COMPUTING

General comments

The paper worked well at discriminating between candidates of differing abilities. All questions attracted the full range of marks available, so no marks were inaccessible to all candidates.

The questions appeared to be fair and were unambiguously worded. There were questions, notably 3 and 9, where candidates wrote down everything that they knew on the topic and then found themselves in the uncomfortable position of having nothing to say in later parts.

The use of proprietary brand names, particularly for software suggestions is beginning to creep back into responses and should be stopped. Examiners do not penalise this except to the extent that such responses are not worthy of credit. On a similar tack, there were many candidates who failed to answer much of the second half of the paper within the context of the oil exploration scenario. Hospitals, banks and even chess playing were used as examples rather than the scenario given and could not gain the marks available. Centres have to use example applications in their teaching but candidates should be aware that other scenarios exist which are sensible and that the scenario used in the examination paper is unlikely to be the one that was used when they were being taught.

Some candidates appeared to run out of time although it is possibly a failure to be able to respond to the later questions rather than lack of time. Some candidates spent too long attempting the algorithm question and this made them short of time towards the end of the paper. It is important that candidates understand that some of the skill in sitting an exam paper is exam technique and these candidates were demonstrating a distinct lack of that technique. The advice with the algorithm question is that it really should be attempted at the end of the examination, or the candidate should restrict themselves to the extra half hour that was the time which was allocated to the question when it was introduced in the revised format of the syllabus.

Comments on specific questions

Question 1

(a)   Mainly well answered. Some candidates simply said that a form-based computer interface has a form. This is obviously not worthy of credit and candidates should beware of simply copying the question down as the answer. A full set of acceptable responses is available to Centres in the published mark scheme to which their attention is drawn.

(b)   Too many 'drawing' applications were given without a justification. The form-based application was better answered despite the fact that it is actually the more difficult one.

(c)   The question asked for the hardware and software of the HCI, not of the entire computer system. When considered in context there is only one acceptable response for each.

Question 2

(a)   Well answered, though a significant number failed to add the leading 0 and some candidates put the 0 at the wrong end of the number.

(b)   The question was clearly about stock control in a warehouse. It had nothing to do with POS or prices or sell by dates. Whilst some of the marks were available if a candidate answered in this way, they had not read or answered the question as printed on the question paper.

Question 3

(a) Well answered, although a single line of answer was all that was expected some answers went on for half a page.

(b) Many candidates do not realise that programs/OS are data.

(c) Software is not stored on ROM so that it is on there when the power is off. It is stored on ROM so that it is there when the power is switched on. These are two very different things!

The second part of this was considered the hardest question on the paper. The answer relies on candidates understanding that instructions can be given to the washing machine and that the processor cannot use ROM only RAM.

Question 4

(a) Well answered.

(b) Many described the entire systems life cycle. Others described as many information collection methods that they could think of. These responses did not answer the question. Very few mentioned the other elements of the analysis stage.

Question 5

Well answered.

Question 6

Very poorly answered. The algorithm question on this paper was intended to be more difficult and so it proved. Very few were able to demonstrate an ability to use the basic structures of language that are expected by the syllabus and most were content to either use IF (both wrongly and with the incorrect structure for the statement) or to copy down the question or to use long wordy prose statements. The Examiners are not looking for perfection, this is a difficult question, but they did expect some type of recognisable algorithm from the candidate.

Question 7

(a) Quality of answers was very much Centre based. Either almost all the candidates got 5 or 6 marks or they got very few, largely, one suspects, by accident.

(b) Candidates must read the whole question including the scenario. This one clearly describes the oil exploration scenario. It also states that the rest of the questions refer to this information, hence it is important to relate this answer to the scenario given, not to medical diagnosis.

Question 8

(a) Answers were very poor. The answers just gave the normal hardware for a computer system. This question must be answered in terms of the data collected at the survey site and then sent to head office. There is nothing in here about any processing at the site or communications from head office or the need for electronic mail. In essence this is a data logging example.

(b) The plotter was poorly answered probably because it was out of the experience of most of the candidates. The second part is a standard question on output formats, straight out of the syllabus, yet it was poorly answered. Candidates who read the scenario were even given 'numeric' in the stem.

