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COMPUTER STUDIES

<p>Paper 0420/01</p>

<p>Paper 1</p>

General comments

The general performance of the candidates was similar to that of previous examinations. The Paper produced a wide range of marks. All of the candidates appeared to have had sufficient time to answer all of the questions.

Many candidates had rote-learnt a good percentage of the theory and consequently did well on that type of question. All but the weakest candidates made an attempt at every question.

The questions that all of the candidates found most difficult were **Questions 6, 8 (c), 12 and 13**. Weaker candidates confused an assembler and an interpreter. A few candidates lost marks because they gave answers that were a just a rewording of the question. Some of the candidates did not read the questions carefully enough and therefore did not answer the questions asked.

In general the overall standard of English was good, the explanations were clear and the handwriting was neat.

Comments on specific questions

Generally candidates were awarded one mark for each correct point/answer or example.

Question 1

- (a) A significant number of candidates confused a check sum with a check digit or even a parity check. Only the better candidates obtained marks for this question. A suitable answer was that a check sum is a meaningless total, for example a hash total, which is produced by adding all the elements of a block to produce a single number that is stored with the block.
- (b) The concept of a relational database was not well known. Many candidates used the words of the question and incorrectly wrote that a relational database was made up of databases that were related. A small number of candidates were awarded marks as their answers referred to tables, one to many relationships, or linked files.
- (c) Many candidates had rote-learnt the definition of random access memory (RAM) and therefore obtained full marks easily. Weaker candidates gained one mark for stating that RAM is volatile, but omitted to state for the second mark that random access memory (RAM) can be read from and written to.
- (d) The term top-down design was well explained by most of the candidates. A suitable answer for one mark was that top-down design is breaking down the problem/task/program and for the second mark into sub problems/smaller tasks/modules.
- (e) Almost all of the candidates gained full marks, they stated that alphanumeric characters include numbers and letters of the alphabet and then gave their Centre Number as an example!

Question 2

Candidates in general gave short answers such as faster easier and more fun. This type of answer was too vague to be awarded any marks. A suitable answer would need to include the fact that students world wide could learn at their own speed/pace any time using multimedia and that testing could be on-line with automatic marking.

Question 3

- (a) Almost all of the candidates were awarded one mark for a light sensor. Very few candidates were awarded the second mark for, for example, a distance sensor or a position (end of film) sensor. Many candidates stated incorrectly that focus, heat and zoom were sensors.
- (b) Candidates were asked to describe how the data collected by the sensors would be used by the control program. A suitable answer was that the data which is input from the sensors is compared against stored pre-set values, calculations are done and then adjustments are made according to the data that is received from the sensors. Majority of the weak answers given, for example 'the camera will take the required action', were too general for marks to be awarded.

Question 4

- (a) This question was well answered. Hacking, virus or fraud were the correct answers given by almost all of the candidates. A few candidates confused computer crime with computer misuse.
- (b) Surprisingly many candidates gave the wrong answer 'anti-hacking software'. Firewall and password were popular correct answers.

Question 5

- (a) Majority of the candidates were awarded one mark for stating that a compiler 'converts' and a second mark for a 'high-level language program into machine code'.
- (b) Most of the candidates gave an acceptable difference between a compiler and an assembler which was usually that a compiler translates a high-level language program to machine code whilst an assembler translates an assembly language program to machine code. Weaker candidates confused an assembler with an interpreter and therefore wrote incorrect answers such as 'a compiler converts the whole program into object code in one go with all the errors reported whilst an assembler converts each instruction then carries it out until the first error'.

Question 6

Very few candidates wrote a clear explanation of the purpose of an interrupt when data is sent to the disk drive. Most of the candidates appeared not to know that the interrupt is a signal that is sent by the disk drive. Other candidates did not read the question carefully and in consequence wrote about printers. An acceptable answer for two marks was that the disk drive sends an interrupt to the processor to tell the processor that it is ready to receive more data or that the transfer is complete.

