COMPUTER STUDIES

Paper 0420/11

Paper 11

General comments

The standard of work from candidates was, in general, similar to that in previous years. Centres are reminded of the following important statement:

Candidates are reminded that all scripts in this subject are now scanned in and then marked on screen by Examiners. It is vital that candidates answer the questions using the space provided to avoid any possibility of any part of their response being lost. The space provided on the exam paper for each question or part question is more than adequate and is a clear indication of the depth of answer required. Should a candidate make a mistake or still need more space and they need to continue their answer elsewhere then they must indicate very clearly where the rest of their answer has been written.

Comments on specific questions

Question 1

This question did not cause any major problems for the candidates. However, there were one or two areas which require particular comment. In part **(a)**, many answers just referred to distant conferencing and did not mention those features particular to video conferencing such as the need to have a network/Internet, communications/compression software, etc. Virtual reality and simulation were confused by many in part **(b)**. It was also common to see the statement: *"simulation was the study of the behaviour of a computer system"* – again this was probably down to rote learning rather than understanding the topic. Whilst part **(c)** was generally acceptable, many candidates gave one word answers as examples *e.g. printer, keyboard* – this is not sufficient for a mark since some expansion, such as *printer out of paper, <BREAK> key pressed,* is required. Part **(d)** was not that well answered with many vague statements being made, such as *"data is collected in a batch"* which does not explain the term *batch!* Finally, part **(e)** was well answered with many references to knowledge base, rules base and inference engine.

Question 2

There were the usual problems here confusing design with analysis, feasibility study, etc. Some very vague answers such as *design the output, design the input* were offered which were not sufficient to gain any marks.

Question 3

Part **(a)** was generally well answered with reference to multimedia, animation and use of graphs being the most common. Unfortunately, many candidates simply named software (e.g. WORD, POWERPOINT, etc.) and consequently gained no marks. Candidates are warned about not using trade names on the front page of the examination paper. Many candidates unfortunately missed the point in this question and referred to interviewing workers, etc. Workers would be affected through, for example, *unemployment, deskilling and the need for re-training.*

Question 4

This question was fairly well answered by the majority of candidates. The most common answers were viruses (corruption of data), computer/hardware crash (data loss) and hacking (illegal access to data).

Question 5

This was generally well answered; but many candidates gave answers that were to vague e.g. *DIRE system is directly replaced by new system, an advantage is that it is faster; PHASED – the syst introduced in phases.* Such answers would gain no marks.

Question 6

Many candidates misunderstood this question and gave examples of input, output and storage devices. Whilst a device such as a keyboard (input) was perfectly acceptable, a printer (output) or hard disk drive (storage system), for example, are not forms of interface with a computer! In part **(b)**, many candidates gave a correct device but the applications were far too vague to gain any marks e.g. *bar code readers are used by supermarkets, cameras are used to take photographs, MICR is used in a bank* are all too vague and do not really describe an application. Acceptable applications would have been: bar code readers are used by supermarkets in automatic stock control, cameras are used to take photographs as part of a security system, MICR is used by banks when processing cheques, etc.

Question 7

Many candidates gained one mark here for reference to scanning the bar code on a product item. The following answer was very common to illustrate the point*: "bar code on the item is scanned and the item is then removed from the database; when it reaches a certain number, the manager is warned"* – such an answer would gain one mark at best for reference to use of bar code scanners.

Question 8

In part **(a)**, whilst most of the descriptions of virtual reality were fairly sketchy, many gained marks for reference to hardware/interface items such as data goggles and data gloves. Many answers in the second part were too vague and good marks were fairly scarce – *"it is less dangerous", "it takes less time", "it is less expensive"* were all very common answers which gained no marks. In part **(c)**, it was very common to see *games* as the application (which is not sufficient!) but there were many good applications from the better candidates.