Question 9

The responses to **(a)** and **(b)** were confused. Again, this is lack of exam technique. The first part asked for basic definitions of the processes while the second referred to context. The backing up of data is not done by the company in case the head office burned down, it is done because the data is valuable, because it would cost too much to do all the site surveys again, and so on. The answer must be in relation to the question.

Question 10

(a) The scenario told candidates that the data was numeric, so candidates should have used this in their answer. Many did not.

(b) Well answered by many.

Question 11

(a) For students who were aware of parity checking this was an easy 4 marks.

(b) Very poorly answered. Most candidates talked of check digits or of adding the bits. This whole area of error checking techniques is a relatively simple part of the syllabus but is very poorly answered.

COMPUTING

The number of good and very good projects increased this year. Many were more realistic in terms of the problem they were trying to solve. Many had clear indications of where the programming skills were to be found, how the programming style was developed, and with enough annotation within the coding to make it very clear just what the program was doing. More, also, were less than 30 pages long and not bound in hard covers, which are best kept for the return of the project.

The accuracy of the marking also improved, but there were some common concerns.

A common problem is where a Centre gives all the projects a high mark, but only one of the projects has any annotation. The differences are clear, and many of the marks for this project depend on the coding being well annotated.

Another concern is the Centres where Database Application Software, such as Access is used. The candidates use wizards and auto code to produce their files and screen layouts, but are credited with the design and programming marks as if they had done the work themselves. In this project we are interested in how well the candidate can design and test a program they have written, not how they can use Access.

There are also, sadly, Centres where the candidates enter work under the heading of Paper 2 when the contents all indicate that they are following the Paper 4 requirements. As there is so little programming in their work, it is not possible to do well on this paper when that sort of project is entered.

Overall, though, more Centres this time had their marks agreed by the Moderators, and more Centres gave us comments as to where the marks had been found. We thank all those teachers and hope that the quality will continue to rise.

COMPUTING

General comments

There were too many candidates who had not been adequately prepared for this examination. The difference between this paper and Paper 1 is that this paper expects many of the answers to be given in context and the questions are considerably harder than their counterparts in Paper 1. It becomes apparent when marking responses from many candidates that they will fail to acknowledge the real question and will try to respond to their own interpretation. For example, **Question 1** was clearly about system implementation in a specific environment. The Paper 1 version of the question would be the generic explanations of the different methods and the accompanying advantages and disadvantages but in this question the whole answer needed to be designed around the bus company which many candidates failed to do. **Question 7** asks how a variable is dealt with by a compiler. Most candidates were happy to ignore that and just wrote down the material that they had been told to learn. This rote learning and the reproduction of what is learned is simply not appropriate to the questions that a candidate can expect to meet on this paper.

Comments on specific questions

Question 1

This question was intended to be the easy starter question which would settle the candidates down and calm some nerves at the start of the assessment. The basic work is taken straight from the Section 1 syllabus, which is repeated in Section 3 around the basis of applying the generic information to real situations. Very few of the candidates treated this as any more than a generic response question and consequently the marks awarded were very disappointing.

Question 2

This question was a good discriminator with lower ability candidates being able to pick up some marks because the concepts were obviously known but only the better candidates were able to produce a suitable link table between TEAM and PLAYER. Many candidates did not label the tables correctly but insisted on placing an 's' at the end of TEAM in order to make it plural.

Question 3

Candidates picked up marks for generic answers about the Internet where the remarks were appropriate to the question. Once again, there were few who limited their responses to the uses which the Internet could be put to by the souvenir business.

Question 4

There were two aspects of the question which most candidates ignored. The first was that the question was asking about working patterns and the second was that it was about the use of computerised communications. The majority of candidates simply came out with the same 'advantages and disadvantages' of technology in the work place. Responses such as this are simply not appropriate to this level of qualification which asks questions with a much restricted focus. Centres are advised to study the acceptable responses which are published in the mark scheme for this, and all other questions. It is important to develop an understanding of the differences in expected responses from similar questions at the different levels of qualification.

Question 5

(a) Well answered. There is an issue with some of the names being suggested but as long as the meaning was clear the candidate did not suffer for producing a non standard response.

(b) The problem is simply that those candidates who understand about interrupts tend to think that the interruption of the present task is automatic and few candidates understand the process of prioritising tasks. There were, however, some exemplary answers to the question and my congratulations to the Centres whose candidates had this deep understanding and also for being able to put such complex ideas across to their students. This was not an easy question.

