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ASSESSMENT and QUALIFICATIONS ALLIANCE

Report on the Examination

Computing

- Advanced Subsidiary
- Advanced

Advanced Subsidiary – (5511)
Advanced – (6511)

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Kathleen Tattersall, BA MEd Director General

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Computing

CPT 1: Computer Systems, Programming and Networking Concepts

General

Weaker candidates continue to hope to gain credit for vague answers. Responses such as 'faster', 'cheaper', 'more efficient' have never been accepted.

Question 1

A version of this question has appeared before and most candidates obtained the 4 marks on offer. At this level, answers such as 'Hardware is parts that you can touch', 'Software is parts that you can't touch' are not acceptable. Candidates should also be aware that answers for 'Hardware' which imply that it is synonymous with 'Peripherals' will not gain credit. The difference between a set of instructions and a sequence of instructions should also be noted, with only the latter being a description of a program.

Question 2

Nearly all candidates obtained some marks for this question.

Part (a)

While almost all candidates could convert from 'Pure Binary', the term 'Binary Coded Decimal' seemed to trigger the misunderstanding of a number with a decimal point. Several candidates gave '1.7' for part (ii). Candidates should understand the mathematical term 'decimal' to mean a number in base 10.

Part (b)

Nearly all candidates gave the correct bit pattern for 33 but a large number failed to get the parity bit correct (the question setter had ensured that the parity bit had to be set to '1'). In part (ii) few candidates realised that the start and stop bits needed to be different and in some cases these were simply left blank. When a binary pattern is asked for, all places must be filled in with either a 0 or a 1. The parity bit must not change, just because start and stop bits are added. These will be stripped off before parity checks are performed at the receiving end.

Question 3

Part (a)

Most candidates correctly gave either 'network card' or 'Ethernet card' with 'modem' being the commonest incorrect answer. Many failed to spot the significance of the word 'each' in the question and gave variations on 'file-server' or 'hub'.

Part (b)

The vast majority gave the correct answers 'ring' and 'bus', with 'star' being a wrong choice for 'A' and 'line/linear' the usual wrong choice for 'B'. Few candidates could think of genuine advantages of the two topologies.

Part (c)

This is pure bookwork and has been asked several times in recent years but was poorly answered with many stating that protocol was needed to 'prevent errors occurring' or 'to prevent collisions'. A significant number of candidates suggested a protocol was a device. It was described as a security system to control the network. Many candidates still give computers human characteristics: 'protocols are needed so that computers understand each other' rather than 'so that different computers can communicate successfully'.

Question 4

Part (a)

This being almost a multiple-choice question meant that nearly all candidates picked up some marks. The majority of candidates did not pick up on the significance of the uni-direction arrow from the processor to the address bus as the major clue.

Part (b)

This part was very poorly answered with the usual 'processor processes data' being a typical response in (i). Students who have knowledge of von Neumann architecture know that instructions have to be in main memory at the time of the fetch-execute cycle, though others could have picked up the mark by stating that the main memory is a temporary store for programs/data. Many candidates lost even that possibility by stating that it stored 'information'. In Computing 'information' is not a synonym for 'data'.

Part (ii) saw hardly any credible answers. Interrupts, clock signals and memory read, memory write were the usual correct answers.

Part (iii) saw a few correct answers with some losing the mark by stating the too vague 'location' rather than the more specific address, or commands rather than instructions.

Question 5

The evidence suggests that this part of the specification is being lightly treated in some instances since all candidates from some centres appeared to be guessing wildly. Candidates who had studied, and presumably used, a High Level Language found this question easy – especially if it involved Pascal. Those that had not, struggled.

Part (a)

Many candidates did not follow the instructions 'copy one relevant statement from the above code'. Instead they only gave a keyword, insufficient to earn the mark available. The assignment statement caused most confusion. Many candidates wrongly picked the type declaration, presumably because of the '=' symbol.

Part (b)

Here candidates were asked to copy one relevant part statement. However, many candidates copied whole statements, thereby not making it clear which part was relevant. Very few candidates could identify the user-defined type or the parameter used in the given code. Local variables seemed to be rather better known.

