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ASSESSMENT and QUALIFICATIONS ALLIANCE

## General Certificate of Secondary Education

# Information and Communication Technology
# 3522 Full Course
*Specification B*

## 3522/C Coursework

# Report on the Examination
*2007 examination - June series*

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## General

Most centres were careful to ensure that candidates' work was marked to a consistently high degree of accuracy and supported these marks with some excellent annotation. However, sometimes marking was not in line with the AQA standards as exemplified at the coursework standardisation meetings.

The quality and quantity of the coursework submitted varied between centres and candidates, but it was generally well presented. Only a few candidates included repetitive or irrelevant printed output. These candidates should be encouraged to be more selective when deciding upon material to be included in their reports bearing in mind that quality is more important than quantity.

The wide range of realistic topics covered and the increasingly sophisticated use of application software by many candidates was particularly pleasing. The quality of the final reports did not always match the skills demonstrated in using of the software.

## Appropriateness of Tasks

Coursework tasks should allow candidates to demonstrate breadth and depth in their ICT capability by addressing an identifiable system that can be used by others. Most centres allowed candidates a free but guided choice of tasks. This approach allowed candidates to develop topics of personal interest and fostered a sense of pride and ownership in the coursework. Such an approach appeared to encourage candidates to document their work more thoroughly and hence the coursework generally obtained higher marks.

Where centres provided a very narrow range of similarly structured tasks, little differentiation was allowed for and it often appeared difficult for candidates to demonstrate their skills.

Occasionally all candidates from a centre attempted exactly the same task. In these cases there usually appeared to be a more rigid teacher-led approach culminating in a tendency for candidates to produce very similar reports. Where all candidates attempted the same task, this rarely encouraged independent thinking and consequently differentiation was often lacking.

Some centres use templates, particularly with less able candidates. Whilst templates can assist in ensuring that all the assessment criteria are covered, care needs to be taken to ensure that they are not too restrictive or too directive. The use of generic flowcharts is increasingly popular, but these gain no credit unless they have been adapted by the candidates for their own particular task. Candidates can only be awarded marks for their own original work. It is helpful if the centre provides the moderator with clearly labelled examples of all templates and flow charts given to candidates.

Coursework tasks that were awarded high marks:

- were within the capabilities and aptitudes of the candidate
- were designed for a third party
- were reusable systems
- kept to the point of the task and were not distracted by sub-tasks that were irrelevant to the solution of the problem being attempted
- enabled candidates to demonstrate the full range of their skills, knowledge and understanding
- contained annotated evidence with comments by assessors to support the marks awarded
- used a report structure based upon the assessment criteria headings

- were restricted enough to allow satisfactory completion of the tasks

**Theme 1: Communicating and Handling Information**

Tasks addressing the theme of *Communicating and Handling Information* were usually appropriately covered with a database solution being the preferred option. Some centres submitted spreadsheet data handling tasks, but, disappointingly, only a few centres made use of web-site creation or presentation software.

A few candidates produced basic web pages or simple linear presentations which were not developed as ICT systems in line with the assessment criteria in the specification. It is essential to note the issue of reusability so that an actual ICT system is produced rather than a one-off solution. Careful consideration should be given to how the solution to the chosen problem allows access to each of the assessment criteria. Candidates should note that they are designing a system for someone else to use and should be encouraged to consider the needs of the end user.

**Theme 2: Controlling, Measuring and Modelling**

The theme of *Controlling, Measuring and Modelling* was mainly covered by submissions based on spreadsheet models.

Care needs to be taken to ensure that any spreadsheet based tasks submitted within this theme are modelling tasks not data handling tasks. Modelling requires the use of functions and/or formulae that can alter the outputs when the input variables are changed and the production of 'what if' scenarios. In order to help distinguish between a (spreadsheet) model and a data handling task it is recommended that candidates run their model a number of times with different input parameters producing a range of outputs. The increasing use of the 'goal seek' feature is welcomed. Candidates cannot be awarded the full range of marks within this theme if they do not produce a modelling task.

Few centres submitted measuring or control tasks, although good reports were produced where centres had carefully considered the assessment criteria and allowed candidates a reasonable freedom of choice.

## Internal Standardisation at the Centre

Most centres assessed candidates' coursework consistently and in line with the assessment criteria. Many centres have effective internal standardisation procedures. Where more than one teacher is involved in marking the coursework, centres are required to carry out internal standardisation of marking before the marks are submitted and there was good evidence of this being done in most centres. Where all of the work within a centre had not been marked to the same standard, this often caused the whole of a centre's marks to be adjusted. A description of the procedure to be followed for internal standardisation of marking can be found in the specification. Centres needing advice on internal standardisation are encouraged to send a representative to one of the coursework standardisation meetings which are usually held in the autumn term and are publicised on the AQA web-site.

