STANDARDS BOOKLET FOR GCE AS APPLIED ICT (9713 Paper 1)

INTRODUCTION

The GCE AS examination papers are based on the assessment objectives as described on page 2 of the syllabus. The assessment areas are

- Practical Skills
- Knowledge and understanding

The structure and timing of each examination paper is given on page 3 of the syllabus.

This standards booklet has been based on responses that candidates have given to the specimen paper for 9713. It is designed to provide support to teachers of the subject in the following ways:

- Giving examples of candidates' work at different achievement levels
- Relating answers to the mark scheme
- Providing a commentary on the candidates' work

The answers provided are designed to give some guidance as to the different range of responses that candidates typically provide and how these responses are assessed. There is no attempt made to provide specimen perfect answers.

QUESTIONS AND RESPONSES

9713, Paper 1 Short answer/structured questions

South African Motors is a car engine manufacturing company which has just started manufacturing complete cars. They are looking to sell cars throughout Africa. The factory is in East London and they have a main office in Johannesburg, where the manager, Simphiwe, organises the day to day running of the business. The main office employs a lot of workers to produce the company payroll for all the workers in East London and for those in Johannesburg. There is also a human resources department in the main office in Johannesburg which keeps all the files on each worker.

Simphiwe has asked Capetown Publicists, an advertising company, to publicise the business on a large scale. The publicist company employs 4 people including the manager Mosola. They need to have regular meetings to discuss their progress with various jobs. This is difficult as they are very rarely in the office together as they all do a lot of their work at home.

Question 1 (a)

The company uses robotic arms to control a number of processes. Give two reasons why they use these robotic arms.

General Comments

Candidates are expected to give a balanced response, for example an answer referring to not having to pay a salary in itself is not a reason. The reason is that although robots cost money to run, this is less than paying a salary. If reasons such as efficiency or speed are referred to the candidates must make sure that they are specific and that their responses refer directly to the context of the question. Arguments related to danger are not really relevant as this is car manufacturing. Answers relating to the rate of production being constant are not acceptable as this would also be true of humans.

Individual Candidate Responses

Candidate A

They may use robotic arms because, firstly, it is more secure than using humans, as if there is an accident, the robotic arm can only break, while a human may cause a lot of pain. The same amount of work will be done by robotic arms in the same time, this means that the rate of production will be constant.

> **Marks awarded = 0 out of 2**

Candidate B

They use robotic arms for safety, because certain processes may be dangerous to humans. They also use robotic arms, because they work quicker than humans, and do not need to take breaks, so they are more productive.

> **Marks awarded = 1 out of 2**

Question 1 (b)

Describe how robotic arms are used in two of these processes.

General Comments

The question asked for a description of **two** processes, candidates could only be given two marks for a list of uses of robotic arms. There is a mark awarded for naming appropriate processes and a mark for the description. Candidates should mention the role of the end effector in their description.

Individual Candidate Responses

Candidate A

They use robotic arms to
- insert the engine to the car
- put wheels onto the car
- paint the car
- drill holes in the car

Marks awarded = 2 out of 4

Candidate B

They are used for accurate procedures like welding car parts exactly into place. They would also be used to paint the car parts accurately.

Marks awarded = 2 out of 4

Describe how the movements of the robotic arm were originally programmed into the computer.

General Comments

Candidates need to realise that robot arms are either manually, or by use of a remote control, guided through the steps and the inbuilt processor in the robot learns the instructions. Alternatively sensors are attached to a human operator tracing the path and feeding this back to a computer. A candidate can gain a mark for saying the task was performed over and over again.

Individual Candidate Responses

Candidate A

Robotic arms are controlled by a computer that is used by a human, that human inputs the actions that are required of the robotic arm, and if the function is repetitive, and always exactly the same, the computer can be programmed to make it repeat the same action over and over again.

Marks awarded = 1 out of 5

Candidate B

The movements of the robotic arm would originally have been defined by a programmer going through the steps by guiding the arm of the robot. The movements would be stored as a program.