Part (c)

Many candidates correctly stated that using named constants made the program easier to understand or that if its value needed to be changed it would need to be changed in only one place.

Many candidates suggested that the code was easier to read. This was not given credit, as being able to read something is clearly not the same as being able to understand it!

Part (d)

Most candidates spotted that if a person's age is recorded it will have to be changed/updated yearly and therefore it would be better to use date-of-birth. A large number of candidates felt that many people would not like to give their age but then, surprisingly, would be quite happy to give their date of birth!

Part (e)

This part was answered well, with most candidates knowing what values a Boolean variable could take.

Question 6

Part (a)

Answers showed some confusion with many candidates describing how the bit-mapped image is displayed on the screen rather than how the image itself is held in memory. There is some overlap so that some candidates obtained credit almost by accident! Many candidates insisted that a pixel of a coloured image could be stored in one bit. Candidates need to understand that an image is broken down into a grid of pixels and for each pixel a number is stored which represents a colour.

Part (b)

Most candidates obtained the mark by stating that it either 'takes up less space' or that it could be 'zoomed in without distortion'. Those who gave the vague 'better quality' lost out.

Question 7

This was very poorly answered with few correct answers.

Part (a)

The question stem gave enough information about how sound is converted to digital data. Most candidates did not pick up on the significant points but concentrated on the quality of the microphone and speakers, or even the sound source. Many candidates referred to bits per second, which did not gain credit. Correct responses referred to the sampling rate (how many samples taken per second) and sampling resolution (how many bits available to store the amplitude measurement).

Part (b)

Many candidates stated that the sound could be 'cleaned up' or 'hiss removed' to gain the mark.

Part (c)

This was poorly answered, with the commonest incorrect answers either returning the question, e.g. 'where sound is synthesised…' or by describing the recording industry's technique of 'sampling' where pieces of already recorded music are used to create a new piece of music. Answers involving the creation of sound by computer gained credit.

Question 8

Part (a)

The vast majority of candidates gave the correct answer.

Part (b)

Most candidates had the right idea that the computer processes data to produce information, though it was sometimes poorly expressed.

Question 9

This is not a new question. However, candidates provided very confused answers.

Part (a)

A compiler translates a high level language program into object code. It does NOT execute it. An interpreter translates a line of code as it executes. It does NOT produce object code. Many candidates wrongly seemed to be under the impression that binary code is synonymous with machine code.

Part (b)

Some very weak answers were given such as 'a compiler is used for large programs, an interpreter for small programs' – sometimes the other way round! Creditworthy answers suggested the use of a compiler to protect source code or for distribution after development is completed, and the use of an interpreter during program development while debugging.

Part (c)

A significant number of candidates had no idea that an assembler translates assembly code programs. Many wrongly assigned it the job of linker/loader or even for reverse engineering.

Question 10

Part (a)

There was a definite improvement in the dry running of a piece of pseudo-code. Many candidates were able to correctly complete the table to gain the 7 marks. Some candidates instantly recognised the bubble sort and decided to skip the dry run and write the final values on the bottom line (the mark-scheme penalised this severely). Others assumed that it was a complete bubble sort and simply wrote down the list of numbers in ascending order. However, a significant number of candidates still did not seem to be prepared for dry-running an algorithm. The grid was left blank or was completely filled in with totally irrelevant numbers by such candidates.

Part (b)

This was poorly answered with many candidates stating that the program stopped or that 'nothing will happen'. A few candidates gained credit by stating that control will pass to the instruction after EndWhile.

Part (c)

Those candidates who answered (a) correctly obtained at least 2 marks for this part. Even good candidates often did not spot that another run through the algorithm would put 81 into the ninth element of List.