## Provision of Information for the Moderator

There was a pleasing amount of background information provided by centres. The better centres provided moderators with:

- a cover sheet for each task which clearly stated the theme that the task addressed
- details of the introduction to the task, including copies of any class handouts and support materials including templates and flowcharts
- the Candidate Record Form attached to the front of the candidate's coursework
- annotation on the candidates' work indicating where and why each mark had been awarded with reference to each assessment criterion as indicated in the specification

Moderation was difficult in the few cases where there was a lack of assessor annotation. This was especially true when the evidence did not appear to support the award of a mark. Annotation can be as little as a letter to indicate the assessment criterion met written next to the relevant piece of work. More detailed annotation is expected where necessary, for example when marks have been awarded by the centre for creditworthy work which is located in another section. Centres are strongly encouraged to annotate their work since it:

- is a requirement of the specification and the *QCA Code of Practice*
- provides guidance and feedback to candidates
- provides justification for the award of marks
- is essential for internal moderation
- assists the external moderation process

## Awarding of Marks

Most centres are aware that marks can only be awarded when evidence is provided to support that award. A few centres awarded full marks based on trivial explanations or little hard copy evidence. The assessment criteria for the award of marks are clearly set out within the specification and the support materials provide more detailed explanations of what evidence deserves credit.

## Comments in relation to the individual Assessment Criteria

Candidates should be encouraged to adopt a systems analysis approach to their work and design a system that can be used by a third party to meet a defined and identifiable need to solve a problem. The major points of concern are discussed in detail below. Many of these points have been mentioned in previous years' reports.

## A: Description of the Task to be attempted

The description should provide a good understanding of what is involved within the problem. Some descriptions lacked clarity. The main focus should be on the problem, and any related sub-problems, rather than the proposed solution.

Candidates must produce their own original work and therefore cannot be awarded marks for descriptions which have been provided by the centre.

## B: Analysis

Candidates who did this section well tended to analyse the task and demonstrate a clear understanding and analysis of what is involved in the problem. Other candidates provided only a cursory analysis often relying on work placed in other sections, especially the Description section, for marks.

Although a list of possible methods that could be employed to solve the problem was often provided, an insight into at least two of these methods is required for marks to be awarded. It is unlikely that an 'insight' can be provided in one short sentence. One quite acceptable possible solution is to simply improve the current method yet this was often not adequately described.

## C: Specification

Most candidates were able to provide some relevant objectives, with many candidates providing clear and reasonable evaluation criteria. Candidates cannot gain credit for objectives provided by the centre or for generic objectives which do not relate to the task. Although it was often appreciated that evaluation criteria needed to be measurable it was not always clear how they referred specifically to the actual problem being solved; candidates should be encouraged to provide actual examples.

To gain full marks candidates need to provide a detailed and reasoned specification which demonstrates depth and sophistication in their choice of evaluation criteria. Good specifications often enabled candidates to provide high quality responses in the Testing and Evaluation sections.

## D: Design of the ICT System

In this section, candidates should develop a planned design of the ICT system and describe the relationships between the various parts of the solution.

Some candidates still appear to be misled by the use of the word 'design' and confuse the design of the screen layout or database structure with the design of the ICT system required here. Credit for the design of data collection forms, file structures, output reports, screen layouts, etc. is given within the Implementation section.

It was pleasing to see a few candidates describing in detail the data flow through the proposed new system and it was these candidates who tended to be awarded the higher marks. Good candidates also showed the relationship between the various parts of the solution by including

detailed annotated data flowcharts, systems diagrams, structure diagrams, detailed input/process/output tables, and/or algorithms.

Several candidates included generic flowcharts which had been copied from text books or elsewhere. These gained no marks. Where candidates had modified the flowcharts to make them relevant to the task being undertaken then credit could be given.

**Implementation**

Justification of the decisions made by candidates when implementing their solutions is a strong theme running through these sections especially for the award of the higher marks within each section. A few centres awarded marks where only trivial justification was provided.

Some candidates appeared to spend a disproportionate time on some aspects of the implementation, such as the entering of an excessive amount of data into tables in a relational database and this was often at the expense of other sections.

**E(i): Hardware Resources required**

These marks are awarded for the selection of appropriate computer hardware for the proposed system.