Marks awarded = 3 out of 5

Mosola decides he needs to get in touch with his fellow executives. This has to be done as soon as possible. Describe at least **two** methods by which they could exchange ideas without having to travel into work. Include in your answer the additional hardware they would need to add to their home computers and printers.

General Comments

Candidates must identify a method and hardware and also describe how the method would enable information exchange. For example, a video conference would enable participants to see and hear every other participant. Email can be used to send mail to every other executive simultaneously or can be used to gain immediate responses. Etc.

Candidate should avoid referring to 'chatting'. The key point here is that an answer relating to a 'controlled access chat room' is required. 'Chatting' is an ambiguous term and should be avoided. Reasons such as 'quick communication' are too vague – it is the immediate response which is important.

Individual Candidate Responses

Candidate A

To start with, they would need a modem to convert analogue into digital data, to be able to connect to the internet. Then they would have the opportunity to use:
- Video conferencing; They need a webcam, a microphone and speakers. They are now able to call each other online and communicate with each other using the microphone and the speakers.
- E-mails/Chat; E-mails are not real-time like Video Conferencing or Chat. You need to open an e-mail account to send e-mails and the recipient is also required to have an e-mail account in order to read them.

    Marks awarded = 2 out of 4

Candidate B

One method through which they could share ideas without travelling to work would be via email. Messages would arrive within a short amount of time to the co-worker and he could, in change, reply just as quickly. The executives would need a modem to be able to use the internet in order to use e-mails as a communication method. They also save money on travelling.

Another way of sharing ideas without travelling into work would be through videoconferences. Through videoconferences, they could see each other and talk in real time, so it would make the sharing of ideas much more fluid and personal. In order to be able to do videoconferencing the executives would need a modem to access the internet, a webcam to be able to see each other and finally a microphone and speakers to speak to and hear each other.

    Marks awarded = 4 out of 4

Discuss the effect of working at home rather than working in the office from the point of view of the company and the workers.

General Comments

The candidates must realise this is AS level. They are not likely in any formal exam to get more than half marks if they do not give both sides of the argument in a **discuss** question. Vague answers like 'they have less human contact' are not going to gain credit. Sentences are expected on this paper rather than a list of bullet points. A more acceptable answer is that 'workers will miss the personal contact with colleagues'

Answers which refer to 'less office space needed' will not gain marks unless they say why this is important i.e. 'don't have to spend money on renting large offices' or 'smaller offices are cheaper to rent or buy than large offices'

Answers like 'less stressful conditions' will not gain credit as working from home can be very stressful at certain times if the worker has a family including small children.

Most companies lay down rules about who will or will not be allowed to work from home so a candidate suggesting that the workers would not have the necessary skills is not acceptable.

Candidates should be told not to write too much on one point. Writing several lines about the convenience of working from home is not going to get many marks on its own. The ability to arrange their own work schedule is the only mark some candidates can achieve in this type of answer. Writing on and on about being able to get up when they want, able to do other things when they want, start work when they want, work when they want are all the same marking point.

Individual Candidate Responses

Candidate A

Working at home could be a huge advantage for people who have to take care of children or disable people at home. They would have more free time to dedicate it to them as they would save a lot of time in traffic, going to work and coming back. These people would also have flexible breaks that they can take when ever they want and therefore be with their children when they needed to be. However, workers working at home will have more distractions than at the office and so they may do less work. There would also be a loss face to face contact with their friends in the office. The company could save money as they would not need so many offices around the city but the employees may do less work at home than in the office because of all the distractions.

    Marks awarded = 4 out of 6

Candidate B

From the point of view of the workers Teleworking is much better than working at the office. They save travel costs from their homes to the working place and they also save a lot of time (especially in big cities). If workers start to do teleworking they can get more comfortable at their homes. Finally If the worker has a young son or a daughter and can't go to work teleworking is very useful. From the point of view of the company Teleworking can be beneficial and a problem, it's beneficial because companies don't have to buy and keep the offices where all the workers work and it can be a problem because workers at home can be easily distracted therefore workers won't work the number of hours they are suppose to and productivity may decrease.