CPT 2: Principles of Hardware, Software and Applications

General

Some questions tested the candidate's ability to recall factual information whilst other questions tested the application of knowledge and understanding of computing. Successful candidates responded well to both types of question. It was evident that a combination of bookwork learning and exposure to programming and package-based work was a major factor in this success. Question 8 separated those candidates who possessed programming experience from those who did not. The better candidates responded to 8(d) with a list of correctly sequenced pseudo-code steps. The weaker candidates responded with a description in prose style which simply echoed the question stem. Some candidates were not familiar with basic terminology, answering questions in general terms. Very surprisingly, several candidates had no knowledge of barcodes, barcode readers and optical mark sensing. Other candidates confused the terms *file* and *record* and *file* and *database* thereby demonstrating a lack of precision and knowledge of the difference between these in a computing context. Although many candidates successfully answered question 7(d), several demonstrated a lack of precision by omitting one or more of the specifications from their screen user interface. In Question 3(a), the weaker candidates simply regurgitated the principles of the Data Protection Act without thinking. The question asked for reasons relating to the nature of computing systems which led to the introduction of the Data Protection Act. Archiving remains a mystery to many candidates with a number believing it to be another name for making a backup. Disappointingly, several candidates showed a lack of appreciation of the capacity and appropriateness of different storage media for the tasks mentioned in Question 7c(iii).

Pleasingly, candidates' grasp of database theory was good and there were many correct answers for Question 7(b).

The spreadsheet question was answered well but some candidates lost marks because of their insistence on placing *Sum* in front of every answer whether it was required or not.

Question 1

This question was answered well by the majority of the candidature. Some candidates were unable to identify a barcode. Some referred to the barcode reader imprecisely and failed to gain credit for infrared reader, line scanner. Some candidates suggested MICR for part (a) and others MICR for part (c)! A batch processing operating system is one that supports the processing of jobs from start to finish without user interaction. Many candidates successfully gave this response.

Question 2

In part (a) most candidates realised the need for round the clock availability because of countries being in different time zones. In part (b) many candidates offered answers that lacked perception and therefore failed to gain credit. "Encryption stops hackers accessing messages" was a popular answer that gained no credit. Credit was given for answers that gave the consequences of being able to read an unencrypted message, such as being able to retrieve information for fraudulent purposes.

Candidates were less successful at reasoning why governments require banks to lodge encryption keys with them. Few answered correctly "so that governments can track money transfers made by criminals or terrorists" whilst many candidates simply stated: "so that governments can monitor messages" thus falling short of what was considered creditworthy.

Question 3

This question triggered many candidates into regurgitating the principles of the Data Protection Act. Those candidates who took a little more care correctly identified that computer systems store a vast amount of data which can be quickly searched. Access is possible remotely and computer systems can be insecure especially when they are networked. Computer systems encourage more information to be stored. Many candidates were able to name two other Acts but not always accurately. A common wrong answer was the "Data Misuse Act". The correct answer is the "Computer Misuse Act".

Question 4

The more successful candidates generally answered parts (a) and (b) with full credit. These candidates successfully conveyed the idea of data being common to more than one file and the system failing to update this common data simultaneously. They also conveyed the idea of a database only keeping one copy of the data or controlling updates and access. Candidates with actual programming experience of file processing and database systems were able to appreciate the concept of data inconsistency and its solution.
Most candidates were able to name at least one validation control in a database system. Common unacceptable answers were "hash totals" and "check digits".

Question 5

Many candidates were able to give meaning to the phrase "to provide a virtual machine". The examiners were expecting candidates to identify this role as hiding the complexities of hardware from the user.
Most candidates were able to name at least one type of resource managed by the operating system and many named three, correctly.

Question 6

This was a high scoring question for most candidates. Credit was most frequently lost for the overuse of the keyword **Sum** which was placed in front of otherwise correct formulae in parts (b) and (c). Many candidates used absolute and relative addressing correctly but some were unsure of how to indicate absolute addressing accurately. For example, A20 became A2$0 or A20$.

Question 7

Generally parts (a) and (b)(i), (b)(ii) and (b)(iii) were answered successfully. However, part (b)(iv) was not. Very few candidates saw the need for a composite primary key – EditionId, PageNo, BlockNo. Many stated FilePathName ignoring the fact that the same file could occur in different editions. Some gave just EditionId for which one mark was given. Others gave PageNo which earned no credit. Credit was given for PageNo and BlockNo together.