There were some excellent descriptions with many candidates choosing to use the Internet to research relevant hardware. Some candidates visited commercial websites and used the services provided to compare the specifications of various items of hardware. Although the production of any such lists alone is not worthy of credit, most candidates then went on to use the information to make selections and to justify their choices commenting on relevant aspects such as the minimum backing storage capacity, the minimum speed of processor, the required resolution of the monitor, the number of pages to be printed per minute, etc.

Some candidates failed to justify their choice of hardware with reference to the actual problem and therefore could not gain full marks. Fewer still referred to the proposed solution or the end user. Other candidates simply listed or described generic hardware (e.g. mouse, keyboard, computer monitor) without realising that, even if a selection had been made, it had to be appropriate to the task to be awarded marks.

**E(ii): Software Resources required**

In this section candidates are required to select appropriate application software and to justify their choice.

A few candidates began by selecting and justifying their choice of operating system. No marks were gained as the assessment criteria clearly refer to application software.

Most candidates were able to select appropriate application software, but many justifications were generic and did not make reference to the problem being solved.

A few candidates mistakenly selected application software for the specific purpose of producing the coursework report or the user guide.

### E(iii): Data Collection, Data Capture and Input

Some excellent work was submitted in this section. Most candidates produced good paper-based data collection forms although sometimes there was no justification for their design. The input forms for database work were particularly impressive and these often had clear justifications for their design.

Candidates occasionally gave thought to data entry when designing spreadsheets by using features such as spinners, drop down lists, comments or even simply the highlighting of cells which required data input. However, many candidates did not provide an explanation as to how data capture forms and data entry screens satisfied the needs of the system, or any indication that these had been designed with regard to clarity, ease of filling in, or ease of transfer to the computer system.

In measurement and control tasks the choice of appropriate sensors was usually well justified.

### E(iv): Data Verification and/or Validation

Many candidates prefaced this section with definitions of validation and verification and various examples which were not related to the task.

Verification was inadequately covered by general statements such as checking the data entries by eye or proof reading on the screen. There were only a few candidates who provided the required evidence for verification by supplying annotated output (such as screenshots or reports) and associated copies of the original documents referencing the corrections necessary. Whilst use of spelling and grammar checkers may be important, they are not normally considered to be part of the verification process.

The extensive facilities built into most modern databases for data validation were used by a large number of candidates who gained the maximum marks, but many seemed unaware of the data validation options offered by most spreadsheet and web-site creation packages.

Candidates who did not provide evidence of the understanding and use of more than one technique could not obtain full marks. Appropriate validation techniques include:

- range checks to reject any items outside an expected range
- type checks e.g. to ensure that the number of students will be entered as an integer
- table look-up checks including the use of restricted lists

A number of candidates provided evidence to demonstrate many range checks, but failed to use the second validation technique necessary for full marks.

A screenshot showing a default data validation error message, even when annotated, is usually not sufficient evidence to demonstrate an understanding of and use of validation. However, annotated screen shots of how the validation was set up and of what happens when an invalid entry is made are acceptable.

Some of the tasks are such that it is inherently difficult to validate or verify the data (for example, when producing a presentation or controlling a robot) and here a critique of the appropriateness of the various techniques is expressly mentioned in the assessment criteria as being worth two marks. Candidates should be encouraged to discuss appropriate validation and

verification checks that would be desirable for their system. A few centres mistakenly awarded two marks for generic explanations.

Credit can be given for evidence of validation, such as screenshots, which has been placed in the Testing section, but centres should ensure that suitable annotation is provided so that the moderator is aware of this.

### E(v): Data and/or Program Structures

This section was well done by the vast majority of candidates with some good justifications given for particular data structures or formulae used. Centres should note that it is necessary to ensure that row and column headers in spreadsheets are printed in order for formulae to be checked. In database work, the selection of table properties such as field lengths and data types was not always explained. Many candidates correctly included the evidence for the creation of mail merge templates and macros.

Although the evidence for this section was sometimes mistakenly placed in the Design section, candidates were not disadvantaged because of this and credit was still given, but centres should ensure that the moderator is made aware of this.

### E(vi): Output Format

This section was frequently well done, particularly in database work where many candidates designed appropriate query-based reports and mail merge documents. Despite the guidance in the support materials, some centres mistakenly gave two marks for the simple production of default printouts without any attempt being made to design specific customised output formats. Candidates who received the higher marks often annotated their printouts to explain how the design of these related to their solution.

Candidates who received the higher marks often annotated any relevant graphical output to indicate why a particular type of chart had been produced and how it related to the solution.

### F: Testing

Most candidates recognised the need to test their systems systematically, but some only produced typical printouts from their system as evidence that it functioned correctly. The simple production of output is not sufficient grounds to be awarded marks under this section.