Question 7

- (a) Many candidates misinterpreted the question and consequently described features of specific software such as PowerPoint and CorelDRAW instead of describing as asked how the edited photographs can be inserted into a multimedia presentation. Acceptable answers were two ways of editing from, for example, crop, edit, scale, flip, blur, trim, weld and blend.
- (b) Surprisingly few candidates gave correct answers such as 'copy and paste' or 'save and import', either of these answers was awarded two marks. Many of the candidates said 'insert' the photographs but they could not be awarded a mark as 'insert' was a repeat of the words in the question.
- (c) Majority of the candidates gave a correct multimedia element that could be included in the presentation. The popular correct answers were sound and animation.
- (d) Almost all of the candidates gained the two marks easily as they wrote down a list of hardware which included two items of particular multimedia hardware from, for example, a fast processor, a high resolution monitor, a sound card, speakers and a projector.

Question 8

- (a) Many of the candidates drew Windows Explorer layouts that were adequate for the requirements of the question. However other candidates lost marks as they either put FILE at the top of their tree diagram or produced diagrams which were not labelled as asked and did not show the relationship/link between the root directory, the sub directory and the file.
- (b) This question required the candidate to write down two file management tasks such as copy, load/save, sort, merge, calculating file size/space left, or automatic backup. Many candidates did not read the question carefully and wrote down non file management tasks, for example memory management and input/output control, therefore they could not be awarded any marks.
- (c) Many of the candidates described compilation errors or run time errors without giving adequate details. Most of the candidates gained one mark for stating that the operating system gave error messages. Suitable answers were operating system tasks such as auto save, scan disk, taking the user through a set of routines to recover, recovering files, updating the error log, causing an interrupt, storing the status of registers on the stack and enabling the interrupt service routine.

Question 9

- (a) Although most of the candidates appeared to understand the requirements of the question many were not able to express their answers sufficiently clearly for any marks to be awarded. Adequate answers were that the manual system was now too slow, there was an increase in business and insufficient staff.
- (b) Majority of the candidates obtained the marks easily. They appeared to have rote-learnt methods of fact finding, namely interviewing, giving out questionnaires, observing work practices and inspecting files/papers.

Question 10

- (a) The two popular correct answers given by the majority of the candidates were a modem and an Internet Service Provider (ISP). Very few candidates gave communications software which was required for the third mark.
- (b) This question was generally well answered. Majority of the candidates gave two correct answers that were usually e-mail and fax.
- (c) Almost all of the candidates answered this question correctly with a video camera and speakers or a microphone.
- (d) This question was generally not well answered. Many of the candidates' answers were a benefit of video conferencing for the worker whereas the question required a benefit video conferencing for the company. Acceptable answers were that there was no need to travel, there was no time lost and no travel expenses.
- (e) Some of the candidates misread the question and consequently gave advantages of teleworking not the disadvantages of teleworking that were asked for in the question. Other candidates gave vague answers that were linked to laziness. Acceptable answers included isolation, the need for the employee to organise their own working day, or the stress on the family.

Question 11

- (a) A small number of candidates lost marks because they shaded extra cells above and below the required cells. Other than that the question was answered correctly by almost all of the candidates. The correct answer was A2:A6 and F2:F6 which were awarded one mark each.
- (b) Majority of the candidates gave the format of the data as numeric, which was a correct answer.
- (c) The correct answer either SUM(F2:F6) or F2+F3+F4+F5+F6 or SUM(F2+F3+F4+F5+F6) was given by almost all of the candidates.

- (d) Majority of the candidates either gave four cells, or just two cells and were awarded one mark. The correct answer for two marks was D5, F5 and F7.
- (e) Very few candidates gave a correct benefit of using a spreadsheet template. A suitable answer was that a spreadsheet template has formats and formula already entered and new figures can be inserted.