    Marks awarded = 1 out of 6

Mosola has considered a number of ways in which ICT could be used to advertise the company but has decided on a web page. Discuss the reasons for his choice when compared with the other ICT alternatives.

General Comments

Again, this is a discuss question and requires both sides of the argument to be given i.e. advantages and disadvantages. In addition, the question asks for alternatives (plural). Any candidate not giving at least two alternatives would fail to get full marks. Please note that a mark for a reasoned conclusion has not been allocated in the mark scheme as the choice is given in the question.

Individual Candidate Responses

Candidate A

Web pages can be accessed by almost anyone in the world with an Internet connection. Since South African Motors is a multinational company (it sells cars throughout Africa), it is beneficial for potential customers all around the world to be able to see their products. Instead of using a web page, creating posters using ICT would be another option. Posters can be seen by everyone, including people who don't have access to the Internet. However, they break easily, or get covered by other posters quite quickly, so they are not very effective. Fliers can also be produced, which are very cheap to produce with mass-production methods. However, they give less information than a website can contain, and can only have text and pictures, unlike multimedia-capable websites.

Marks awarded = 4 out of 6

Candidate B

A webpage is a good alternative to other ICT advertising alternatives for several reasons.

A webpage can be accessed by anyone with access to the Internet, which means people from all over the world will be capable of accessing the company's site. This is better than other alternatives such as printing posters or flyers, which will only be seen locally and at certain locations. Also, a webpage can contain detailed information about the company, as well as images and videos of the cars they sell all at the same time. This has an advantage over other advertising methods such as posters, flyers or even videos, which can only show one bit of information at a time and don't allow you to choose which one to see.

Marks awarded = 2 out of 6

Simphiwe has decided it might be a good idea to computerise the payroll system and also the human resource department records. He has asked a systems analyst to investigate the current system and to suggest a replacement system.

Discuss the different methods of researching the current system and suggest an appropriate method the systems analyst could use.

General Comments

Candidates at this level are required to describe each method to show they understand what is involved. Where they only give the advantages and disadvantages they will only gain a maximum mark of 4 (if their answers are correct) without a reasoned conclusion. In this example, as the scenario tells us that all the work takes place in the main office, observation and interviews could be argued for in this case but as there are a lot of workers, this may take a lot of time. The scenario does not tell us if there is lots of paper work so, based on this reasoning, the likely solution is to use questionnaires. Candidates should not respond about methods of implementation. This has been a common misunderstanding by candidates at IGCSE level.

A reasoned conclusion must consider all methods and give good reasons for the choice of one of them. There are no right or wrong answers in a reasoned conclusion as long as the reasons given look at all sides of the argument and are plausible.

Individual Candidate Responses

Candidate A

Different methods of researching the current system and an appropriate method the systems analyst could use.
- Observation. You see what's going on with your own eyes. However, employees might act differently when someone is watching them.
- Interviews. Take up too much time. It's so time consuming, that it might not be worth the money and time. It's only useful if it involves one sole person.
- Questionnaires/Surveys. They are not taken seriously and people don't put much effort into them. However, doesn't take up very much time and the people do not need to meet at one time. They don't have to gather together to do it.
- Document Collection. It is unbiased and simply shows you what they are doing. Only normally done if there is a lot of collection available.

    Marks awarded = 3 out of 6

Candidate B

An analysis of the system may be done by testing the computer. This would allow the analyst to use the computer and see what it contains and what it doesn't contain. It could also be analysed by observation, as the analyst would watch the workers as they work, and take notes of what it does or doesn't contain. Lastly it could be also used by interviewing, as the analyst would interview the current workers, asking them about the system, its uses, and what it contains.

