved attendance, improved tracking of attendance cuts down internal truancy, automatic SMS messages to parents, automatic creation of statistics, automatic archiving, Drawbacks Fire cannot use the system and might not know who is there Cost of setup Cost of maintenance Equipment breakdown / power cut **6-8 marks** Candidates give a clear, coherent answer fully and accurately describing and explaining at least two methods and distinct benefits and drawbacks. They use appropriate terminology and accurate spelling, punctuation and grammar. **3-5 marks** Candidates give explanations of methods, benefits and drawbacks but responses lack clarity. There are a few errors in spelling, punctuation and grammar. **1-2 marks** Candidates simply list methods but may not give benefits and drawbacks, or give a brief explanation of one. The response lacks clarity and there are significant errors in spelling, punctuation and grammar. **0 marks** No appropriate response.	8

8. (b)	One mark for a list of four or more. Benefits must link to specific examples. Drawbacks may be generic. If benefits not linked to examples only one mark. Answers may include discussion of the benefits and drawbacks of the following: CAL CBT Blogs Distance learning Video conferencing Online learning / Internet researching / e-learning Chat rooms Revision programs Authoring software Interactive whiteboards Specialist hardware VLEs e.g. **Benefits** You can work at your own pace Instant feedback (qualified) More dynamic learning Teacher can be at a distance **Drawbacks** Lack of collaborative learning Need to be self motivated Lack of social interaction Cost of installation and maintenance (must be well qualified) No marks for repeated items. **7-10 marks** Candidates give a clear, coherent answer discussing benefits linked to specific examples and drawbacks to illustrate their points. They use appropriate terminology and accurate spelling, punctuation and grammar. **4-6 marks** Candidates discuss some benefits with linked examples and drawbacks, but responses lack clarity. There are a few errors in spelling, punctuation and grammar. **1-3 marks** Candidates simply list benefits and drawbacks and examples are not linked. The response lacks clarity and there are significant errors in spelling, punctuation and grammar. **0 marks** No appropriate response.	10
9.	1 mark each for any two general points (max 2) and 1 for advantage and 1 for disadvantage. Produce a set of equations (mathematical model) which are solved to predict weather twice a day Collect data, compare actual with observed, create model, test the model. Large number of measurements such as pressure, temperature, humidity. Information comes from all over the world, sources such as radar, satellites, balloons, etc. Advantages Only takes 1 hour to produce a 6 day forecast. Can predict path of hurricanes, etc. Can help farmers plan work. Disadvantages 160 million equations solved – cost of buying a supercomputer. Long range forecasts cannot be 100% accurate in predictions.	4

Before starting to mark question 10 look briefly through the spreadsheet printouts to determine how the candidate has identified pages, screenshots or features. In reading each answer to questions 10 (a), 10 (b), 10 (c) and 10 (d) look for the page or printout indicated. If you cannot see the item, look at the page (printout) before and after the one indicated. If you cannot see the item then no mark can be awarded.		
10. (a)	No mark for writing out the formula used. One mark for explaining what formula does and one mark for why the information is required. e.g. DATE: I used Date on page 1, cell a5 to show on which day the transaction occurred to date stamp it for future reference. Single IF: I used the IF formula on page 4 in cell f7. IF (A5 >= 17,"OK", "not old enough") checks the age of the person in A5 and this allows them to apply for a driving licence.	2x2
10. (b)	What and why? i) *My macro shown on page 4 defined the special print settings in the Page Setup dialog box (1) and printed the invoice on page 5 (1)* *Identify a navigation macro and where is it going to/between (1) this will make it more user friendly / to move backwards and forwards more efficiently (1)* *ii) Graph: The graph on page 8 showed me how money was spent (1) and it allowed me to work out the break even point (1)*	2x2
10. (c)	What and why? ***One mark for stating method and identifying it, second mark for benefits*** ***Must be a different benefit for each method*** *e.g*. List boxes in cell C4 on page 6 select a car from a pre determined list of cars (1) reducing data entry errors / increasing efficiency (1) Option or check boxes (Boolean choice) on page 5 in cell F3 clicking in the cell for yes/no data (1) increasing efficiency by saving time / reducing data entry errors (1) Spinners on page 7 in cell D5 to select the number of cars sold (1) will alter the outputs in the model / so you can see different outcomes more easily (1)	2x2
10. (d)	What and why? No mark for naming a different process but up to two marks for detailed description x2. Examples could come from: Sort, Search, 3D referencing, Output Report (Invoice) / data entry form (Order Form), VB Code, validation, etc. e.g. On page 7 I used a 3-D referencing formula in cell B2 to summarise monthly data (1) onto the annual summary sheet (1)	2x2
	Total	80