Question 12

- (a) The correct answer 'REF' was given by almost all of the candidates.
- (b) Majority of the candidates gave the correct answer, namely a type check or presence check.
- (c) A few candidates confused AND and OR and consequently wrote down 19000, an incorrect answer. The correct answer given by majority of the candidates was 19000, 15000, 12000 and 9000.
- (d) The most common errors were to use OR instead of AND, to omit the (\$) after RENT or to confuse > and <. Other than that the question was usually answered correctly. The correct answer was (AREA = "South") AND (RENT(\$) < 15000). One mark was awarded for (AREA = "South"), a second mark was awarded for AND and the third mark for (RENT(\$) < 15000).
- (e) Weaker candidates were unable to sort the reference numbers in ascending order on TYPE then AREA, they just wrote down the reference numbers ascending order therefore they were not awarded any marks. Marks were awarded for {H006, H008, H004,} {H009, H002, H005}, {H003, H001, H007} or {H006, H004, H008,} {H009, H005, H002}, {H003, H007, H001} with one mark being awarded for each correct group of three.

Question 13

- (a) Very few candidates were able to answer this question correctly. Majority of the candidates did not realise that the algorithm put the numbers into ascending order and consequently gave the output as 41, 38 (the same as the input). The correct output was 38, 41.
- (b) The better candidates that got part (a) right correctly stated that the purpose of the variable T was to act as a temporary store to facilitate the swap.
- (c) Weaker candidates confused a program library with a book library. Very few candidates knew that subroutines (procedures) that are stored in a program library can be shared by several programs and so less memory and program code is required.

Question 14

- (a) Only a minority of the candidates knew the Data Protection Act/Rules. Majority of the candidates gained one mark for passwords. Very few candidates gained two marks. A correct answer was two from, for example, the data should be processed fairly and lawfully, used only for the purpose for which it was collected, kept no longer than needed, kept secure, must be relevant and also that the data subject has the right to check the data and have it changed if it is incorrect.
- (b) Many candidates gave wrong answers such as PIN, account balance and age. Majority of the candidates gained two marks. Correct items of personal data include name, address, occupation, date of birth, gender, telephone number and ID number.
- (c) Very many candidates had rote-learnt the method of calculating a check digit using weights, modulus eleven and the remainder and obtained full marks easily. The candidates that managed to get part of the calculation correct were awarded one mark.
- (d) Candidates usually gave a correct reason for updating the customers details, for example a change of address or telephone number and was awarded one mark. Very few candidates got the two marks for the processing which is done by the computer system. Many candidates gave a general description of updating a file using batch processing. A description of searching the customer file using the account number, locating the customer record and writing the new item in the field was required for the processing marks to be awarded.

Question 15

Apart from a minority of candidates that described the monitoring equipment that is used in an intensive care unit the question was answered well. The better candidates gave description of the expert system knowledge base that contains the knowledge of medical experts, how the symptoms are input and the knowledge base searched using the inference engine and rules. Weaker candidates gained two marks for saying that the doctor input the symptoms and the computer suggested the type of illness and treatment.

Question 16

There was a wide variation in the answers given. Some of the answers were excellent whilst others were very poor. Marks were awarded for benefits of using a computer-aided design program (CAD) which included 3D views, simulation, testing, calculations, accuracy/precision, CAD software graphics facilities and links to computer aided manufacturing (CAM).

Question 17

Many candidates did well on this question once they realised that inputting the log on and log off time, calculating the time logged on and constructing a loop was enough for four marks. The better candidates wrote a well-constructed algorithm and were awarded full marks. Very few candidates were awarded the mark for initialising the variables. Weaker candidates lost marks for not dividing properly and not putting the loop in the correct place.

Up to a maximum of six marks, one mark was awarded for each correct step in the algorithm:

Initialise variables/arrays

Loop each student

Input ID

Input log on

Input log off

Calculate difference

Store difference

Calculate average

Output average.

<p>Paper 0420/02</p>

<p>Project</p>

General comments

The quality of work was of a similar standard to previous years. The number of inappropriate projects which provided limited opportunities for development and therefore did not qualify for one of the higher grades was fewer than in previous years. However the number of cases of plagiarism and malpractice was higher.

The majority of Centres assessed the projects accurately according to the assessment headings. Overall the standard of assessment by Teachers is improving and Examiners are recommending fewer changes than in previous years. *Marks can only be awarded where there is written proof in the documentation.* In some instances marks are awarded by the Centre where there is no written evidence in the documentation. Centres should note that assessment of the project can only be by reference to the criteria in the syllabus and that Centres must not devise their own mark schemes. There are still a small number of Centres that award half marks which is not allowed by the syllabus.