Question 9

Some very general answers were given in part **(a)** where candidates just described a menu rather than a drop-down menu. Many gained a mark for indicating that the choice was made by highlighting the required option. The second part was fairly well answered with many candidates realising that drop-down menus only work when a limited number of options are available.

Question 10

In general, many candidates understood the concept in part **(a)**, but had difficulty in explaining it and consequently few marks were gained. In part **(b)**, the advantage of high-level languages was generally well understood. However, almost no-one gained the mark for advantages of using low-level languages, namely direct control of registers, gain knowledge of how computers work, etc. Part **(c)** was generally well answered.

Question 11

All parts of this question were generally answered well. The following errors were very common: in part **(a)**, B5 + C5 +D5 + E5 + F5/5 (brackets missing), AVERAGE(B5:F5)/5 (additional 5 in the formula); in part **(b)** SUM(B5:F5)/2 (incorrect formula).

Question 12

Many candidates clearly just guessed where the errors in the algorithm were, but a significant number identified the errors correctly and, probably more importantly, also suggested a valid correction.

Question 13

There were no real problems worth reporting here. A full range of marks was seen.

Question 14

This question was not well answered. Many candidates still think that sensors control processes and do not realise that it is the microprocessor that actually supplies signals to valves, heaters etc. by way of, for example, actuators and DAC. In part **(b)**, many candidates suggested an alarm/warning – this would not be acceptable in this application. The final part was generally acceptable.

Question 15

Part **(a)** was generally well answered, but all numbers between 8 and 104 were seen on the exam papers. For some reason, only *US1* was seen in a number of cases in part **(b)**. The most common error in part **(c)** was the use of the AND statement instead of OR. Parts **(d)** and **(e)** did not cause any major difficulties.

Question 16

There were no problems in parts **(a)** and **(c)**. In part **(b)**, the description of encryption was satisfactory but it was still common to see encryption described as a form of *coding* rather than *encoding*. Unfortunately, several candidates still think encryption prevents illegal access to files. Encryption does not stop the access, it just makes the files unintelligible without the decryption key.

Question 17

In part **(a)** a significant number thought broadband and WiFi were the same thing. It was also very common to see vague answers such as: *"it is faster", "you don't need to use phone wires to connect to the Internet", etc.* Part **(b)** did not give too many problems, but many candidates were very vague regarding hacking into WiFi networks. It was necessary to indicate why WiFi was different to wired Internet connections. Part **(c)** was generally well answered.

Question 18

This question required the use of nested loops to work effectively**.**

Whilst the usual number of 1- and 0-mark responses were seen, there were a significant number of candidates gaining full marks on this question. There is still strong evidence that the better candidates enjoy the challenge of solving problems using the algorithmic approach. These questions will continue to be used as a way of instilling logical thinking into problem solving.

The only repeating errors were:
- **If** temp > highest **then** temp = highest (should be highest = temp)
- output in the wrong place (i.e. inside the main loop)
- incorrect loop control (mainly problems with **for** ..... **to** ..... **next** loop constructs)

COMPUTER STUDIES

Paper 0420/12

Paper 12

General comments

The paper produced a wide range of marks. None of the questions set denied candidates the opportunity to display their knowledge and very few candidates did not attempt to answer all of the questions. There were a few questions, detailed below, where some candidates had difficulty in achieving the maximum marks on offer.

The comments below on individual questions provide a rationale on the awarding of marks which should prove helpful to teachers of the subject. Examples are given of responses which obtained marks when a degree of interpretation had to be made when considered alongside the specific wording of correct responses in the mark scheme; and equally, examples, with explanations where necessary, of responses which did not obtain credit.

A number of responses were deemed to be too vague to obtain any credit. It is worth reminding candidates that their answers should reflect a level of understanding gained by following a course in Computer Studies and not just that which might be found in the public at large.

Comments on specific questions

Section A

Question 1

As a whole this question was answered well by most candidates with very few candidates not achieving at least 6 out the 10 available marks.