    Marks awarded = 2 out of 6

Question 3 (b)

One of the recommendations of the systems analyst will probably be to create a database of information about the workers. The information will contain details about both the payroll and personnel information. Explain how the data will be organised on the database including details of how they will be retrieved.

General Comments

Candidates need to be able to use appropriate technical terminology. The scenario deliberately creates a situation where direct access as well as serial access is necessary hence the answer relating to indexed sequential.

Individual Candidate Responses

Candidate A

The records would need to be indexed to allow for direct access of records and for individual records to be accessed rapidly. The database would contain a primary key field. This field would contain information that is unique to each employee and allow for that employees records to be access quickly. The payroll information would be the best primary key.

Marks awarded = 2 out of 4

Candidate B

Records should be indexed as to allow direct access for the employees.

Marks awarded = 1 out of 4

Question 3 (c)

The workers in East London are hourly paid. The number of hours of workers in East London are sent, via the company network, to the main office. Describe how a payroll system would take in this data and produce their payslips.

General Comments

This is a question about how the data is input and processed. Candidates should understand the processing involved when running a master file and transaction details together and be able to describe this.

Individual Candidate Responses

Candidate A

The payroll system would batch process the calculation based on the details the number of hours that each worker had worked and their hourly rate of pay. The details of the rate of pay for the worker would be stored on a master file. The process would calculate the total amount of money to be paid to the worker and produce a payslip for each one. The master file would be updated to record details of the amount of money that each worker had been paid.

Marks awarded = 4 out of 4

Candidate B

The main office will have a database that contains all the records and when the number of hours worked are sent, they will automatically calculate the payroll. It will be batch process as the payrolls will be given at the end of the month if paying per month.

Marks awarded = 1 out of 4

The company has to follow government data protection rules when it comes to storing data about the workers. One of these rules is that the company has to keep the data secure. Describe three other rules which the company must obey.

General Comments

Candidates should have a good general understanding of the rules and good practice regarding the protection of data. This question requires candidates to be able to describe the rules that apply to the protection of sensitive personal information. Marks will be credited for descriptions of the rules, however the question does not ask for a description of the reasons why the rules have been put in place

Individual Candidate Responses

Candidate A

In order to ensure that information about individuals is not used by companies in ways that they would not want to happen companies are only allowed to use personal information for the purposes for which it was collected. The company would not be allowed to give the payroll information to a company that wanted to sell pensions to the workers.

Marks awarded = 1 out of 3

Candidate B

The company must ensure that records are kept up to date, if records are kept for a long time the company should have a programme of checking and updating these records. The records should only be kept for as long as is necessary, so for example once a worker leaves the company the data about that individual should be deleted. They should also only use the data for the purpose that it was originally collected unless permission from the individual concerned is obtained.

Marks awarded = 3 out of 3

Explain why it is necessary to have data protection rules.

General Comments

Candidates should have a good general understanding of the rules and good practice regarding the protection of data. Candidates should understand the purpose of data protection rules and the risks associated with inadequate systems. This should enable them to make judgements about the level of data protection that is appropriate. Candidates' answers should identify the type of information stored and how data can be quickly retrieved and once retrieved how easy it is to copy or change it.

Individual Candidate Responses

Candidate A

Data kept in computers can be more dangerous than that kept on paper. Data can be quickly and easily copied and distributed to people who will not use it lawfully. Data protection rules are necessary to avoid people who are not supposed to see personal information to see it. Data falling in the wrong hands can be used against the subject of this data without him/her knowing.

Marks awarded = 2 out of 6

Candidate B

It is common for sensitive personal information to be held on computers. This might include financial details, health records or details of peoples address and phone numbers. If this information were to be obtained by people who wished to do harm to the individual it might be used to access bank accounts or given to companies who wished to send unwanted advertising material or call them to sell their products. It is also possible for people to change the records held about an individual on databases much more easily than they could change a paper record, and they are less likely to leave a trace of the fact that a change had been made. Data held on computers represents more of a risk to the individual than paper based records because it can be easily copied and quickly communicated over the Internet. The data protection rule also make sure that companies keep records that are as accurate as possible about people.