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. Testing should include full test plans with expected results which can then be compared with the actual results and we would also expect to see labelled printouts which clearly match the test plans. Some projects do not demonstrate that they have actually been run on a computer. Software advances and the use of 'cut and paste' can give the impression that the results have simply been word-processed. It is recommended that candidates make use of appropriate screen dumps 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 Centres 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.

The assessment forms for use by Centres should not allow for a deduction for the trivial nature of any project. Centres should not make any deduction in this section. One of the Moderator's roles is to make such a deduction. Therefore if the Centre thinks that a deduction should be made in this section then that particular project must be included in the sample. 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 marksheet(s) in case this is required by the Moderator. In addition the MS1 mark sheet should be sent to Cambridge International Examinations by separate means. 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. 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.

The standard of marking is generally of a consistent nature and of an acceptable standard. However there are a few Centres where there was a significant variation from the prescribed standard, mainly for the reasons previously outlined. It is recommended that when marking the project, Teachers indicate in the appropriate place where credit is being awarded, e.g. by writing in the margin 2,7 when awarding two marks for section seven. A small number of Centres are beginning to adopt this convention and it is hoped that more Centres will use this method of demonstrating where credit has been awarded.

Areas of relative weakness in candidate's documentation continue to include setting objectives, hardware, algorithms 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. This is an area for improvement by many candidates whereby they do not specify their objectives in computer-related terms, e.g. to make a certain process faster. If the objectives are clearly stated in computer terms then a testing strategy and the subsequent evaluation should follow on naturally, e.g. print a membership list, perform certain calculations etc. The revised assessment criteria for 2004 place a clear emphasis on setting objectives in business and computer-related terms.

There was evidence that some candidates appeared to be using a textbook, or the Teacher's notes, to describe certain aspects of the documentation. Some candidates did not attempt to write this section of the documentation with specific reference to their own problem. 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. Where the work of many candidates from the same Centre is identical in one or more sections then the marks for these sections will be reduced to zero by the Moderators. Centres are reminded of the fact that they should supervise the candidate's work and that the candidate verifies that the project is their own work.

The hardware section often lacked sufficient detail where full marks are scored by a full technical specification of the required minimum hardware together with reasons why such hardware is needed by the candidate's solution to his/her problem.

Candidates should ensure that any algorithm is independent of any programming language and that another user could solve the problem by any appropriate method, either programming or using a software application. It is possible for some applications to generate the algorithms, these should be clearly annotated by the candidates to score any marks. Algorithms must clearly relate to the candidate's solution. If a candidate uses a spreadsheet to solve their problem then full details of the formulae, links and any macros should be included. Centres may wish to know that the use of modules when using a database package should include the use of linked tables. Similarly when using spreadsheet modules can be achieved by exporting data from one worksheet to importing into another spreadsheet, i.e. the spreadsheets are linked together. Centres might wish to encourage the candidates to use validation checks, lookup tables and what-if analysis.

Many candidates did not produce test plans by which the success of their project could be evaluated. The results of a test strategy should include the predicted results, output both before and after any test data, such printouts should be clearly labelled and linked to the test plans. This will make it easy to evaluate the success or failure of the project in achieving its objectives.

An increasing number of candidates are designing websites as their project. Candidates must include site layout and page links in their documentation. The better candidates should include external links and possibly a facility for the user to leave an e-mail for the webmaster or submit details to an on-line database, in this case the work would qualify for the marks in the modules section. Candidates might also consider designing an on-line form or questionnaire for submission which can then be tested.

Centres should note that the syllabus changes for 2004 include a revision of the assessment criteria for the coursework project. It is hoped that the new arrangements provide more structured guidelines on the awarding of marks in each section. Centres might wish to archive any documentation/forms relating to 2003 or earlier to ensure that only the new assessment criteria and relevant forms are used. The assessment forms and guidance can be found in the 2004 syllabus starting on page 17.