OCR

GCSE (9–1)

Examiners' report

COMPUTER SCIENCE

J276

For first teaching in 2016

J276/01 Autumn 2021 series

Introduction

Our examiners' reports are produced to offer constructive feedback on candidates' performance in the examinations. They provide useful guidance for future candidates.

> **i** Reports for the November 2021 series will provide a broad commentary about candidate performance, with the aim for them to be useful future teaching tools. As an exception for this series they will not contain any questions from the question paper nor examples of candidate responses.

The reports will include a general commentary on candidates' performance, identify technical aspects examined in the questions and highlight good performance and where performance could be improved. The reports will also explain aspects which caused difficulty and why the difficulties arose, whether through a lack of knowledge, poor examination technique, or any other identifiable and explainable reason.

A full copy of the question paper and the mark scheme can be downloaded from OCR.

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Paper 1 series overview

This theory paper covers specification sections 1, including;

- Systems architecture
- Memory
- Storage
- Wired and wireless networks
- Network topologies
- Protocols and layers
- System security
- System software
- Ethical
- Legal, cultural and environmental concerns.

There are a total of 80 marks, the exam is a non-calculator paper, with 1 hour 30 minutes allowed time.

Candidates did well on this by giving examples, definitions, descriptions and explanations of computing terms and principles. Candidates also needed to consider scenarios and apply knowledge appropriately.

The strongest answers in the quality of written communication question considered both positive and negative issues arising from the scenario and wrote a clear and structured response.

Candidates were required to use their programming knowledge from Paper 2 to answer one question that covers the synoptic content.

Candidates who did well on this paper generally did the following:	*Candidates who did less well on this paper generally did the following:*
• Applied their understanding to the context in the question directly, by referencing an aspect of the scenario and relating this to the point they were stating. • Considered the positive and negative issues in their discussion in the question that assessed the quality of written communication. • Considered answers from a variety of viewpoints. • Identified legislation in their response to Question 8 instead of only describing the problems that can arise from each. • Considered a range of environmental impacts.	• Gave a valid point without developing their answer to give more depth. • Gave generic responses from recall without applying this knowledge to the given scenario. • Repeated the same point multiple times within an answer without giving further information. • Did not read the question carefully and did not answer the question given, for example defining a term instead of the threat it poses. • Mixed up cultural and environmental impacts, repeating environmental impacts when asked for cultural ones.

Comments on responses by question type

Level of response questions

Candidates with the strongest responses considered the scenario from multiple points of view and included both positive and negative issues.

Many candidates focused on the negative and gave many valid negative points. Fewer candidates considered the positive impacts of using personal devices.

The most common positive points included the reduced cost to the school, and the ease that students could continue their work within school and at home. There were a range of negative issues. The most common response was based on privacy (such as the use of cameras in school). Other responses included that some students may not have access to devices or may have older devices that would demonstrate the digital divide.

Common misconceptions

?	**Misconception**	- The control unit and arithmetic logic unit are both examples of registers. 'Copyright' as a term is an example of a piece of legislation. Copyright is part of the legislation Copyright Designs and Patents Act. - A virtual network does not have any hardware. A common phrase is that a virtual network is non-physical, but this means that it is not defined by specific hardware that it has to use, but that it can be accessed from anywhere, through any hardware. 'Issues' refers only to negative points, instead of both positive and negative. - Solid state devices last longer than magnetic devices, whereas they have a limited number of read/write cycles whereas magnetic do not. - A benefit of a solid state device is that it has no moving parts; this is a factual description but does not identify why this is a benefit i.e. it is more durable. - Magnetic devices are not portable. Magnetic hard drives are portable, especially external ones that are protected from damage in a casing. Solid state devices are often smaller and are less likely to break if dropped.

Key teaching and learning points – comments on improving performance

Few candidates could identify functions of an operating system. Many candidates gave descriptions that did not match functions. The most common correct answer referred to a user interface.

Candidates should understand the functions included within the specification (e.g., memory management) and what this function does, or why it is needed in a computer system.

Candidates need to read the question carefully and answer what is being asked, for example there is a difference between what, why and how. For example:
- Question 7(c)(i) - The strongest responses explained what effect each had, and how this would impact the performance. For example, 'more users mean more of the bandwidth is being used at a time, which means that the performance will be lower as the bandwidth is split between more users'. Lower scoring responses simply stated that 'more users slows the network'. This second answer states what the effect is, but not **how** it contributes to the performance.
- Question 7(d)(i) and (d)(ii) - The stronger responses described the threat that was posed to the network, for example it identified that malware could delete data, or a brute force could gain access to student's accounts and manipulate or delete data. The less successful responses gave a definition of the threats, for example that a brute force attack tries every possible password.

Guidance on using this paper as a mock

When marking the answers take note of the annotations in the mark scheme.

- Marks are usually given as 1 per bullet point, unless otherwise stated.
- If a candidate gives two answers that meet the same bullet point then only 1 mark is given.
- The use of a // on a line indicates an alternative answer for that bullet point. Only 1 mark can still be given.
- The use of a / on a line indicates an alternative word, e.g., Question 7(c)(iii), MP 4 has 'e.g., packet number/destination' - either packet number, of destination can be given a mark, but if both are given, it is still 1 mark.
- The use of bold indicates that that idea must be present, it can be expressed in a variety of ways but that idea must be present. For example, in Question 6(b)(a) 'faster **access/read/write speed'**. The exact wording is not required, but the response must refer to the speed of reading/writing to the device to gain this mark. An answer such as 'the device is faster' is not given a mark as it is not identifying what it is faster at doing.
- The use of underline indicates that that word or phrase must be present. Alternatives that have the exact same meaning can be given, but they must be clearly present to be given the mark. For example, in Question 1(b)(ii) 'billion' is underlined, therefore a response such as 2.5 million FDE cycles cannot be given, but 2,500,000,000 can be given.

When marking the quality of written communication question, read the whole answer and then determine which band is most suited.

- The top band states 'The candidate is able to weigh up both sides of the discussion', this equates to including both the positive and negative issues associated with students bringing in their own devices.
- The mid band does not require both sides to be given, but it needs 'a reasonable attempt to discuss the impact on most areas', in this question this includes ethical, legal and privacy issues. The mark scheme gives some examples of areas that can be considered, but some points can cover two or more issues. For example the potential risk of students using cameras inappropriately in school could be an ethical issue (because they could be taking photographs of people when they are not permitted it, or do not want it), it could be privacy (a school is not a public place and students and teachers may not expect photographs to be taken of themselves) and legal (depending on the content of the photographs there could be legal consequences), the point or points covered depend on the candidate's explanations.
- The lower band requires a 'limited attempt to apply acquired knowledge and understanding to the context provided', so these responses may be about students bringing in devices in general, and not necessarily related to the school environment, the ethical, legal or privacy issues.

Once the most suitable band has been selected, the mark within the band needs to be determined. This depends on the amount of relevant context, the suitable expansions, structure of the response, appropriate use of terminology and overall understanding that is conveyed. It is important to realise that the top marks (7 and 8) are not reserved for the best possible answers, any answers that meet the requirements can be given these marks.

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