Question 1

(a) A large majority of candidates scored well for this part of the question usually for stating that a buffer is a **temporary memory or storage area,** and giving a **printer buffer** as an example (or to elaborate on this example by stating that 'pages waiting to be printed were stored in a buffer'). Fewer candidates mentioned the need for buffers to compensate for speed differences between peripherals and the processor.

(b) Well answered by many candidates. A common error was to repeat the word 'batch' without explaining just what that meant: '..data is collected together *in* a batch before processing starts'. Candidates were expected to state clearly that **all** the data is collected before processing begins.

(c) Not as well answered as other parts of the question. A response which indicated that the candidate understood that the **'e'** stood for **'electronic'** was enough to gain a mark. Many candidates gave Ebay as an example which did not gain a mark - the rubric on the front cover clearly states that 'No marks will be awarded for brand names ...'. It is a common error throughout the paper and teachers should draw their candidates' attention to the rubric and explain that examples such as 'Ebay', 'Word' or 'Excel' would not gain marks whereas 'online shopping', 'word processor' or 'spreadsheet' would.

(d) A common error was to confuse 'simulation' with 'virtual reality'. This error was then repeated later in the paper when the question asks about 'virtual reality'.

(e) Surprisingly few candidates explained that the 'e' in 'email' stands for 'electronic'.

Question 2

(a) A well answered question by most candidates. Those candidates who did not score we confused the effects the introduction of robots would have **on the work force** and the adva **to the company.** For example, whilst unemployment/reskilling/deskilling are effects on the w force, having a reduction in the wage bill is of benefit to the company. This was not what this pa of the question asked for.

(b) Many candidates scored at least 1 mark for this part. Reduction in wages paid, robots being able to work 24 hours 7 days a week and greater throughput were commonly seen correct responses. Candidates would do well to remember, though, that human beings can work for 24 hours at a stretch. The important point is that robots would not need to take breaks, or get tired during this 24-hour period, and unless clearly stated in their response the ability to work for 24 hours *on its own* was not enough to gain a mark.

(c) A well answered question with very few candidates failing to obtain the mark for 'robots being programmed to perform the task'.

(d) A poorly answered question by many candidates. A common error was to assume that a human would check **every** television produced for missing parts! The more able candidates gave one of the correct responses to this question, with surprisingly, 'responding immediately to parts being missing' as the most common correct response; it was anticipated that the need for quality control checks would be more commonly seen.

Question 3

A well answered question, but a common mistake made by candidates was to give 'fact-finding' as a correct response and then to go on and expect further credit for stating the specific variety of methods by which this would be done.

Question 4

A very well answered question with most candidates obtaining at least 3 out of the 4 marks available. Responses not given credit were usually just too vague for the mark to be awarded – for example 'data should not be transferred to another country' should clearly state '..to another country *without equally secure data protection laws';* and '..data should not be passed on to other people' should clearly state '....to a third person *without permission*'.

Question 5

(a) A very poorly answered question. A large number of candidates gave 'hacking' as their response without realising that all they were really saying was that the customer's access details would be accessed by someone who was unauthorised to do so. The question clearly asks 'How [can]...the details be discovered...?. Those candidates who did gain marks for this question did in fact realise that 'hacking' on its own did not answer the question.

(b) This part of the question was not well answered by most candidates either. The more able candidates did realise that the anonymity of the online user to the online shop increases the security risk as the payment details could be entered by anyone, not necessarily the card owner; and, as opposed to the online shop, in a high street shop the card's PIN number and/or a signature would be needed.

(c) Much better answered than the previous two parts to the question with most candidates scoring at least one mark and many gaining both marks.

Question 6

(a) Well answered by many candidates. As usual a number of candidates responded with details about how the expert system would be **used** and not, as the question states, how the system would be **developed**. A good question to use as an example by teachers when reminding their candidates to 'read the question'.

