External Assessment Report 2012

Subject(s)	**Computing**
Level(s)	**Higher**

The statistics used in this report are pre-appeal.
This report provides information on the performance of candidates which it is hoped will be useful to teachers/lecturers in their preparation of candidates for future examinations. It is intended to be constructive and informative and to promote better understanding. It would be helpful to read this report in conjunction with the published question papers and marking instructions for the examination.

Comments on candidate performance

General comments

The 2012 Higher Computing paper was generally well received by candidates, centres and the press. The broad opinion voiced was that the paper was fair and within the grasp of a prepared candidate. There were no changes to the structure of the paper since last year. The average mark gained by candidates in the exam increased by 3.9 marks from last year to 67.0 out of 140 in 2012. This, coupled with a slight rise of 0.6 marks in the average gained for the coursework, has produced an increase in both the pass rate and the proportion of grade A passes this year.

Markers reported that the standard of English is still quite poor in some scripts, and significant numbers of pupils are still not reading the questions properly and/or tending to give rather simplistic responses. Explanations/descriptions tended to be rather terse, lacking the technical detail required at Higher level. Scenario-based questions seldom drew out answers in the given context. However the grasp of the two Core topics is improving, as the rise in average mark of 16.4 out of 30 gained in Section I gives testament to. Candidates also gained 28.9 out of 60 in Section II on average, again an increase on the previous year.

The numbers of candidates attempting the three units were 1,413 for Artificial Intelligence, 962 for Computer Networking, and 1,393 for Multimedia Technology. The average marks gained in the written paper by each of these three groups were 69.82, 66.71 and 64.34 respectively. This difference is largely due to the performance in the Optional topic. Detailed analysis of the questions reveals no bias in the relative level of difficulty for these options.

Many candidates still appear to be ill-prepared for the examination, with 12% gaining less than 79 marks out of 200 for the examination and coursework combined. These candidates may not be wholly suited to Higher. This is borne out by the fact that centres themselves estimate that 30% of candidates will fail to gain a grade C or better (actual exam performance shows the figure to be 29.8%).

Areas in which candidates performed well

Each question highlighted below averaged **75% or more** of the marks available.

Section I

Question 1: (0.8 out of 1 mark) Shows that candidates have a good grasp of binary conversion.

Question 7: (0.9 out of 1 mark) Demonstrates that candidates can identify a given network topology.

Question 11 (a): (0.9 out of 1 mark) Shows a good knowledge of stages in the software design process.

Question 13 (a): (0.9 out of 1 mark) Demonstrates understanding of the Boolean data type.

Question 16: (1.7 out of 2 marks) Tested understanding of characteristics of maintainable code; the majority did very well.

Section II

Question 18 (b) (iii): (0.8 out of 1 mark) Shows that candidates can identify utility software.

Question 19 (a): (1.5 out of 2 marks) Demonstrates solid knowledge of the UNICODE format.

Question 19 (c) (iii): (0.8 out of 1 mark) Shows a good knowledge of virus code actions.
Question 20 (b) (i): (0.9 out of 1 mark) The majority of candidates correctly identified the software specification.
Question 20 (d): (0.8 out of 1 mark) Tested understanding requirement for independent testing.
Question 20 (f): (0.9 out of 1 mark) Showed that the majority of candidates could identify role of project manager.

Section III

Part A

Question 23 (a) (0.8 out of 1 mark) Shows that candidates can identify the purpose of the Turing test.
Question 24 (e): (1.5 out of 2 marks) Demonstrates solid knowledge of search techniques.
Question 25 (b): (0.8 out of 1 mark) Candidates were able to perform this calculation successfully.
Question 27 (a): (0.9 out of 1 mark) The majority of candidates correctly identified the solution to the query.
Question 27 (b): (1.8 out of 2 marks) Tested understanding requirement for independent testing.

Part B

Question 29 (f) (i): (0.8 out of 1 mark) The majority of candidates can identify the language used for mobile phone web access.
Question 29 (g): (0.8 out of 1 mark) Demonstrates solid knowledge of maintenance types.
Question 31 (d) (ii): (0.8 out of 1 mark) The majority of candidates could identify circuit switching.
Question 32 (c): (2.4 out of 3 marks) Most candidates can complete this calculation.

