GCSE
COMPUTER SCIENCE

8525/2 Paper 2 Computing Concepts
Report on the Examination

8525
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Introduction

This was the first examination series for the revised Specification. New topics included Boolean expressions, relational databases and SQL.

Examination Technique

There were several questions on this paper that asked students to carry out calculations and asked students to show their working. Many students who calculated incorrect final answers were awarded a proportion of the available marks for showing some correct working. A large number of students did not show their working and therefore, did not gain any marks on these questions. Students should be encouraged to show their working whenever the question asks them to.

Where diagrams of logic circuits were required it was often difficult to determine what logic gates had been drawn because a ruler had not been used to draw straight lines – this was particularly important when distinguishing between AND and OR gates. It is important that diagrams are neat and clear.

Generally, responses that used terms such as 'easier' or 'faster' etc were not specific enough to be awarded marks. Terms of this nature must be explained and qualified.

Questions 1 and 2

Students generally performed well in converting between number bases but less well in addition of three binary numbers – particularly when adding three 1s.

Students did not perform so well in stating the arithmetic effect of applying a binary shift even though guidance was given in the stem of the question.

Question 3

Many students were able to draw a correct logic circuit. It was noticeable that where a ruler was not used in drawing the AND gates it was not always clear whether the logic gate drawn was an AND gate or an OR gate. Where it was not possible to determine what gate had been drawn no marks could be awarded for that part of the circuit diagram.

Boolean expressions were included in the paper for the first time in this series and these proved challenging to many students. **For this year only,** students were awarded a mark if they used correct Boolean operator symbols throughout the Boolean expression, as asked for in the question, even if none of the expression was correct. About a quarter of students gained no marks at all and about a quarter gained full marks. Commonly, students repeated the question, replacing off with false and on with true. This is an area that students need to develop further.

Questions 4 and 5

Many students responded well to this question and supported their answers with examples, but some students often gave vague responses, such as 'systems software is software that is built in' or 'application software is downloaded onto the computer'.

The functions of an operating system are listed in the Specification but many students used very imprecise terminology in their answers, such as 'handles memory' or 'handles security'. These vague answers were not precise enough to award marks. **For this year only,** students were awarded a mark for stating that the operating system manages peripheral devices, as an alternative to managing input and output devices.

The question on autonomous vehicles was well answered and appeared to be a topic that students were able to engage with and enjoyed. Many related the question to the 'trolley problem' and the question of liability. Whilst many made good points about both the legal and ethical issues fewer turned this into a discussion.

Questions 6 and 7

Many students thought that an assembler turned high level code into low level code or turned low level language into high level language. Students' responses also showed a common misunderstanding of how an interpreter works. Over half of students were unable to gain any marks on question 7.2. More able students described the steps taken in interpreting code and the fact that machine code subroutines are called to carry out commands. Weaker answers tended to state that code was translated line by line and the process stopped as soon as an error was encountered.

Question 8

Many students answered that RAM is cheaper than cache but often only gave half of the response required for the second mark, for example 'RAM can store more data' or 'cache only stores frequently used instructions'. Cache memory was often confused with web browser cache.

Question 9

This question was well answered. There were some very good responses to the second part, with a large number of students giving good explanations of how computers built to a price point or budget would reduce the opportunity to include more expensive components.

Questions 10, 12 and 13.3

These questions required calculations to be carried out and many students did not gain working marks because they did not show their working on the paper. All but one mark on each question can be gained from showing the working so students should be advised to do this.

A common error in question 12 was to use a colour depth of 3 bits rather than 2.

Question 11

Many students showed their understanding that the ASCII value of characters is a sub-set of Unicode, but a substantial number gave the correct ASCII value but not the Unicode value.

Question 13

This question was about digital sound samples and many students were able to give a good definition. However, there was a substantial number who confused sound with images and gave a response relating to images.

Question 14

The vast majority of students gave Bluetooth as a correct answer to question 14.1, although some students clearly did not understand what a Personal Area Network is. For question 14.2 most students gave one difference as a difference in geographical area. A substantial number gave this difference as 'WANs are larger' or 'LANs are smaller' which was too vague to award a mark. Another common wrong answer was that 'LANs are wired, WANs are wireless'.

Good responses to advantages of a wireless network were given but often students talked about it being 'easier, or cheaper, to set up' or 'working over a greater range'. Weaker responses were often too vague to be awarded a mark.

A common incorrect answer to question 14.5 was that 'https creates secure websites' or 'encrypts websites'. Whilst these answers have some merit they are not technically correct and so not awarded marks.

Questions 15 and 16

Students often focussed their answers on hacking and hackers. Often, they used these terms incorrectly and this affected the marks that were available to them.

Question 15 was generally well answered though there was some confusion about 2 Factor Authentication, where a mixture of other methods was often given. Often responses included a method but did not explain it.

Penetration testing did not appear to be well understood. Many students confused attempting to gain access to a system for security testing purposes with hacking, often talking about 'white hat hackers' or 'black hat hackers', terminology that was not relevant to the question and that we discourage. Better answers were similar to the information given in the Specification.

Question 17

A reduction in file size was the most common answer to question 17.1. Many students gave a response that it would mean the compressed file could be attached to an email, without explaining that the compression would mean the file size would be within the limit for attachments. The majority of explanations concerning the suitability of RLE for compressing the data given in the question focused on the size of the resulting data. Very few talked about the need for a high frequency of consecutive repeating characters in the original data. A common incorrect answer was that the data would not be readable, or understandable, after compression.

Question 18

There were many excellent explanations of how primary and foreign keys are used to relate data in linked tables. There were also many students who used incorrect terminology – commonly stating that a relational database 'linked several databases together' rather than linked multiple tables.

Students should be aware that field names do not have spaces in them. Many students wrote MemberID as two separate parts, Member ID, which is not creditworthy.

The SQL questions produced a large number of very good responses. However, about a third of students did not gain any marks. This was either because they did not attempt the question or had

attempted to answer in programming code, pseudocode or other alternatives. **For this year only** == was accepted instead of = as part of a condition in the SQL WHERE clause.

Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the Results Statistics page of the AQA Website.