Some candidates still experience difficulty giving a pathname accurately. Candidates are encouraged to get some experience using a command line user interface so that they can appreciate how directory systems are organised. Archiving remains a mystery to many candidates. All too often it was confused with backing up. Even when candidates gave evidence that they understood the meaning of archiving often they could not express themselves accurately. In particular, the need to remove files from on-line storage was not expressed accurately enough to gain credit.

Surprisingly, many candidates were unable to suggest a suitable cost effective medium for this archive. The most popular unacceptable answer was magnetic hard disk. The examiners were looking for magnetic tape/cartridge or DVD-R/RW/RAM or **several** CD-Rs/RWs.

Many candidates scored well in part (d). Marks were lost when candidates failed to include all the specified functionality. A simple checklist approach to what needed to be included would have worked but this seemed to escape the attention of several candidates. The latter often included many unnecessary artistic embellishments to their labelled diagram whilst omitting some essentials.

Part (e) was well answered by many.

Question 8

Candidates' perception of a text file was a file of characters. However, there is a little more to a text file than this. The accepted answer was a file containing a sequence of characters organised on a line-by-line basis. Such a file needs special handling because, when displayed, the end-of-line characters are used to generate a new line. Other files, although composed entirely of characters, do not display sensibly in a text editor because they lack line structure. Text editors produce text files! A scanner may be used to enter the word-pairs, printed on paper, directly into the computer system. Optical character recognition software is needed to turn the scanned image into text. However, the question asked for the hardware only.

In part (b) any of the following answers were acceptable: ordered on some field; direct access not possible; access must start from the beginning of the file; to access the n^{th} record the preceding n-1 records must be accessed first. Many candidates understood that a sequential file is ordered but often candidates omitted to state on some field. Few candidates were able to state two characteristics which were acceptable. However, many candidates were able to give two correct field names for fields in file B. The principles of good programming practice were in evidence here with candidates giving field names that were meaningful and which accurately described field contents. Therefore, the only acceptable names were EnglishWord/WordInEnglish and FrenchWord/WordInFrench. Plurals were rejected.

Part (c) was answered well.

Part (d) divided the candidature into two groups. Those who were able to apply programming knowledge, understanding and skill and those that were unable or who lacked such knowledge, understanding and skill. Candidates who answered in prose scored zero. Candidates who wrote a list of steps pseudo-code style were generally successful. These candidates wrote their solution so that it could have been converted into an actual program with relative ease. They were therefore able to access the marks allocated by the mark scheme.

CPT 4: Processing and Programming Techniques

General

Candidates who had covered the specification and revised the fundamental bookwork and basic skills contained in it, did well on this paper. However, marks were lost through lack of precision in answers and the failure to recognise and use appropriate terminology. This is a subject where certain terms have very precise meanings and the correct use of terminology is expected at this level.

Marks were also lost through not reading the questions carefully to pick up all the details. This was particularly demonstrated in questions 6, 7 and 9. The question setters do not include superfluous words, and details in the stems of questions all have some relevance to the questions that follow.

Question 1

This question referred to the loading of data into a linked list. No marks were given if the items had not been loaded in the given order. Binary trees were not credited.

In part (a), nodes should have been numbered with correct links. A start pointer was expected with some indication of the last item. In (ii) 'snipe' and 'grouse' had to be added at the end of the list and the pointers amended correctly to incorporate them.

In (b), many candidates correctly said that in a dynamic structure the amount of memory required would vary but few gained the second mark here by stating that this would be at run time. Size was an acceptable alternative to amount of memory required, but it was insufficient to say that 'items could be added or deleted'. Incorrect answers included the ability to sort items.

In (c), answers that memory is allocated from a heap or pool of available locations and pointers hold the address of the next free location or of the last allocated block gained both marks.

