STANDARDS BOOKLET FOR GCE AS APPLIED ICT (9713 Paper 3)

For paper set May/June 2008

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 9713 May/June 2008 Paper 3. 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.

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QUESTIONS AND RESPONSES

9713/03 Short answer/structured questions

Rameses III hospital in Cairo is a modern building with a good ICT network. They use the computer system for monitoring the health of patients in Intensive Care Units (ICUs). The computers are also used to carry out medical diagnosis using an expert system. A lot of its drugs are supplied by the Pyramid pharmaceutical company. This company carries out research and development to produce new drugs. Once the final drug is approved there are many stages before production. This requires the company to use project management. Pyramid also carries out safety training for all its employees. Computer Aided Learning (CAL) is used with the help of interactive DVDs.

Question 1 (a)

Describe how the monitoring system in an ICU would determine whether a doctor or nurse needs to be warned about a patient's condition.

General Comments

This is a question about doctors or nurses using a monitoring system and it is a topic that should have been covered in teaching. Candidates needed to read the scenario to understand what an ICU is. It is not a computer system. A sensor does not alert the computer. The computer takes the readings continuously from the sensors/ADC and the programmed conditional test decides if action needs to be taken. Answers must reflect this. Note the use of preset 'range' rather than preset 'value'. In practice a monitoring system would use a range of values which are deemed acceptable rather than a single value as given by many candidates in their responses. Note also the importance of the microprocessor triggering the alarm; most candidates failed to give this answer. The first marking point is to emphasise that it is a continuous process. The marking point requires not just the word 'sensor' but what it monitors.
The marking point available for the need for an ADC, is a very easy mark. The fourth point was missed by a lot of candidates who had learned just a pre-set value and not the real world condition of a range for the test.

Individual Candidate Responses

Candidate A

If the heartbeat of the patient drops or increases from the preset value a buzzer will ring calling a doctor or a nurse. If the temperature of the patient increases from the preset value. Monitoring system will measure blood pressure and if it is above or below the preset value.

Marks awarded = 0 out of 4
This candidate repeats the same point, this should be avoided by candidates.

Candidate B

Patient's in ICU are very susceptible to heart attacks hence they are being monitored continuously. The patients blood pressure, temperature, breathing rate and heartbeat or pulse rate is being monitored by the sensors. A pre-determined value or range is programmed into the system. If the patients heartbeat or glucose levels falls below or above a certain optimum range that means the patient requires medical attention. When values go out of range an alarm or beeper is triggered.

Marks awarded = 3 out of 4

Question 1 (b)

What are the advantages of using the computer patient monitoring system?

General Comments

There are some easy marking points here but others require a higher level of understanding.
The first marking point (Gives 24/7 cover qualified e.g. leaving nurses free to deal with other matters/lower costs using microprocessor rather than nurses) was often missed by candidates because they only gave the 'what' of 24/7. This shows little subject knowledge and understanding unless qualified with a 'why' such as doctors/nurses can tackle other tasks, or to provide enough trained staff to monitor each patient would cost too much. A further marking point is available foe a discussion of computer systems being able to detect small changes and being less prone to mistakes. Another marking point is available for discussing that a computer system can monitor more than one variable at the same time (note the qualification here for the mark; nurses can monitor more than one variable but not at the same time.)

Individual Candidate Responses

Candidate A

- The patient can be monitored continuously, there is no need for nurses to take shifts over the patient.
- The computer would be able to respond quicker than a nurse in case of an emergency.
- Having an automated system would free work from staff enabling them to work elsewhere or made redundancies thus cutting costs.

    Marks awarded = 3 out of 3
    Note the qualification provided by this candidate.

Candidate B

- Accurate results
- 24/7 'All day' around the clock monitoring
- Less cost of staff
- Saves a lot of time for staff

    Marks awarded = 0 out of 3
    Gives minimal detail and fails to expand their answer to an A2 level and hence earns no marks.
    Also note that 24/7 monitoring is also possible for nursing supervision so no mark.

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Question 1 (c)

Describe how the Expert System would be used to help diagnose an illness.