Many candidates demonstrated a clear strategy by producing a test plan in table format indicating the expected outcome referenced to screenshots showing the actual outcome. Candidates should be encouraged to produce a systematic and comprehensive strategy for testing their solution using valid, invalid and extreme data where the outcome is known so that problems with their system can be identified and corrected. The test data and the expected outcome should be stated and the annotated evidence should clearly show the use of the same test data.

Those candidates who had systematically planned their testing strategy and justified it obtained the higher marks. A few of these candidates also tested against their specification.

Candidates who tested their system by letting their friends use it, or who included statements from teachers that they had seen the system working, but did not include evidence, were awarded few marks. The small number of candidates who provided no evidence at all gained no marks.

Many candidates included in this section the testing of their validation techniques. This is quite acceptable, but candidates should realise that this is only a part of a testing strategy and is not in itself evidence of a comprehensive strategy.

### G: User Documentation

Many candidates scored well in this section. As separate and clearly identifiable user documentation is necessary many candidates used their desk top publishing skills to produce some excellent manuals in booklet form. These manuals often included a contents list, page numbers, sensible headings, different sections, frequent appropriate screen shots and even FAQs. A few candidates produced ‘on-line’ user documentation providing hard copy as evidence.

It is important to take into account that the system has been designed for a third party who may be an unfamiliar user of the system created and instructions for the use of the system must be comprehensive. However, those few candidates who gave generalised instructions on how to use the application software to create the system could not be awarded marks.

Technical documentation should cover areas that a normal user would not be expected to use such as changing validation rules, altering formulae, adding links, etc. Some candidates covered this area in a troubleshooting section.

### H: Evaluation

A failure to specify suitable evaluation criteria in the analysis and a lack of a comprehensive, planned testing strategy, limited the ability of many candidates to produce good evaluations.

Many candidates seemingly copied their specification into the evaluation section, but not all went on to comment on the effectiveness of their solution against each of the evaluation criteria. Those candidates who just copied the evaluation criteria and placed ticks next to each criterion or made simple comments such as ‘this was done’ were considered to have made a cursory evaluation not worthy of marks.

The best evaluations made reference to test results and detailed relevant refinements to their system which could usefully be employed in future.

### J: Communication within the report

Many candidates were rewarded for the clarity of their communication and a good standard of spelling, punctuation and grammar. The majority of candidates used the structure of the assessment criteria to present their report and this helped them communicate effectively. The use of word processing usually resulted in the presentation of high quality reports, appropriately formatted, and containing a varied range of techniques. Some candidates relied entirely on spelling checkers and did not proof read their work leading to some interesting use of words.

The best reports often made good use of standard word processing facilities such as headers and footers.

## Administration

Most centres submitted candidates' marks and coursework by the published deadline. It was disappointing that other centres did not to submit their marks by the deadline and as a result slowed the moderation process. It is possible that the resulting delay could lead to candidates not receiving their grades on the published date.

The Candidate Record Forms were usually completed accurately and clearly which greatly assisted the moderation process. Centres should be careful to avoid arithmetic errors when totalling a candidate's marks and transcription errors when transferring marks to the Candidate Mark Forms. The Candidate Record Forms should be signed by both candidate and teacher. The absence of a signature could affect the prompt reporting of results.

Candidate Mark Forms were usually completed according to the supplied instructions, but the moderation process was occasionally hampered by centres not displaying marks clearly on both the yellow and pink copies submitted to the moderator. Some centres also provided the moderator with a very useful rank order list.

A few centres did not include a Centre Declaration Form to indicate that internal moderation had taken place. Two separate Centre Declaration Forms are required when centres enter candidates for both Full Course and Short Course.

Most centres sent a correct sample to the moderator as indicated in the AQA regulations. The sampling procedure was only problematic for a minority of centres who did not supply the requested coursework by return of post. Most centres also assisted by sorting the sample into candidate number order.

The vast majority of centres followed previous recommendations that candidates' coursework should be securely bound, preferably using a treasury tag in the top left corner. Regrettably, a minority of centres continue to submit coursework as either loose pages in card folders or plastic wallets.

## Further Information

Information on any of the issues raised above can be obtained from:

1. The specification
2. The specialist coursework advisers which AQA has nominated to assist centres with any matters relating to coursework
3. The exemplar coursework material and the relevant commentaries
4 The coursework support material
5. The coursework standardisation meetings

Details are available on www.aqa.org.uk or by e-mailing ict-subjects@aqa.org.uk

### *Mark Ranges and Award of Grades*

Grade Boundaries and Cumulative Percentage grades are available on the **Results Statistics** page of the AQA Website