Question 2

There was much confusion in this question between multi-tasking and multi-programming. Sadly, many candidates wrote the answers down correctly initially, and then amended their work to be incorrect. Most recognised the multi-user scenario.

Question 3

This question involved comparing the number of items which would be accessed when searching a list of 137 items using a binary search as opposed to a linear search. For the binary search, answers varied from 1 (the search goes directly to required item) to 256 or 2^8, although the reason for this was not made clear. 68 or 69 were common errors. The correct answer was 8. For the reason, candidates frequently had the idea of discarding the unwanted half, but the concept of this being repeated in each repetition was required for credit. A correct reason was credited even if the candidate had miscalculated and given an answer of 7 or, occasionally, 9.

For the linear search, the answers were more often correct, although 138 or 136 were sometimes given. A good reason here was 'Although most searches will take less, if the required item is the last in the list then all items will be accessed before it is reached'. Too many candidates missed this mark by stating that every item needed to be looked at; some even stating that the list would be un-sorted. A linear search is performed on a sorted list. Reference to looking at every *file* resulted in the answer being talked out.

Question 4

This question required candidates to recognise an example of a command line interface (CLI), and to make a comparison with other operating system interfaces. The majority of candidates recognised the interface it was, although a number took it for a job control interface. Many were able to give the command line interpreter as a program that receives instructions entered via the interface and which analyses them.

Advantages and disadvantages of the CLI were only moderately well expressed, and were frequently too vague. One good candidate wrote for the advantages: 'The interface is faster at executing instructions than a WIMP / GUI interface' and 'Less memory is taken up by the operating system in providing the interface, therefore there is more memory for executing instructions'. This same candidate then wrote for the disadvantage: 'User has to learn specialised commands / syntax and ordering unlike in a WIMP/GUI interface'.

Question 5

This question was based on section 13.3 of the specification: Data Representation in Computers. The majority of candidates converted from hexadecimal to binary correctly.

Conversion into decimal from two's complement frequently showed a lack of understanding of that representation. Many candidates did not appear to recognise that the bit pattern represented a negative number, although some stuck a minus sign in front of their answer with no other indication that they had taken it into account. Too many converted the exponent to 3 only to write down 10^3.

The reasons given for normalising were frequently weak. One good answer was 'Allows more precise values to be held in the same amount of memory'. Precision/accuracy alone was insufficient. Another reason is that normalising ensures that only one representation of a number is possible. Incorrect answers included that this was the only way to represent negative or decimal numbers.

Question 6

In this question, candidates were asked to differentiate between the operations of the arithmetic ADD and the logical AND instructions. Candidates found it difficult to explain this. Two simple truth tables were a sufficient answer, or an explanation that ADD performs a calculation on the binary number, while AND compares the bits individually, outputting a 1 only when the two inputs were both 1. A common error was that AND outputs a 1 when both the inputs were the same.

In part (b), most candidates knew that intermediate results were stored in a register, though many chose the MDR, MDB, CIR or status registers instead of the accumulator. A general-purpose register was also accepted. RAM, cache memory and a stack were not credited.

For part (c) many candidates had a vague idea that access was faster to and from the registers than to and from main memory, but few managed to get the second mark by expanding on this answer. Credit was given for a good explanation as to why this was so. The fact that this was an intermediate result, and so more calculations were to be carried out on this data, also seemed to have been overlooked by many candidates.

Question 7

This question involved looking at a simple logic programming language. The expected answers to (a) were Alan, using clauses 11, 4 and 1, and Chris using clauses 10, 8 and 2.

Most candidates arrived at the correct grandfathers, but many did not give all three clauses invoked in each case. A few gave clauses but did not identify the results of their search, so could not be credited.
A gratifying number of candidates correctly derived a clause for cousins in the form cousin(W,X) IF grandfather (Y,W) AND grandfather (Y,X). With the clause for grandfather given, candidates were not expected to produce a complicated clause combining mothers and fathers, brothers and sisters, which a few tried to do.