General Comments

This question refers to a doctor or nurse using an expert system - not a patient. To receive credit, answers must be about the use of such a system not how it is created. Candidates need to read the stem of a question carefully please. Many candidates seemed not to understand how a user would be asked questions etc by an expert system and then use the system to inform their diagnosis. One very good answer provided by a candidate hit the marking point with 'the doctor can then compare the results to his own conclusions and make a decision.'

Individual Candidate Responses

Candidate A

An individual, probably a nurse would first ask questions to the patient using the expert system user interface. She will enter the answers given to her by the patient. Using the knowledge base and rule base the system will search the information it has and produce a suitable output.

   Marks awarded = 4 out of 4

Candidate B

The symptoms of a patient are entered into the expert system using a keyboard. The inference engine searches the entire knowledge base which has accumulated data to search for possible illnesses. The percentage probability of the patient having a particular disease is output onto the screen, which the doctor or nurse can use to help diagnose the illness.

   Marks awarded = 3 out of 4

Describe the advantages and disadvantages of using an Expert System in this application.

General Comments

Many candidates failed to qualify their answers and therefore missed the marking points which require a description of the advantages and disadvantages. For example, expert systems are expensive to purchase because they need a great deal of time to interview experts. Both advantages and disadvantages needed to be covered for full marks.

Individual Candidate Responses

Candidate A

The expert system can perform the task quickly which saves time. There will be no need of an experienced or skilled doctor to deal with the patient for illness. But, the expert system needs to be kept up to date to predict about new diseases. The initial setup cost is very high as it requires sophisticated programming.

> **Marks awarded = 3 out of 3**
> **This candidate (and candidate B) and the next give 4 good marking points but can only earn the maximum 3 marks.**

Candidate B

Expert systems have a wider knowledge base than a human and therefore this helps the doctor diagnose illnesses that he/she may not know about. There will be a higher chance of diagnosing the right disease faster which would save time and money that would be spent on analysis. Expert systems are very expensive to buy and maintain.

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

Candidate C

Advantages would be like the fact that diagnosis takes place faster which results with customer satisfaction and thus higher income. Also junior staff can handle or help out patients thus less wages to be paid. Disadvantages may be like the initial cost of the system; having to reprogramme the system whenever a new illness is discovered.

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

Describe how computers are used by Pyramid in their research.

General Comments

This question is about researching new drugs, answers must relate to this context.
Drug companies spend millions on research and will have a database of previous work to search through. Some candidates answered that the internet could provide information. Drug companies would be actually be very secretive and not use an open area.
The modelling of a human body and its reaction to the drug was offered by a small number of candidates.

Individual Candidate Responses

Candidate A

Designing of drugs and research is done by the computer. The computer predicts the reactions of various chemicals and records it. The computer compares the with the data already stored in the system. The computer controls the exact quantities of various chemicals need and various conditions.

Marks awarded = 3 out of 6

How could appropriate software be used by the company to determine the selling price of the drug?

General Comments

Suitable applications were required here to produce a selling price for a new product to evaluate a selling price and thus a profit margin. The main answer expected was a spreadsheet. Some candidates were confused by selling price and gave bar code reader as an answer. Quite a few candidates described using an online auction site to sell the drugs which demonstrated a lack of understanding of how big business would use ICT.

Individual Candidate Responses

Candidate A

It could use the spreadsheet, database, DTP and word processor. Spreadsheet to calculate selling price of the drug which automatically calculates. Database to store information about the drug. Word processor to design a report.

Marks awarded = 0 out of 2

Candidate B

They might use spreadsheets since they provide goal seek option which will help them set the profit and the appropriate selling price could be calculated.

Marks awarded = 2 out of 2

How are Gantt charts and other project management tools used to ensure the project meets its objectives and is completed on time?

General Comments

The questions sets out the need for time management using a project management application/technique. Very few candidates had an adequate level of subject knowledge in this area to be awarded high scoring marks. Candidates need to have the subject knowledge and understanding of Gannt charts as set out in the first four marking points:

- *Gannt chart shows all stages/tasks to be done*
- *Gannt chart shows the critical path(s)*
- *Gannt chart shows key project milestones*
- *Gannt chart also shows:*
    number of days to do tasks
    progress on tasks as % complete
    progress vs expected time to do work
    how tasks are all linked together

Some knew about CPA and PERT charts. However, few candidates understood the key feature of project management software that there is automatic updating of key points as a project progresses.