(b) (i) Well answered by the candidates who understood the difference between simulato[illegible] reality. As opposed to simulators, which allow one to study the behaviour of a syste[illegible] model, virtual reality creates a seemingly real 3–dimensional world which the user, [illegible] appropriate special hardware, can feel an integral part.

(ii) Although a specialised form of headgear with integral 'goggles' is utilised in virtual reality, candidates did not gain credit for being vague about this hardware – so 'a helmet' was insufficient to gain the mark.

Question 7

(a) The question is concerned with a screen allowing ***input*** of data and so marks were awarded for improvements facilitating this ***input*** of data. Marks were not awarded for responses dealing with purely cosmetic improvements to the screen. Nor were marks awarded for *adding* items to the screen presented.

(b) (i) Candidates who scored well on this part correctly gave a clear description of verification. The majority of those candidates who did not score well gave either a description which was *almost* correct (many omitted the comparison with the source document stating merely that '[verification] checked the input was correct' or '[verification] checked no errors made typing data in'), or the frequently seen incorrect answer which described validation.

(ii) The question clearly asks for those fields which ***should*** be verified.

Question 8

(a) Generally well answered with many candidates scoring at least 1 mark for having the barcode read by a barcode reader. There are still a large number of candidates who think that the price is normally contained within the barcode itself.

(b) A reasonably well answered question. A common error was to decide that more items should be ordered ***before*** checking the stock level.

Question 9

(a) The most commonly seen correct responses were 'mouse' and ‘touch screen'. An error seen surprisingly often was to recommend the use of a light pen ***with*** a touch screen.

(b) Most candidates scored 2 or 3 marks for this question. Responses commonly seen confused the two types of printers – i.e. stating that ink-jet printers were 'noisy' and gave 'poor quality print-outs' and that dot-matrix printers were 'quiet' and produced 'excellent quality print-outs'. Another commonly seen incorrect response was to give differences in the print-out speed of either type when both can be quick or slow depending upon the job they are doing.

Question 10

(a) Many candidates did well on this part of the question. Incorrect responses seen abbreviated 'average' to 'avg', placed brackets in the wrong place, preceded (or followed) the formula with 'D2=...' or '.....=D2' etc., or omitted equals signs altogether. The question clearly asks for the formulas which would be printed and so therefore the formulas must be exact.

(b) (i) Well answered by many candidates. Cells A1 and C1 being omitted was a commonly seen incorrect response.

(ii) Generally well answered.

(c) Well answered. Incorrect responses usually omitted some of the cells updated..

Question 11

(a) Well answered.

(b) Generally well answered. Common errors seen included **'AND'** instead of **'OR'** in the sea condition and placing the units for the conditions ***after*** the actual values.

(c) Well answered. Candidates who did not gain maximum credit usually got the order wrong or missed out 1 or more of the car references.

Question 12

(a) Well answered by most candidates.

(b) Not as well answered. Common incorrect responses seen were 'web browser', 'installation software' and 'software to allow video conferencing'.

(c) Generally well answered with a spread of the correct answers being seen. Candidates who did not gain credit generally gave vague and rambling answers.

Question 13

Well answered.

Question 14

(a) Generally well answered. Some candidates could not have really understood the question as some bizarre incorrect sensor types were given – vehicle A would have to be very close for a 'pressure sensor' to be of use, and one wonders how 'heat sensors' or 'noise sensors' would work in this scenario.

(b) Not well answered. Marks were gained by candidates including the use of ADC/DAC's and the continuous nature of the monitoring but few of the other mark points were seen. Candidates felt that the system would be a typical control system with preset values being stored and compared whereas the variables involved (speed, distance, mass etc.) need to be recalculated continuously. Another common misconception by candidates was that sensors performed some of the control involved; that computers (and sensors) could apply the brakes etc.

(c) Poorly answered. Many candidates were concerned about other vehicles on the road; difficulty in parking, or when stopped at traffic lights.