For part (c), few candidates suggested two valid but different, specific types of problem suited to logic programming. The accepted list was long and included such problem types as medical diagnosis, the processing of natural language, artificial intelligence and image interpretation.

Question 8

This question was on addressing modes**.** Many candidates appeared to know the different types of addressing, judging by the answers to part (b), especially immediate and direct. However, fewer were able to explain each mode in words that made sense. Some confirmed their mark with an example which clarified what they were trying to say. A number referred to the operand as the 'address field' or 'address' which confused their answer. Many seemed to assume that these addressing modes were used exclusively for one type of instruction; e.g. Direct addressing means that 'the number will be loaded into the accumulator.' Indexed addressing was often confused with indirect addressing.

Most candidates gained some marks from part (b), with a pleasing number correctly completing the table.

Question 9

This question was on file management. This was a question where knowledge and use of correct technical terms were really expected, but, sadly, often missing. A filename includes its extension, so making the two files of different types, created by different applications, would not solve the problem posed of saving two files with the same filename on one floppy disk. The correct answer, given by many candidates, was to place the two files in different directories or folders.

The most common correct reason given in part (b) for the loss of disk capacity was the File Allocation Table, with system or boot files and disk details (name, capacity etc.) coming a close second. Again, many candidates could not give the correct terms and some 'calculated' that there was no loss of capacity anyway.

Many threw away marks in part (c) by not relating their answers to the loading of an executable file, explaining instead the general roles of these two sub-systems. It was felt that loading a file offered sufficient scope for candidates, as the file management sub system searches for a match of the filename, using the FAT to locate it, obtains the size of the file and checks the file status and that the file is not corrupted or already open. The memory management sub-system then finds the required amount of memory and allocates it to the executable file, loads it into memory and marks that memory as taken. It also sets up the page management table and manages virtual memory. Claiming that the memory management sub-system allocated memory for the file to *run* lost marks. Many candidates gained marks only for their suggested errors.

Question 10

Again, vague answers lost marks in this question on object oriented programming, although it was felt that candidates were more familiar with this topic than previously. To say that two advantages of an object oriented approach were 'can add new code more efficiently' and 'easier to program' is not creditworthy.

The terms 'inheritance' and 'encapsulation' were liberally scattered over the page, but rarely in a context that gave two advantages of the object oriented approach. The term 'modules' was often used in place of 'objects' or 'classes', which made an otherwise intelligent answer incorrect. A good candidate wrote 'Data and instructions are encapsulated into the object, therefore objects can be re-used', and, 'Attributes and activities can be inherited by subclasses meaning less new code is required.' .

Most candidates drew a correct inheritance diagram for the classes described in part (b), but few gained marks for writing the class definition in part (c), although considerable latitude was given in assessing their efforts.

CPT 5: Advanced Systems Development

General

This paper examined several new topics: – Active Server Pages (ASP) and how applications may be executed on a web site; Data Definition Language (DDL); encryption in the context of the Internet. Candidates responded well to questions on these new topics, with the exception of Data Definition Language. However, in areas of the specification which have been examined before some candidates made errors reported on in previous reports. For example, some candidates were unable to complete the dataflow diagram template accurately. Many candidates were not familiar with the term *unproductive maintenance* in the context of a flat-file database.

Pleasingly, many candidates were able to describe tables accurately, using the correct attribute names. The same candidates were able to write a correct SQL statement for the given requirement. Candidates' knowledge of networking was also quite good. However, some candidates confused the physical configuration and logical configuration of a network.

Question 1

Many candidates were able to respond successfully to this question with one of installation, operations, training, systems maintenance or technical manual.

Question 2

The most popular answer was to fix bugs in the system's programs. A second very popular answer was to change the system to meet new requirements. This question was not about data maintenance. Therefore, answers such as "to tidy the database" were not accepted.

Question 3

Many candidates were able to score high marks on this question. Several candidates chose a biometric method, such as a fingerprint recognition system for gaining entry into the car, others chose a magnetic strip card. For the second mark, candidates were required to relate the information gained from scanning the card or biometric method to information stored in a database on the remote computer. Some candidates simply stated: "this information was sent for checking on the remote computer". This was not enough to gain credit. Candidates are reminded that examiners are looking for evidence of knowledge and understanding of computer systems. Referencing a database of registered users shows such understanding and knowledge.

