

BCS Higher Education Qualification

Certificate

COMPUTER AND NETWORK TECHNOLOGY

October 2021

EXAMINERS' REPORT

General comments

The majority of the candidates showed good understanding of the questions and provided relevant answers. A small number of candidates would have benefitted from providing more in-depth answers.

Question number: A1

A1. Syllabus area: Section 4 – Networks

Total marks allocated: 30

Examiners' Guidance Notes

Part a of this question was about the OSI model, and which devices may operate at Network, Data Link and Physical layers.

Almost half of the candidates answered part a of this question correctly and were able to suggest the appropriate devices. However, a number of candidates failed to cover the whole requirement which was to identify an appropriate device and to describe the operation of that device together with the appropriate data unit. A significant number of candidates failed to describe the correct operation, but gained some marks for noting an appropriate device.

Part b was less well answered with many candidates not correctly interpreting the question and giving descriptions that didn't match to the devices referred to in part a. In part this appears to be related to them not appropriately identifying the correct devices. A fully comprehensive description was given by a sizeable minority of candidates who gained high marks. The identification of the role of the repeater/hub and its operation proved particularly challenging and was correctly described by only a few candidates.

Question number: A2

A2. Syllabus area: Section 1 - Fundamentals

Total marks allocated: 30

Examiners' Guidance Notes

Part a required knowledge of the full adder. Some candidates chose to provide a narrative description of the principles behind building a full adder, which proved to be difficult to describe without reference to a logic diagram. Very few marks were able to be given for this style of answer. For those candidates who did provide logic diagrams, many chose to describe the half adder and then seek to explain how it can be modified to become a full adder. This approach was

time consuming and ultimately gained minimal marks. Very many candidates could not give a basic account of the full adder and show its place in a topology that adds two bits and a carry. Many candidates were able to show a valid truth table, although only a few were able to provide a Karnaugh map.

Part b was generally better answered than part a, with most candidates able to give an explanation of a shift register, though many of these attempts were given low marks due to not showing how shift registers process the bits. Most attempts showed an appreciation of the flip-flop and recognised it as a building block of an n bit shift register, but failed to subsequently gain marks for showing how it can be used to cascade into a 4-bit shift register.

Question number: A3

A3. Syllabus area: Section 2 – Processor Architecture

Total marks allocated: 30

Examiners' Guidance Notes

For part a. Many answers showed a good understanding of the two-platter configuration of a hard disk and were able to provide a sketch showing the main components of the disk and the physical layout of the mechanical structures. This accounted for some one-third of the marks for this question. Not many candidates were able to correctly describe the placing of data on the disk or show an appreciation of the size of sectors. Many answers showed a lack of clarity on the typical construction of tracks, sectors and cylinders.

Part b was less well answered than part a, with only a few candidates correctly identifying the spiral construction of data. Many answers were incomplete with either a description of the layout missing, or when given, failed to annotate the position of sectors and single-track data. In only a few cases did answers give a reasonable comparison to a hard disk with many variations of typical data capacities being largely incorrect. Many candidates were unable to show evidence of understanding the physical differences of the media, and had some difficulty in articulating the different methods of data storage and retrieval.

Question number: A4

A4. Syllabus area: section 3 – Introduction to Operating Systems and System Software

Total marks allocated: 30

Examiners' Guidance Notes

This question had 3 parts with 2 sub-sections in each part.

Part A required candidates to describe Process and Thread. This question was generally well answered. However, many candidates were unable to show the context of a thread as a part of a process. Many answers exhibited a confusion and interchanged the roles. A significant number stated that a thread contained many processes and then had difficulty in describing a process per se. A number of candidates interpreted **thread** as **threat** and gave some convincing accounts of virus protection in hardware, subsequently failing to answer the question.

Part B required definitions of swapping and paging. This part of the question on OS memory management was well answered by only a few candidates. The essential difference between whole process swapping and address space paging in memory management was identified in a

minority of answers. In general, there was often a lack of clarity in describing one or other of either swapping or paging and this made clarifying the differences a problem.

Part C required the candidates to highlight the strengths and weaknesses of paging and segmentation. This question was particularly testing of a candidate's knowledge of paging and segmentation. The question related to a specific operating system namely, iOS as an operating system for mobile phone technologies. Many candidates who attempted this part of the question offered a reasonable account of the decisions to be made in each choice. However, a good number of answers tried to focus on iOS and gave good accounts of strategies adopted by iOS, which are specific to iOS.