1.	Any 4 of the following well discussed **1 mark per factor.** **- 1 mark per explanation.** **Note explanations must be distinctly different and match factor.** Consistency of signposting and pop up information *e.g. Every 'Next' should be in the same place using the same icon.* *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) as users do not have to keep learning things / Helps users learn their way around the system.* 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 less guidance on the screen* **Note Nothing to do with devices** 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.* Location of where machine is to be used *e.g. No sound in a noisy area.* *Touch screens in museums / factories / etc, (with explanation of why).* 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.* House Style/Ethos *e.g. So that it conveys who the organisation is and all the company docs look/feel the same.* Specific point about colour *e.g. Effect of colour blindness, blue/yellow best combination.* On Screen help *e.g. Rather than wasting time looking in manuals, etc.* Disabled Access *e.g. If a person is blind then the computer could recognise voice input.*	4x2
2. (a)	1 mark for star shape and position of file server 1 mark for terminal/peripheral and labelling the cable	2
2. (b)	Any 2 from • There is no dependence upon a central host • 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 • No collisions • Cabling costs - less than other topologies • Each computer has the same access as others so no one node can dominate the network	2

2. (c)	3 x (1 mark for giving each factor and a 2nd mark for a fuller description) **Cost of the network** • Initial purchasing of equipment • Installation and training • Maintenance / Personnel 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 **Size of the organisation** • Needs can range from a small LAN to a global WAN. • Some communications media are limited by the distance they have to travel. • Amount of data processing required must also be considered. **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. **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 existing operating systems and protocols. • It must support any peripherals already in use e.g. bar code readers, printers, etc. **Performance in terms of: reliability / user friendliness / capacity / speed of processing** Different parts of the organisation may have different performance requirements. e.g. a real-time e-commerce system may require greater speeds and capacity and security than the in house payroll system. **Condone security if reference to level of risk NOT hacking / viruses** ***If candidates only list factors then maximum mark is 1***	3x2
3.	Any four of the following, **discussed in suitable detail**: **4 x 1** Maintaining a company website / need for trained staff Catalogue of stock, stock database Methods of secure payment / shopping trolley Database of customer orders/bids Order/bid tracking / email confirmation ***If candidates just state four points then maximum mark is 1***	4

4. (a)	**One mark for the correct name and correct brief explanation for each strategy x 2.** **One mark for an advantage and one mark for a disadvantage of each method 2 x 2.** **Direct changeover** – stop using the old system one day and start using the new system the next day (1). Disadvantage - Element of risk particularly if the hardware and software are cutting edge (1). If the system fails then it can be disastrous to the business (1). Advantage - Requires fewer resources (people, money, equipment) and is simple, provided nothing goes wrong (1). **Parallel changeover** – Old ICT system is run alongside the new ICT system for a period of time until all the people involved with the new system are happy it is working correctly (1) Advantage - Used to minimise the risk in introducing a new ICT system (1). The old system is then abandoned and all the work is done entirely on the new system (1). Disadvantage - Lots of unnecessary work (as the work is being done twice) and is therefore expensive in people's time (1). It also adds to the amount of planning needed for the implementation (1). **Phased conversion** – A module at a time can be converted to the new system in phases until the whole system is transferred (1). Advantage - IT staff can deal with problems caused by a module before moving on to new modules (1). Disadvantage - Is only suitable for systems consisting of separate modules (1). **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 (1). Advantage - Implementation is on a much smaller and manageable scale (1). Disadvantage - Takes longer to implement the system in all the branches (1).	2x3
4. (b)	**One mark for each point up to a max of four.** Example answers include: • 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 rigorous testing. • Network performance or speed of access to stored data becomes unacceptable as more users are added to the system. • Modifications to the system are needed regularly and the system needs replacement with a new one. • Too much time is spent updating to the new system. • The cost of user support is too high. • There are security breaches which were not envisaged when the system was first developed. • Speed – hard drive filling up – demands of software • Fashion – hardware satisfaction • Compatibility issues using newer versions of software	4