Part C

Question 35 (e) (i): (0.8 out of 1 mark) Demonstrates solid knowledge of the purpose of anti-aliasing.

Areas which candidates found demanding

Each question highlighted below averaged **25% or less** of the marks available.

Section I

Question 6 (b): (0.2 out of 1 mark) Asked for two tasks carried out by file management ‘during this save operation’. Candidate responses generally lacked technical depth or ignored the context.
Question 12: (0.2 out of 2 marks) Asked candidates to ‘describe one difference’ between the language types. Responses were very poor here, with most candidates merely stating two (often incorrect) facts about scripting and/or procedural languages.
Question 15: (0.1 out of 1 mark) Asked candidates to relate test results and corrective maintenance. Responses were simplistic and/or inaccurate, failing to address the fact that corrective maintenance is required for errors not picked up during testing.

Section II

Question 17 (b): (0.3 out of 2 marks) Asked candidates to explain flaws in use of MIPS as a measure of processor performance. Responses were simplistic references to the table, such as ‘the other two numbers are bigger’. Many responses addressed system, rather than processor, performance.
Question 17 (d) (i): (0.2 out of 1 mark) Called for the naming of a ‘logic operation’, such as AND/OR. Surprisingly, most candidates were unable to do this, referring instead to arithmetic calculations or the fetch execute cycle.
Question 19 (c) (i): (0.1 out of 2 marks) Found candidates unable to state that a file virus affects executable files only and does not infect data files, such as the one in the scenario.
Question 19 (c) (ii): (0.2 out of 1 mark) Tested that candidates knew that the core feature of a virus was its ability to replicate – they did not. Candidates remain convinced that the capacity to cause damage is the defining feature of a virus.
Question 22 (a): (0.5 out of 2 marks) Asked candidates to explain why a section of code was not ‘efficient’, as it used a series of IF structures. Many offered simplistic responses about the output, including ‘£495 is not cheap’. The use of nested IFs or a CASE would remove the unnecessary execution of conditions after the band has been set to ‘cheap’.
Question 22 (e): (0.5 out of 2 marks) Called for a definition of a function - a block of code that has, or returns, a single value. Most responses were akin to ‘it is a predefined section of code’, thus ignoring the fact that two marks were on offer.

Section III

Part A

Question 25 (a): (0.5 out of 2 marks) Tested knowledge of problems in vision systems in a simple context. Many candidates floundered or ignored the context completely.

Part B

Question 28 (a) (ii)): (0.2 out of 1 mark) Showed that most candidates did not know that the OSI layer where encryption takes place was presentation.
Question 30 (d): (0.7 out of 4 marks) Asked candidates to describe two ‘software’ security techniques for excluding hackers. Incorrect responses fell into three categories. Many merely named, rather than described, two for a maximum of two marks. Other responses included methods already named in, and therefore excluded by, the question. Some candidates described hardware methods.

Part C

Question 33 (d): (0.3 out of 2 marks) Showed clearly that most candidates did not know the difference between hardware and software codecs and therefore could not compare and contrast them.
Question 34 (c) (i): (0.2 out of 1 mark) Asked candidates to identify ADPCM as the compression method in WAV files. Most offered mp3 or another simplistic response such as ‘lossy’.
Question 34 (c) (ii): (0.4 out of 2 marks) Asked for a description of the above compression method. Even avoiding double-jeopardy, answers were very poor in the detail required at Higher.
Question 34 (f) (iii): (0.2 out of 2 marks) Asked candidates to describe a disadvantage of normalisation. Responses were simplistic one-liners, lacking in any real detail.

Question 35 (d) (ii): (0.5 out of 2 marks) Tried to elicit that, as PNG was 24 bit, it had a sufficient number of colours available to remove the need to create more using dithering. Responses showed a lack of understanding of both dithering and the standard format PNG. Many responses cited resolution, rather than colour depth as the benefit.