Marks awarded = 6 out of 6

Scenario 2

After many successful years of trading, Shazad supermarkets are extending their services to include a home shopping service. Customers will log on to the service using their home computers, choose the products they wish to buy, and then these will be delivered to their home for a small extra charge. The local supermarket will have workers who will go round the store collecting the goods together so that home delivery can take place.

Question 4 (a)

Describe the minimum hardware and software requirements of the home computer
which will be used in this system and why they are needed.

General Comments

Candidates should demonstrate a knowledge of the appropriate technical terminology. It is important that candidates not only list Items necessary but also give reasons for their inclusion. Answer given without explaining why they were needed cannot be awarded any marks. Candidates should also ensure that their answers are specific to online shopping and not just the generic use of the Internet.

Individual Candidate Responses

Candidate A

An Internet Browser is necessary to view the supermarket's website and a modem to have an Internet connection.

> **Marks awarded = 2 out of 3**

Candidate B

The customers will need to have a Modem to enable the to connect to the Internet, in addition the computer will need to have an Internet Browser installed to enable the computer to access and read the website. The customer will need to be able to select the product that they require, this will require a mouse and keyboard.

> **Marks awarded = 3 out of 3**

Describe what effect the introduction of the system will have on the working opportunities and practices for the supermarket employees.

General Comments

Candidates need to focus on the effect the changes will have on the supermarket employees generic answers about the effect of technology on working practice will not be awarded any marks.

Individual Candidate Responses

Candidate A

Less checkout operators will be needed in this new system, since there will be fewer customers buying things at the supermarket. Therefore, many of these may be sacked. On the other hand, technical workers will be needed to keep the system working and updated. These technical workers will be able to have more flexible working hours and probably work from their homes. Van drivers will also be needed to complete the deliveries.

     Marks awarded = 4 out of 5

Candidate B

The introduction of the home shopping service would affect the jobs of the employees. For example, van drivers would need to be hired to carry the shopping to the houses which order products. The staff are likely to undergo computer training. Also, there will be a need to hire technical staff to take care of any computer-related problems.

     Marks awarded = 2 out of 5

Some customers are worried that they will have to pay using a credit card. Discuss why you think this will be a problem or not.

General Comments

This is a five mark question requiring 5 separate points to be made by the candidates. Candidates should ensure that their answers are too brief or spend too much time discussing the same point and therefore failing to make enough different points often about the perceived lack of security.

Individual Candidate Responses

Candidate A

Some customers may be worried about the security of online shopping: they might feel safer when they shop at the supermarket than when they have to give their credit card details on the Internet. On the other hand, the fact is that it is nearly impossible for a hacker to break into a secure website and read the credit card details of customers. Furthermore, data will be encrypted, which adds yet another layer of security to this system.

Overall, I believe that customers should not be worried: online shopping is quite safe.

   Marks awarded = 2 out of 5

Candidate B

If customers are worried about the security of using their credit cards online this is going to cause a problem to the company as it will lead to fewer customers using the site than would otherwise be the case. The fact that some customers do not have a credit card will lead to some customers not using the site. Customers may also be worried about their credit card details being intercepted by hackers.

However, the security of paying for goods over the Internet is much better than many people think. In order to access a persons details a hacker would need their username and password. Also secured data would be encrypted when being transmitted, encrypted data is almost impossible to crack without the encryption key.

The security of paying over the Internet is much better than many people realise, however because some people are worried about it this will lead to those people not using the system.

   Marks awarded = 5 out of 5

A number of staff will be needed to update the website on a regular basis. They will be required to use computers for long periods of time. Describe the health and safety issues arising from this.

General Comments

Candidates must ensure that they describe the health and safety issues themselves rather than methods that could be implemented to overcome them. Candidates must also ensure that they say what the cause of the problems are in order to be awarded any marks.