Individual Candidate Responses

Candidate A

Gantt charts, CPA (Critical Path Analysis) and PERT (Project Evaluation Review technique) can be used. The CPA show each task is divided with the deadline and completion time.

Marks awarded = 3 out of 4

Candidate B

Gantt charts are physical representations of the tasks undertaken together with the time. They could be used to divide the project into tasks and identify the milestones and the staff with the required skills. They would keep regular status of the project that would be compared with the original set deadlines and signal delays.

Marks awarded = 3 out of 4

Candidate C

Gantt charts are used to determine which tasks can be done in parallel. Other project management tools like critical path shows which is the longest task; they tell the project leader how much time each task takes.

Marks awarded = 3 out of 4

What are the advantages of Pyramid using CAL over more traditional classroom-based training methods?

General Comments

This questions required candidates to **compare** CAL to traditional classroom training. It was a topic that should have been familiar to candidates and was well answered. This question asked for only the advantages of CAL and not for an evaluation of the two methods.

Individual Candidate Responses

Candidate A

- The student may work at their own pace and it may be undertaken at any time according to their schedule.
- There is no need to spend money to hire trainer.
- With CAL there may be automatic response and immediate feedback in tests.
- Workers may learn by their own mistakes.

     Marks awarded = 4 out of 5

Candidate B

CAL is better because not all employees work at the same pace. In addition to that, some areas can be repeated by a person. CAL can be dome at any time to suit a person.

     Marks awarded = 3 out of 5

Explain the disadvantages of CAL.

General Comments

Many candidates did not give valid disadvantages of CAL. A large drug company is not likely to suffer power cuts; it will have its own standby generators if the power is unreliable as they cannot afford to lose a batch of drugs being manufactured. Candidates gave this answer quite frequently, but it was not accepted in this scenario. Candidates quite often described how students could be distracted when using CAL. Many candidates answered that CAL could be expensive but failed to qualify why this might be the case.

Individual Candidate Responses

Candidate A

It would be easier for students to cheat as no supervisor would be necessary
Knowledge provided by CAL is limited
High initial costs to provide computers and create specially written software.

Marks awarded = 2 out of 3

Jollywood is a large music retailer. It has decided to offer online shopping to sell its music CDs, DVDs and other products. They will use their website www.jollywood.org to allow customers to log on, choose and buy their goods. These goods are sent out from Jollywood's central warehouse which is computerised. Jollywood have had market research carried out which suggests that they should no longer sell traditional HiFi systems that use CDs and tapes. They will need to stock items which use state of the art technologies.

As well as this, the company has decided to operate a call centre providing an information service to customers. Customers will be able to phone the centre if they have a problem with a product or other queries and the operators will advise them.

Question 4 (a)

What advantages does Jollywood's move to online shopping offer the customer and the music retailer?

General Comments

This questions uses online shopping as its topic, which most candidates should be familiar with. Any music retail site provides the features that candidates were expected to have an understanding of and be able to describe. This question was required detailed knowledge of such a system to be given in context. A maximum of 3 marks was allowed for benefits to either party, as the question was about the advantages to both the customer and the store.

Individual Candidate Responses

Candidate A

After this move more and more people can gain access to their products. Also they can be updated on any upcoming events etc.

> **Marks awarded = 0 out of 4**

Candidate B

Advantages to customer:-
1) No sticking to shopping hours it can be done any time.
2) Shopping can be done 24 hrs a day
3) Can search all the shops for best price.
Disadvantages:-
1) Must pay delivery charge
2) lose personal touch)
Advantages to music retailers:-
1) savings on office space as less staff needed
2) a wider catchment of customers.
3) customers can be informed of new products by mail *(no mark)*

> **Marks awarded = 3 out of 4**
> **Answer 2 is a repeat of the first answer. This candidate also gives disadvantages to the customer which were not asked for in the question and so did not receive credit.**

Describe the features you would expect to find on Jollywood's site.

This question required good descriptions of the features of a web site. Many candidates failed to understand the difference between features such as a shopping basket and the content such as company privacy policy.