5. (a)	A management information system (MIS) is an organised collection of people, procedures and resources (1) designed to support the decisions of managers. (1) Examples of use similar to the following: • 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. **4-5 marks** Candidates give a clear, coherent answer fully and accurately describing MIS illustrated with an example. They use appropriate terminology and accurate spelling, punctuation and grammar. **2-3 marks** Candidates describe MIS, but responses lack clarity. There are a few errors in spelling, punctuation and grammar. **1 mark** Candidates give a brief comment on MIS. The response lacks clarity and there are significant errors in spelling, punctuation and grammar. **0 marks** No appropriate response.	5

5. (b)	Candidates may describe some of the following: **Factors which make a good MIS** • Accuracy of the data • Flexibility of data analysis • Providing data in an appropriate form • Accessible to a wide range of users and support a wide range of skills and knowledge • Improve interpersonal communications amongst management and employees • Allow individual project planning • Avoid information overload • Allow speedy decisions for urgent situations **Factors which can lead to poor MIS** • Complexity of the system • Inadequate initial analysis • Lack of management involvement in initial design • Inappropriate hardware and software • Lack of management knowledge about computer systems and their capabilities • Poor communications between professionals • Lack of professional standards **Examples of possible responses** Features of a good MIS include the following: • Accuracy of the information produced usually dependent on the accuracy of the data input. • Ability to allow managers to set up their own queries flexibly. • Presents the data in an appropriate form, for example a graph, to make it easy to understand. • Can be used by managers who have differing experience and skills in the use of ICT. • Ability to be transferred to other packages for further processing/analysis such as a spreadsheet package. Factors which can lead to a poor MIS: • Inadequate consultation with managers during the analysis of the system to find out what their requirements from the system are. • Lack of training for managers means many managers do not use the system as they should. • Inappropriate hardware or software being used. For example, the network may run slowly when processing the information needed when producing MIS reports. • Inadequate initial analysis. The system does not do exactly what it should do. **6-8 marks** Candidates give a clear, coherent answer fully and accurately describing both good and poor factors illustrated with examples. They use appropriate terminology and accurate spelling, punctuation and grammar. **3-5 marks** Candidates describe both good and poor factors with at least one example, but responses lack clarity. There are a few errors in spelling, punctuation and grammar. **1-2 mark** Candidates simply list good or poor factors or give a brief description of one. The response lacks clarity and there are significant errors in spelling, punctuation and grammar. **0 marks** No appropriate response. List of three factors 1 mark (can award twice)	8

6. (a)	1 mark for each factor and 1 for each further explanation x 2 Context must relate to a Health Authority • Identify potential threats / who has access • What is the likelihood of risk occurring / value of data to other people / location • Short and long term consequences of the threat / loss of data • How well equipped is the health authority to deal with the threat • How much money the health authority has	2x2
6. (b)	**Problem (1) expansion in context of impact (consequence) (1) strategy (1) expansion in context (1)** *Example* Problem: Staff unaware of who actually is in their buildings (1 mark) this could be very dangerous if there is a fire or looking for an at risk patient, etc. (2nd mark for more detail) Strategy: Have a backup system on paper or off site (1 mark) which staff could have emergency access to, to look up information. (2nd mark more detail). Other strategies: set up a disaster recovery system, employ a RAID system. Hackers getting in – firewalls as prevention.	4
7. (a)	1 mark for the **Issue** and 1 mark for the **Prevention x3** **RSI (repetitive strain injury) / (CTS) Carpal Tunnel Syndrome caused by prolonged working at computers or computer games** Ergonomic keyboards / wrist and foot supports / correct chair positioning **Eye Strain or epileptic fits** Non flickering screens / Screen filters to remove glare / correct lighting in the room / Take regular breaks from looking at the screen **Back problems** Adjustable chairs foot supports / tilting screens / take regular breaks and walk around the room **Stress from having to learn the system** Better training **Ozone irritation from laser printers** Locate personal laser printer 1 metre away from user **Radiation affects embryos leading to miscarriages** Screen filters **Use of Wi-fi** Only switch on when needed / any reasonable answer	3x2
7. (b)	**1 mark for each named example 1 mark for further description x 3** • **Teleworking –** working from home using computer networks saves on transport cost, time, etc. • **Video conferencing –** allows remote meetings • **Condone re-location** – ICT has allowed companies to centralise forcing people to move • **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, data clerk • **Collaborative working** – working together on same electronic document	3x2