Individual Candidate Responses

Candidate A

One major health issue for staff using computers for long periods of time will be Repetitive Strain Injury, due to typing continuously. Back problems can also appear in people who sit on the same position for hours without moving. Lastly, employees might suffer from headaches as they will be required to stare at the computer screens for a long periods of time.

　　　　Marks awarded = 3 out of 3

Candidate B

If the staff has to use the computer for very long times the company would have to supply special seat to avoid any back problem as the employees will have to be seated for a long times. Also they would have to take breaks form the computer to do some exercise and so reduce any health problems. Furthermore anti-glare would also be supplied by the company to prevent any eye problems.

　　　　Marks awarded = 1 out of 3

Scenario 3

Mr Devlin is the principal of a college of education. He has decided to upgrade the computer network. He wants to have a new system which will allow the college to keep student personal records and test marks. He also wants to have a system which will let the students have the opportunity to use computers to improve their learning. He has invited Sara Lopez, a systems analyst, to design and create the new system.

Question 5 (a)

When Sara is designing the new system she will produce a number of recommendations. She will need to choose input devices and software for use with the system. Explain the choices she will have to make.

General Comments

It is important when answering this question that candidates not only list the choices that Sara will have to make but that they also describe the factors that these choices will depend on.

Individual Candidate Responses

Candidate A

Sara will have to chose the different types of software the new system will use, including a range of prices for the school. She will need to design forms to collect the personal data records and a set of reports to display this data.

Marks awarded = 0 out of 4

Candidate B

She will need to consider how the data will be entered onto the system, this is likely to be done using data collection forms. The design of the data collect forms will need to take account of the data that is going to be stored and the output that will be required by the system. She will need to consider the processing of data that will be required when deciding on the design of the database. She will also need to put suitable validation routines in place which are appropriate for the data to be inputted.

Marks awarded = 3 out of 4

Describe the types of input devices and software that she could recommend so that students will benefit from the use of CAL and CBL.

General Comments

Answers should concentrate on the specific types of input devices and software which would benefit students, general descriptions of CAL and CBL will not be awarded any marks. On the other hand in order to be awarded marks candidates should ensure that their descriptions of devices and software are put in an educational setting and are not just general descriptions.

Individual Candidate Responses

Candidate A

A web browser would be needed in order to access educational websites on the Internet. Students will also need a mouse to be able to select files and other options. Keyboards will be useful for typing essays and website URLs. Graphics programs may be used by student to produce graphs for maths or physics, and word processing software will be necessary to type essays or other computer-written work.

Marks awarded = 5 out of 6

Candidate B

Computers can be a great benefit for disabled candidates, they can use concept keyboard for to help them input special characters more quickly and tracker balls can help some people control the pointer more accurately than a normal mouse. There are many educational websites that can be accessed using a computer with a modem and browser. Spreadsheets can help students to analyse data in science experiments.

Marks awarded = 4 out of 6

Question 5 (c)

Students would like to be able to continue with their computer-based work at home.

Discuss the methods which they could use to enable them to do this.

General Comments

Candidates are asked to discuss methods or moving data, not simply name them. Answers should have information regarding size of memory as well as mentioning the portability (or lack of it).

Individual Candidate Responses

Candidate A

Floppy disks could be used. These hold very small amounts of data, but are small and easy to carry. USB sticks are smaller than any other hardware devices used for storage, and can hold relatively large amounts of data. Rewritable CDs are another option: although they can hold large amounts of data, they are often slower to use than USB sticks, and larger than floppy disks. In conclusion, I believe USB sticks are the best option, since they can hold more data than floppy disks (and sometimes more than CDs), and are small and portable.

Marks awarded = 4 out of 4

Candidate B

Students could use different methods to take their work home. One would be using USB sticks, which can carry a lot of data and are small. Also, they could use floppy discs or CDs as an alternative. Lastly, they could send themselves emails with the work.

Marks awarded = 1 out of 4