Question 6

Part (a) was almost universally answered correctly while **part (b)** was poorly understood. Some candidates tried to copy the original algorithm for producing the tree in some way, but this did not answer the question. Others had learned the different traversals off by heart and simply chose one, almost always choosing the wrong one.

Question 7

This was very poorly attempted. The question expected the candidate to be able to talk, not about the whole process, but about how the process affected one important part of the code. This question, as much as any other, showed the difference in expectation between the candidate and the Examiner. Candidates should realise that at this level the simple regurgitation of knowledge is rarely appropriate.

Question 8

(a) 'Using an example application' is what makes this different from the AS type question. Many candidates simply ignored this requirement.

(b) Some easy marks to pick up here. However, most candidates think that simply because it is parallel processing it is going to be necessary for everything to be super-sized. It is not necessary to have large storage for instance. Not all parallel processing examples use a lot of data.

Question 9

Very poor. Yet again, many candidates simply produced an account of the place of the MAR and what it needs to store. Candidates were awarded appropriate marks but most were unable to say what the contents actually were that were being stored.

Question 10

Most candidates were unable to score any marks for this question. This is clearly a fundamental part of the syllabus, and is not that difficult. The first part of the question only asked for the column headings, the failure to be able to do this simply pointing to the conclusion that this work has simply not been covered.

Question 11

There were many Centres where every candidate was able to score close to full marks, while there were an equal number where the concepts simply were not recognised.

Question 12

As with **Question 11**, candidates from some Centres scored very well while others were floundering and suggesting that algorithms should be used.

Question 13

This was not a question about ring and bus networks. It was however a question about ring and bus networks being used in the example application given. The question carefully drew a picture of a scenario where it was necessary to network machines and yet very few candidates took any notice and once again just produced the standard answer that would have been appropriate to the generic question.

COMPUTING

General comments

This report provides general feedback on the overall quality of project work for GCE Advanced Level Computing candidates. In addition, all Centres receive specific feedback from their Moderator in the form of a short report that is returned after moderation. This reporting provides an ongoing dialogue with Centres giving valuable pointers to the perceived strengths and weaknesses of the projects moderated.

The projects submitted covered a wide variety of topics with better candidates again showing evidence of researching a problem beyond their school or college life. The majority of projects were developed using Access.

In order to have the full range of marks available to the candidate, the computing project must involve a third party end user whose requirements are considered and clearly documented at all stages of the system development. Centres are reminded that the project work is designed to test the candidates' understanding of the whole systems life cycle, not just the use of software to solve a problem. The requirements are clearly set out on pages 30 to 34 of the syllabus in 'The Guidance on Marking the Computing Project' section. Also these requirements can also act as a useful checklist, for both teachers and candidates, setting out the expected contents of each section.

Again Centres are reminded that candidates must use this guidance for the expected contents of their reports rather than some of the popular A Level textbooks available for project work, which do not cover the full requirements of the CIE syllabus. Candidates who prepare their work only using text books and not the syllabus for guidance often miss out vital sections of their reports; this reduces the marks available to them. Also candidates include items that are not required which increases the size of the project and does not attract any extra marks.

Project Reports and Presentation

As usual, the presentation of most of the reports was to a very high standard, with reports word-processed and properly bound. However, candidates should ensure that only material essential to the report is included so that there is only one volume of work submitted per candidate. Candidates are reminded that authentic letters from end users are essential to provide evidence for the Evaluation and Investigation and Analysis sections; these letters must not be typed out by the candidate.

It is strongly recommended that the structure of the candidate's report follows that of the mark scheme set out in the syllabus. This allows both teachers at the Centres and Moderators to check that work for all sections has been included. It is essential that the pages of the report are clearly numbered by the candidate.

Project assessment and marking

Unfortunately few Centres provided a breakdown of marks showing the marks given for each sub-section of the syllabus. Centres are reminded that they must use the mark scheme as set out in the syllabus and also include a detailed breakdown of the marks awarded for each sub-section together with a teacher commentary as to why the marks awarded fitted the criteria for that sub-section. This commentary should include references to the appropriate pages in the candidates' reports.

Again Moderators have noted that Centres providing a commentary are far more likely to have accurately assessed the project work of their candidates.