Many candidates correctly suggested some radio/microwave/satellite/mobile phone communication link for sending the accounting system to the remote computer but relatively few understood the need to convert the information stored in the car's computer into a form suitable for transmission. A modem/terminal adapter is necessary.

Several candidates ignored the requirement to supply the user with an electronic record and suggested a printer in the car or a visual display unit. However, many candidates successfully answered: "by e-mail", "text message to mobile phone" or "written to magnetic stripe card/smart card".

Question 4

Candidates' responses to this question revealed that dataflow diagramming continues to be an area of weakness among the candidature. A process name must begin with a verb and must describe the processing task accurately. In this scenario the clue to the process descriptor was in the third line of the question: "This part prints a report of details of luggage". Therefore, acceptable process names were: "Print Report/Print Luggage Details Report/Produce Report". For the data store name the clue was contained in the last sentence: " The details are processed against a master file for the particular flight." and the given data flow label "Passenger Record". Therefore, acceptable answers were "Flight Master File" and "Passenger File". Common incorrect answers were: "Passenger Record/s" and "Database". "Master File" was rejected on the grounds that it was not precise enough.
The data flow is a report and so acceptable answers included "Report" and "Printed Report".

Many candidates correctly identified *barcode scanner* as a possible device for use by the luggage handlers. Several candidates simply stated "a scanner" and therefore failed to gain credit.
An appropriate printer for printing multi-part stationery is an impact printer such as a *dot-matrix printer*. The continued existence of dot-matrix printers in the market place is due to their ability to print on multi-part stationery.

Question 5

The majority of the candidature succeeded in making a creditable attempt at this question. The most popular answer for part (a) was the lack of any physical trace with electronic mail alterations, which is not true of alterations to paper mail. Fewer candidates answered that opportunities exist to alter e-mails because e-mails travel through several computers/servers to which access is possible.

Many candidates successfully deduced that a publicly distributed public key would be used to encrypt e-mail and the corresponding private key would be used to decrypt it. Some candidates failed to make it clear that the recipient's private key, not any private key, must be used. To verify that e-mail has originated from the sender and has not been altered the sender's private key can be used to encrypt the e-mail. The corresponding public key can be used to decrypt this e-mail. Many candidates understood the sequence in which the keys had to be used but fewer spelt out that decryption takes place using the sender's public key, not just any public key.

Question 6

Many candidates were able to distinguish a database from a database management system and to correctly identify the three levels of a DBMS. However, few understood the term "unproductive maintenance" and how it is overcome in a DBMS.
Defining concurrent access did not prove difficult for the majority of the candidature. However, there were many imprecise answers to the question "why must concurrent access be controlled?". The accepted answer covered the lost update scenario.

Explanations of DDL were usually creditworthy but examiners were left with the impression that candidates lacked experience of the *use* of DDL. Very few were familiar with the how a DDL is used to restrict access. Data Definition Language or DDL is used to create/define/specify. For example, DDL is used to create a database, table, index, data types and validation controls. It is also used to define/specify primary keys, foreign keys and attributes. Access to data items in a database is defined in DDL through the create/grant view mechanism. Many candidates referred to setting access rights. This was not an acceptable answer.

Question 7

The specification states that candidates should be aware of how applications may be executed on a Web site and aware that ASPs can combine HTML, scripts and components to create dynamic web pages. Candidates' responses to this question indicated familiarity with this part of the specification. Many candidates obtained high scores on this question. Candidates' labelled diagrams for part (a) showed a good knowledge and understanding of FORMS and the mechanism for obtaining input from a user. Part (b) created little difficulty and many candidates obtained full marks for this part. Candidates' responses to part (c) revealed a lack of knowledge of Telnet. Some candidates had difficulty specifying the URL accurately.