Candidate A

A log-on button with separate fields for username and password, as well as a 'sign-in' or register button for new users. Purchasing CDs should be easy with 'add to cart' button. The transaction window should have fields to pay in credit card details and an instant calculator to see how much they would be spending (basket).

Marks awarded = 4 out of 5

Candidate B

It would have product catalogues, a search facility for that catalogue. Suggestions such as 'those who bought this also bought…' A facility for comparison of similar products such as all Ipods™ (they would sell no more HiFis). The facility to create a user account. A shopping cart check out facility.

Marks awarded = 5 out of 5

Candidate C

The features that would be expected to be seen on Jollywood's website are news, downloads, products for sale.

Marks awarded = 0 out of 5

Candidate D

- How to search for what you need to buy
- Previews of the music so you could choose
- Announcing new releases
- Telling the customer if stock is available
- Telling the customer about the methods of payment

Marks awarded = 0 out of 5

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Each item at the warehouse is marked with a bar code. Describe how an automatic stock control system would be used.

General Comments

Many candidates failed to understand the level of detail required and did not provide an adequate description of how the system would be used, for example, the record of the item sold must have been clearly mentioned when number in stock filed is reduced.

Many candidates failed to be specific about the processes applied to the product as identified by its bar code and gave vague answers about deleting/deducting stock.

Individual Candidate Responses

Candidate A

At the EPOS terminal the worker will scan the bar code containing the unique item number of the products using a bar code reader connected to the computer. This uses the database to search for the item being sold using the unique item number. The quantity sold will then be subtracted from 'number in stock' field. The computer will then compare this new value with the reorder value and will automatically send out an order for more of this item if the stock is below the reorder value.

Marks awarded = 5 out of 5

Candidate B

The item's barcode is scanned and the quantity in stock in the database is subtracted from the 'number in stock' field. The stock level is compared with the reorder level; if it is below this number a request is sent to the vendor to dispatch more of that item. When it arrives the 'number in stock' field is increased by the quantity delivered.

Marks awarded = 5 out of 5

Question 4 (d)

Explain how a "just in time" system could be used by Jollywood at the warehouse.

General Comments

Just in Time was a topic that was generally well answered, however the stem of the question was often repeated in candidates' answers, this shows poor exam technique as no marks can be awarded for simply repeating the question. Many candidates failed to explain that it was the customer who drove the ordering.

Individual Candidate Responses

Candidate A

Just in Time means that the sale of the product happens just in time. There is no space required for storage and there is no wastage involved. The CD is requested from the supplier and when it reaches the warehouse it is shipped to the customer.

Marks awarded = 3 out of 3
No credit was awarded for the first sentence as this repeated the question.

Question 5 (a)

Describe how market research would have been carried out for Jollywood.

General Comments

To gain the marking points candidates were required to contextualised their understanding of market research to Jollywood. Generic descriptions of market research techniques did not gain credit. A candidate who simply offered a list such as questionnaire, interviews, pop ups was not awarded marks.

Individual Candidate Responses

Candidate A

Jollywood also have to make a search of competitors web sites to be sure that customers will choose to use their site.

Marks awarded = 1 out of 5

Candidate B

Jollywood would call its customers and ask a series of questions. They could place pop-ups on the website for customers to answer a set of questions. The data retrieved is analysed and current trends identified.

Marks awarded = 3 out of 5

Describe the recent advances in technology which have led to music CDs being replaced by other media.

General Comments

Candidates generally failed to give the technical advances enabling MP3 players. Some candidates failed to understand that the question was about why new technology has made the CD redundant. This section was an opportunity for candidates to use their everyday experience with MP3 players and explain why these have radically changed the music industry and market. Centres should take note of the level of description required to explain why, for example, flash drive players and hard disk machines have been so successful due to the technological developments.

Individual Candidate Responses

Candidate A

Today we have DVDs in which we can have music, USBs and mobility phones which have lots of memory. Furthermore we have MP3 to save our music.