Question number: B5

B5. Syllabus area: Section 3 – Introduction to Operating Systems and System Software

Total marks allocated: 12

Examiners' Guidance Notes

A high number of candidates answered this question. The question required candidates to describe a Router and a Switch. Lots of candidates struggled with providing a definition and description of switches and routers and couldn't link either to the OSI 7-layer model, the types of data used (frames/packets), or where such devices were used.

The majority of the candidates described a Router as the home device that connects their home network with ISP. A small number of candidates were able to describe the function of a Router.

The majority of the candidates were able to describe the function of a switch, but a handful of answers related 'switch' to be an on/off device or an electronics circuit that connects devices.

It would be beneficial for candidates to consider some examination of enforcing basic networking fundamentals.

Question number: B6

B6. Syllabus area: section 3 – Introduction to Operating Systems and System Software

Total marks allocated: 12

Examiners' Guidance Notes

A high number of candidates answered this question.

This question was about 6 characteristics of Operating Systems. A lot of candidates were able to identify the types of functions for an operating system.

Some candidates struggled with features and went off at a tangent, covering lots of things not represented by OS's. There seemed to be some ignorance about AV being covered by most OS's etc. However, most of the candidates answered this question in a detailed manner.

Question number: B7

B7. Syllabus area: section 2 – Processor Architecture

Total marks allocated: 12

Examiners' Guidance Notes

Candidates were required to explain the fetch-decode-execute cycle.

Almost half of the candidates who attempted this question answered it well. Most candidates added a relevant diagram, some with a lot of detail and others with minimal information. However, some candidates were unfamiliar with the instruction cycle and how it works with the various processor/motherboard components, and were not able to diagrammatically represent the process.

Question number: B8

B8. Syllabus area: Section 1 – Fundamentals

Total marks allocated: 12

Examiners' Guidance Notes

A low take-up for this question amongst candidates. The question looked at different types of flip-flops and asked for diagrams and a description.

Some candidates seemed to think a diagram and a logic table answered the question but were only likely to score 50% of the marks in this case. Candidates were more likely to get the D flip-flop wrong, and the feedback part of the JK flip flop was confusing to some. Most diagrams had some issues, but the explanations were good.

Question number: B9

B9 : Syllabus area: section 4: Networks

Total marks allocated: 12

Examiners' Guidance Notes

This question by far was the least popular. Candidates should have been exposed to tracert and netstat in their studies, especially if using Windows environments. FTP is a legacy TCPIP application but is still widely known and used.

The majority mixed Pathping with Ping only command, and very few could answer the uses of Tracert or Netstat, and in some cases appeared confused by Pathping, and unsure what Netstart did.

Question number: B10
B10: Syllabus area: section 3 – Processor Architecture
Total marks allocated: 12
Examiners' Guidance Notes
<p>A fair number of candidates attempted this question. Quite a few candidates understood the principle of the program counter, but tended to be confused by the memory address register and memory buffer register, and how they were actually used. The question had 3 parts which required them to answer about Program Counter, MAR and MBR. Some candidates mixed the answers between all 3.</p>

Question number: B11
B11. Syllabus area: section 3 – Introduction to Operating Systems and System Software
Total marks allocated: 12
Examiners' Guidance Notes
<p>Almost all candidates answered this question. This question required candidates to explain the concept of cyber security, and 3 methods to safeguard from viruses.</p> <p>Overall, candidates did not struggle with composing a definition for cyber security. When documenting three methods for safeguarding a computer from viruses, nearly all candidates were able to identify the need for antivirus. However, candidates struggled with the other methods, especially updating software and patching systems. Password hygiene also wasn't much of a consideration.</p> <p>Lots of answers concentrated on what a user should do, rather than to how to safeguard the computer. Candidates need to look more closely at the basic steps for IT security hygiene.</p>

Question number: B12
B12. Syllabus area: Section 4 Networks
Total marks allocated: 12
Examiners' Guidance Notes
<p>Lots of candidates chose to answer this question. This question was about virtualisation and cloud computing. The majority of candidates struggled to answer the first part correctly; mixing virtualisation with virtual reality.</p> <p>It appears that lots of candidates are struggling with very simple IT definitions, such as virtualisation and cloud computing. Many candidates seem to think virtualisation is about virtual memory only, and cloud is just about storage, so some work is necessary to reinforce additional explanations.</p>

Most could answer the cloud computing part effectively and described various models of available cloud technologies.