8.	**Up to four of the following, discussed in detail, with different examples**: 4 x 2 **or any two of the following, discussed in greater detail:** 2 x 4 • censorship - for example in Burma, China • accuracy of information - if it is on the Net people believe it to be true • privacy - e.g. people can look at photos which are meant to be for family only, etc. • effects upon communities (e.g. corner shop closing) • ownership and control / intellectual property rights – who owns the information • plagiarism (e.g. buying exam answers) • lack of social interaction – people don't go out and talk to other people • gaming addiction – led to a big increase in addicts – online poker • electronic bullying – pupils sending nasty emails to each other, etc. • bad websites / inappropriate content/activity (suicide, racism, pornography, grooming) **NOT** crimes such as fake websites *If list of four points max 1 mark.* *If list of eight points max 2 marks.* *Maximum two marks for repetition of same point.*	8

9. (a)	**One mark explanation per relevant point, up to nine:** **Answers must be sentences and not a list.** **Consequences must match threats.** **List of threats 1 mark. List of consequences 1 mark.** **Threats** • Terrorism • Natural disasters • Sabotage • Fire • Theft • Poor training (condone) **Note:** Hacking and viruses are not a threat in themselves. Insert a virus to deliberately destroy data is sabotage. Hacking to take data is theft. **Consequences** • Loss of business and income • Loss of reputation • Legal action • Costs of recovering data (**Not** just data loss) **Note** - **must cover at least two 'threats' and two 'consequences' for maximum marks.**	9
9. (b)	**Any four methods, discussed in appropriate detail:** Methods for controlling access to computer rooms Methods of securing integrity of transmitted data Methods including private and public keys Call back procedures for remote access Establish firewalls Use virus scanners Proxy servers Password systems Methods to define security status and access rights for users Methods for physical protection of hardware and software Security of document filing systems Condone backup held off-site ***Note*** *- no credit for simply 'backup'*	4x2

10. (a) (i)	Suitable definition of data normalisation, such as: A staged (mathematical) process (1) which removes repeated groups of data and inconsistencies. (1) Or Simplifying data structures (1) so that attributes in each table only relate to the entity. (1)	2
10. (a) (ii)	WARD(Ward no, NumberOfBeds, *StaffId*) PATIENT (Patient no, Name, illness, admission date, consultant, address, contact, *Ward no*) *Marking – award one mark for **each** table name, one mark for **each** primary key field, one mark for **both** foreign keys and one mark for **two** other relevant fields.*	6
10. (a) (iii)	Explanation involving any two relevant reasons: Hierarchy of passwords Storage of data separate to programs Access rights to parts of the program	2x1
10. (b)	**2 marks for definition and 5 for advantages/disadvantages** **(Must to have at least two of each)** A distributed database is a single database that is under the control of a DBMS where the storage devices are not all attached to a common processor. Instead the data is stored in storage devices attached to multiple computers usually located across a network. Or A distributed database has data stored on a number of computers at different locations but appears as one logical database. Advantages: • 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: • 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 • Greater chance of data inconsistency • Harder to control the security of data spread in many different locations.	7
	Total	90

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