> **Marks awarded = 0 out of 4**
> **This candidate names devices but fails to give the descriptions required to be awarded marks.**

Candidate B

These devices (MP3 player) could store a minimum of 300 songs much more than a CD

> **Marks awarded = 1 out of 4**

Candidate C

Music compression technologies such as WMA or MP3 have enabled music, in good quality, to be available to download and carried on portable media. Invention of high capacity battery life portable players has enabled people to carry their music on the go. With the availability of high speed internet and music downloading services have reduced the need for CDs. WiFi and devices such as ITouch has enabled new music downloads when on the move.

> **Marks awarded = 4 out of 4**

Jollywood have bought all the necessary hardware to create the call centre. Describe the specialist software which will be needed and explain why it is required.

General Comments

The answers must be about specialist software – CTI was mentioned by some candidates who then should have described some of its features as set out in the mark scheme. A web browser is not specialised software.

Candidates generally did not understand that this software enables telephone messages to be sent through the network to any computer. Very few understood that a caller would key in a number to select from an automatic menu system for routing.

Individual Candidate Responses

Candidate A

CTI automatically queues incoming calls and links them to agents who become free. It monitors call status, the workers rate of handling calls and logs and records calls.

Marks awarded = 3 out of 4

Question 6 (b)

Describe how computers would be used to support the call centre operators when dealing with customer enquiries.

General Comments

The question required candidates to describe how an operator could be assisted by the ICT system in handling calls. It was understood by some candidates but others demonstrated little knowledge or understanding of this topic.

Individual Candidate Responses

Candidate A

Computers have on screen scripts provided with a sequence of questions to ask the caller. Search engine facility to quickly find the solution to troubleshoot customer problems.

Marks awarded = 3 out of 4

Candidate B

Scripts are provided which will prompt the operator to ask the customer questions. The operator types in the responses and enquiries will be automatically solved without over stretching the operator.

Marks awarded = 2 out of 4

Question 6 (c)

It has been decided to employ more disabled operators at the call centres. Describe what features the computers system should have to help these disabled operators.

General Comments

This was well answered apart from those candidates who failed to explain why the device was suitable for a particular disability.

Individual Candidate Responses

Candidate A

For example, for operators who have sight problems the screen can be large or fonts bigger and background less bright. For operators who have motion limits tracker balls or joysticks would replace a mouse.

Marks awarded = 2 out of 3

Candidate B

Some people may not have hands so they can use a foot mouse to navigate on screen and select items.

Marks awarded = 1 out of 3

Candidate C

A touch screen for people who are not able to type. A voice output and input system for people who cannot see. Tracker ball for people who do not have full use of their hand.

Marks awarded = 3 out of 3

Science Fiction writers over the years have made many predictions which have proved to be accurate, for example robotics and monorails. The only major advance never predicted by these writers was the internet.

Question 7

Describe how the internet has quickly grown since its introduction in the 1990s.

General Comments

An open question that provided candidates with an opportunity to use their subject knowledge and understanding. All of the candidates will have used the internet and should have a good understanding of how it has changed. Far too many answers just identified an item, such as online shopping, without expanding on how its rapid growth has led to an expansion of the internet. There was scope for a description of technical advances, for example the widening of the type of information on the internet, the improvement in technology affecting PCs and media players. Many candidates failed to give valid explanations for the **growth** of the internet.

Individual Candidate Responses

Candidate A

Different organisations realized the importance of collaboration and started connecting local area networks to form a wide area network. The Internet started to grow and different types of business started up. The first was on-line shopping with Amazon being one of the first. Many shopping companies followed which increased network traffic. Many educational institutes went on-line with their resources making the Internet a valuable research resource and increasing traffic even more. As modern technology and the reliability of security systems has improved more and more people are using on-line banking. People all around the world are now using internet messaging and video chat which demands more data transfer.

Marks awarded = 6 out of 8

Candidate B

With the production of faster computers and faster connections such as ISDN or DSL the Internet attracted a very large market. 'Flash' enabled software meant that multimedia was used on Web sites and which increased data traffic. With increased security e-commerce was now possible for many more users. The launch of search engines such as Yahoo lead to more people using the Internet. Then came the dawn of the 'chat age' and many were using instant messaging to communicate with each other. The creation of social networking web sites has further increased traffic. The increased user base has led companies to work with a wider audience with the Internet available almost anywhere.

Marks awarded = 6 out of 8