Question 8

Many candidates correctly identified three relationships. In part (b) some candidates lost marks by not mapping the data requirements into the relations accurately. For example, some candidates used WardID and not the given WardName, NurseName and not the given NameOfNurseInCharge. Many candidates managed an acceptable SQL statement correctly joining the tables Patient and PatientMedicalCondition. The complete SQL statement was

```
Select Patient.Forename, Patient.Surname,
                  PatientMedicalCondition.MedicalConditionNo
  From Patient, PatientMedicalCondition
  Where Patient.WardName = 'Victoria'
        And Patient.PatientNo = PatientMedicalCondition.PatientNo
```

Question 9

Candidates' knowledge and understanding of networking was generally very good. In part (a) many candidates successfully replaced the hub by a bus layout. Many candidates showed good knowledge and understanding of how packet collisions affect the performance of an Ethernet bus network.
The term physical configuration refers to how a network is actually cabled. The term logical configuration refers to how a network behaves, e.g. as a bus. In part (b) (ii) some candidates did not interpret physical configuration correctly and drew two logical bus segments connected by a bridge instead of two hub-based segments connected by a bridge.

Pleasingly, many candidates understood the difference between the operation of a switch and that of a hub but several adequately explained the switch's operation but not the hub, thus losing a mark. Part (c)(ii) was generally well answered with popular answers being "no packet collisions" and the consequences of no collisions being a faster service.

Mark Ranges and Award of Grades

Unit/Component	Maximum Mark (Raw)	Maximum Mark (Scaled)	Mean Mark (Scaled)	Standard Deviation (Scaled)
CPT1	65	65	32.6	11.3
CPT2	65	65	31.2	8.2
CPT4	65	65	24.8	10.3
CPT5	65	65	28.5	9.3

For units which contain only one component, scaled marks are the same as raw marks.

CPT1 (6207 candidates)

Grade	Max. mark	A	B	C	D	E
Scaled Boundary Mark	65	46	41	36	31	26
Uniform Boundary Mark	105	84	74	63	53	42

CPT2 (2139 candidates)

Grade	Max. mark	A	B	C	D	E
Scaled Boundary Mark	65	42	38	34	30	26
Uniform Boundary Mark	105	84	74	63	53	42

CPT4 (2650 candidates)

Grade	Max. mark	A	B	C	D	E
Scaled Boundary Mark	65	40	35	30	26	22
Uniform Boundary Mark	90	72	63	54	45	36

CPT5 (952 candidates)

Grade	Max. mark	A	B	C	D	E
Scaled Boundary Mark	65	42	37	33	29	25
Uniform Boundary Mark	90	72	63	54	45	36

Advanced Subsidiary award

Provisional statistics for the award (608 candidates)

	A	B	C	D	E
Cumulative %	15.5	33.2	52.3	73.7	88.3

Advanced award

Provisional statistics for the award (65 candidates)

	A	B	C	D	E
Cumulative %	6.2	21.5	46.2	70.8	89.2

Definitions

Boundary Mark: the minimum mark required by a candidate to qualify for a given grade.

Mean Mark: is the sum of all candidates' marks divided by the number of candidates. In order to compare mean marks for different components, the mean mark (scaled) should be expressed as a percentage of the maximum mark (scaled).

Standard Deviation: a measure of the spread of candidates' marks. In most components, approximately two-thirds of all candidates lie in a range of plus or minus one standard deviation from the mean, and approximately 95% of all candidates lie in a range of plus or minus two standard deviations from the mean. In order to compare the standard deviations for different components, the standard deviation (scaled) should be expressed as a percentage of the maximum mark (scaled).

Uniform Mark: a score on a standard scale which indicates a candidate's performance. The lowest uniform mark for grade A is always 80% of the maximum uniform mark for the unit, similarly grade B is 70%, grade C is 60%, grade D is 50% and grade E is 40%. A candidate's total scaled mark for each unit is converted to a uniform mark and the uniform marks for the units which count towards the AS or A-level qualification are added in order to determine the candidate's overall grade.