Advice to centres for preparation of future candidates

- Candidates should be able to name and describe each item/concept identified in the course descriptors. This list could be issued to candidates and be used for regular 'traffic-lighting'.
- The context of a question is important. If a candidate does not link their answer to the given scenario when asked to do so it will mean lost marks.
- Candidates must ensure that they read the whole question. Too many candidates missed out marks through careless misreading, for example describing a security method named in the stem of a question rather than describing another as required (see question 30 (d)).
- Level of response required at Higher is greater than that required of Credit or Intermediate 2 candidates. Candidates should not offer answers like 'it is easier/quicker/cheaper' without some corresponding justification of why they are easier/quicker/cheaper.
- In topics where Core and Options overlap, the Options have more detail and candidates are therefore expected to go further within their responses. An example of this would be in 34 (c), where many Multimedia candidates settled for responses such as 'lossless', rather than name and describe an actual technique.
- Work steadily throughout the year, making notes and learning the material properly. Candidates who cram at the last minute seldom recall with the level of detail required during the exam itself. The simple recall of facts may not help candidates when they are asked to relate parts of the course or answer in context.
- Attempt **every** question in the first two sections and in the Optional topic studied. A blank response can gain no marks! Always give it your best guess!
- Read the marking instructions and External Assessment reports for previous years. These will give a clearer understanding of the level of response required. These documents contain invaluable advice for candidates and centres on a range of questions.
- Candidates should also be encouraged to read past papers, marking instructions and exam reports. They can gain invaluable insights into the process if they are trained to 'think like a marker'.
- Candidates should gain plenty of practice in exam technique throughout the year. It is vital that they also experience a practice assessment, or prelim, as close in structure to the real thing as possible. A well structured prelim, marked to the same standard as the SQA examination, will give important formative and summative feedback to candidates and Centres alike. Shorter tests, perhaps focusing on parts of the course, give little real idea of the demand of the final examination and are less valid for generating estimates (or supporting Appeals).
- Practise the 'set pieces' for each of the Optional topics; learn the obvious lists.
- Set out calculations neatly and get in plenty of practice.

Statistical information: update on Courses

Number of resulted entries in 2011	4124

Number of resulted entries in 2012	4025

Statistical information: Performance of candidates

Distribution of Course awards including grade boundaries

Distribution of Course awards	%	Cum. %	Number of candidates	Lowest mark
Maximum Mark 200				
A	22.9%	22.9%	921	135
B	24.6%	47.5%	989	116
C	22.7%	70.2%	915	98
D	9.7%	79.9%	389	89
No award	20.1%	100.0%	811	-

General commentary on grade boundaries

- While SQA aims to set examinations and create marking instructions which will allow a competent candidate to score a minimum of 50% of the available marks (the notional C boundary) and a well prepared, very competent candidate to score at least 70% of the available marks (the notional A boundary), it is very challenging to get the standard on target every year, in every subject at every level.
- Each year SQA therefore holds a grade boundary meeting for each subject at each level where it brings together all the information available (statistical and judgemental). The Principal Assessor and SQA Qualifications Manager meet with the relevant SQA Business Manager and Statistician to discuss the evidence and make decisions. The meetings are chaired by members of the management team at SQA.
- The grade boundaries can be adjusted downwards if there is evidence that the exam is more challenging than usual, allowing the pass rate to be unaffected by this circumstance.
- The grade boundaries can be adjusted upwards if there is evidence that the exam is less challenging than usual, allowing the pass rate to be unaffected by this circumstance.
- Where standards are comparable to previous years, similar grade boundaries are maintained.
- An exam paper at a particular level in a subject in one year tends to have a marginally different set of grade boundaries from exam papers in that subject at that level in other years. This is because the particular questions, and the mix of questions, are different. This is also the case for exams set in centres. If SQA has already altered a boundary in a particular year in say Higher Chemistry this does not mean that centres should necessarily alter boundaries in their prelim exam in Higher Chemistry. The two are not that closely related as they do not contain identical questions.
- SQA's main aim is to be fair to candidates across all subjects and all levels and maintain comparable standards across the years, even as arrangements evolve and change.