Question 15

Very well answered by most candidates.

Question 16

Much better answered than in the past. Few candidates did not attempt both parts to the question. Candidates either did very well or very poorly, though it was clear that many candidates had been taught well and many of the previous errors seen had been eliminated. Candidates who did well could have easily obtained a mark for all of the mark points on the mark scheme. Those who did poorly commonly did not initialise variables, missed out part of any loop they included, and used the same variable for a variety of tasks in their algorithm.

COMPUTER STUDIES

Paper 0420/02

Project

The quality of work was of a broadly similar standard to previous years. Centres will need to obtain the moderation report for specific details of candidates' performance and the Centres assessment of the projects.

Overall the standard of assessment by Centres is reasonably accurate but not as accurate as in previous years. However there are some occasions where credit appears to have been awarded when there is no relevant work in the documentation. There are also occasions where a higher mark has been awarded than that warranted by the work. The largest areas of discrepancy are: the objectives and the links with later sections, hardware and software requirements, and technical documentation. It is disappointing to note that in many Centres where changes are being recommended by the Moderators that these are for exactly the same reasons as in previous years.

It is important to realise that the project should enable the candidate to use a computer to solve a significant problem, be fully documented and contain substantial sample output from their proposed system. Some projects do not demonstrate that they have actually been run on a computer. It is recommended that candidates make use of appropriate screenshots and include these in their documentation to show the use of a computer.

However the standard of presentation and the structure of the documentation continue to improve. Many candidates structure their documentation around the broad headings of the assessment scheme, and this is to be commended. It would appear that many Schools provide their candidates with a framework for documentation. This can be considered part of the normal teaching process but the candidates do need to complete each of the sections **in their own words**. Each project must be the original work of the candidate. Marks were deducted where there was an overuse of such templates. Sadly there was an increase in the number of suspected malpractice, some of which were clearly in breach of the syllabus which states that the project must be the candidate's own work and that joint projects are not allowed.

Centres should note that the project work should contain an individual mark sheet for every candidate and one or more summary mark sheets, depending on the size of entry. It is recommended that the Centre retain a copy of the summary mark sheet(s) in case this is required by the Moderator. It was pleasing to note that the vast majority of the coursework was received by the due date. It causes some considerable problems in the moderation process where Centres fail to meet this deadline, or do not provide the correct and complete mark sheets and forms. Although the syllabus states that disks should not be sent with the projects, it is advisable for Centres to make back-up copies of the documentation and retain such copies until after the results query deadlines. Although disks or CDs should not be submitted with the coursework, the Moderators reserve the right to send for the electronic version. Centres should note that on occasions coursework may be retained for archival purposes.

Areas of relative weakness in candidate's documentation continue to include setting objectives, hardware, technical documentation and testing.

The mark a candidate can achieve is often linked to the problem definition. The candidates need to describe in detail the problem and where this is done correctly it enables the candidate to score highly on many other sections. The method of solution must be explained in order to gain credit in ***section 11***. In order to gain credit for test strategy candidates must include the expected results, without these expected results the candidates will score zero marks.

It is important to note that candidates write their own documentation to reflect the individuality of their problem and that group projects are not allowed. Centres are reminded of the fact that they should supervise the candidates' work and that the candidate verifies that the project is their own work. A number of candidates did not meet the requirement for technical documentation that a contents table had to be

provided. If a contents table is not provided then no marks can be scored for technical docume s was reflected in the Moderators' adjustment for a number of Centres.

Centres should note that there are minor adjustments to the assessment criteria for the June examinations onwards. Full details can be found on the CIE website but these include:

Action plan	-must be referenced to the systems life cycle and either a Gantt or PERT chart is needed to score full marks.
Systems flowchart	-marks will be specifically awarded for a systems flowchart
Programming	-marks will be specifically awarded for candidates' program coding and use of macros.