Comments on Individual Sections

The comments set out below identify areas where candidates' work is to be praised or areas of concern and are not a guide to the required contents of each section.

(a)   Definition, Investigation and Analysis

(i)   Definition - nature of the problem

Nearly all candidates described the organisation and the methods used but only the better candidates identified the origins and form of the data.

(ii)   Investigation and Analysis

In order to gain good marks candidates must clearly document user involvement and clearly state agreed outcomes. Candidates need to consider carefully the evidence obtained from interviews, observation of the existing system and analysis of user documents, then ask follow up questions to fill in any gaps in the knowledge obtained about the current system or requirements for the new system. Alternative approaches need to be discussed in depth as applied to the candidate's proposed system rather than in general terms. A detailed requirements specification should be produced based on the information collected. Centres are again reminded that the system proposed does not have to cover more than one area of the business or organisation chosen. Detailed descriptions and prices of hardware and software available are not required here.

(b)   Design

(i)   Nature of the solution

Centres are again reminded that the requirements specification set out in the analysis needs to be discussed with the end user and a set of measurable objectives agreed and signed off. These objectives will then form the basis for the project evaluation. Candidates need to provide a detailed description of the processes to be implemented and designs for the required outputs. These items were missing from some of the projects seen.

(ii)   Intended benefits

Most candidates described the benefits of the intended system. However some candidates did not provide evidence for this sub-section so they should not have been awarded any marks.

(iii)   Limits of the scope of solution

Again, some candidates did not provide evidence for this sub-section so they should not have been awarded any marks.

(c)   Software Development, Testing and Implementation

(i)   Development and Testing

Centres are again reminded that evidence of testing needs to be supported by a well-designed test plan that includes the identification of appropriate test data, including valid, invalid and extreme cases, together with expected results for all tests. This plan should be cross referenced to the test results. For marks to be awarded in the top band for this sub-section the test plan and results should show that all parts of the system have been tested. Again, many candidates only tested the validation and navigation aspects of their system, and omitted to test that the system did what it is supposed to do, thus not being able to gain marks in the highest band for this section.

(ii) **Implementation**

Again, many Centres have marked this sub-section too generously, as high marks cannot be given unless there is written evidence from the end user that they have used the system and agree with the strategy for implementation. The implementation plan should contain details of user testing, user training and system changeover that have been both discussed and agreed with the user. If no user testing is included then few marks are available for this sub-section.

(iii) **Appropriateness of structure and exploitation of available facilities**

It was pleasing to see that more candidates are discussing the suitability of both hardware and software and that better candidates provided a log of any problems encountered together with details of how these problems were overcome.

(d) **Documentation**

(i) **Technical Documentation**

The standard of work provided for this section is high, with most candidates producing a stand-alone technical guide that includes most of the following: record, file and data structures used; database modelling and organisation including relationships, screens, reports and menus; data dictionary; data flow (or navigation paths); annotated program listings; detailed flowcharts; details of the algorithms and formulae used. Better candidates also included specifications for the hardware and software on which the system could be implemented.

(ii) **User Documentation**

This section was completed to a good standard by most candidates. Centres are again reminded that for full marks the candidate must include an index and a glossary, and the guide needs to be complete including details of backup routines and common errors. Also good on-screen help should exist where this is a sensible option.

(e) **Evaluation**

This section is consistently marked very generously by Centres with high marks given to candidates who have provided little evidence for each of the sub-sections. Centres are reminded that there are 8 marks for this section and in order to gain high marks candidates need to provide a detailed evaluation that includes the content set out in the guidance for marking projects section of the syllabus.

(i) **Discussion of the degree of success in meeting the original objectives**

It was pleasing to see more candidates considering each objective in turn but not all indicated how their project work met the objective or explained why the objective was not met. Centres are reminded that for high marks to be obtained candidates need to include results from the use of user defined, typical test data as part of this discussion.

(ii) **Evaluate the users' response to the system**

Centres are reminded that this response needs to be clearly provided by the end-user showing that they have used the system; it should not just be reported by the candidate. The candidate should then evaluate that response. Evidence for this section must be original letters, preferably on headed notepaper, signed by the end user and not typed out by the candidate.

(iii) **Desirable extensions**

For the 2 marks available in this sub-section candidates need to identify possible extensions and identify the good and bad points of their final system.