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Examiners' Report
June 2022

International GCSE Computer Science 4CP0 01

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Introduction

The 2206 paper is the first one that approaches a 'normal' sitting since Covid restrictions were first put in place. It must be acknowledged that there are still problems in many areas where the IGCSE is sat and that candidates may not have had a 'normal' educational regime leading up to the examination.

Answers were, on the whole, better than might have been expected, given the disruption over the last year. However, measures have still needed to be taken on a national level to ensure reasonable comparability with grades from 2019.

Examples, with comment, will be given to illustrate different marking points. Zero mark answers will normally only be used to illustrate a particular point about how candidates answered/misunderstood a question. Multiple choice, tick box, select a letter and similar questions are not included. The mark scheme for these is self-explanatory and there are no possible alternative or partly-correct answers.

This report should be read in conjunction with the question paper and mark scheme.

Question 1 (a)(i)

Candidates scored less-well than expected in this question.

A frequent incorrect response was to rewrite the question wording of **program instruction,** saying that it is an instruction for a program, or something similar.

1 Computer systems have both hardware and software components.

(a) The central processing unit (CPU) uses the fetch-decode-execute cycle.

(i) State what is meant by the term **program instruction.**

(1)

It is an intruction which the program has to execute.

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Examiner Comments

This example shows the rewording of the question to form an answer. This type of answer will not be credited.

Total: 0 Marks

1 Computer systems have both hardware and software components.

(a) The central processing unit (CPU) uses the fetch-decode-execute cycle.

(i) State what is meant by the term **program instruction.**

(1)

Program instructions are a step by step ~~procedu~~ process that does a certain task.

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This answer receives mark point 1, a task that is being carried out.

Total: 1 Mark

A one mark response

1 Computer systems have both hardware and software components.

(a) The central processing unit (CPU) uses the fetch-decode-execute cycle.

(i) State what is meant by the term **program instruction**.

(1)

A program instruction is a ~~instruction~~ data that will be fetched, decoded and executed by the CPU.

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Examiner Comments

This response achieves mark point 2, something being executed by the CPU.

The candidate takes the 'fetch decode execute' wording from the question. This is acceptable because the mark is for the idea of the CPU following an instruction.

Total: 1 Mark

Question 1 (a)(ii)

Candidates scored less well than expected in this question.

A frequent incorrect response was to rewrite the question wording of **memory address,** saying that it is an address for the memory, or something similar.

(ii) State what is meant by the term **memory address.**

(1)

A register that holds the a The address of the memory location that contains the data or instruction. The MAR holds this address.

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Examiner Comments

The first part of the answer, the address of the memory location, was frequently an incorrect response because it is simply a rewording of the question.

In this case, the candidate goes on to explain that the location contains data. This receives mark point 2.

Total: 1 Mark

(ii) State what is meant by the term **memory address.**

(1)

A hardware component that holds the address of the instruction that is currently being fetched.

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Examiner Comments

The first part of the answer, a hardware component, is ignored as being irrelevant to the answer.

The second part of the answer receives mark point 2.

Total: 1 Mark

Question 1 (c)(i)

This question is about benefits of a higher clock-speed. Most candidates seemed to understand the idea and gave sensible answers.

(c) The performance of the CPU is affected by the clock speed.

(i) Give **one** benefit of having a higher clock speed.

(1)

Faster execution of instructions and faster decoding of information.

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Examiner Comments

This is mark point 1, more instructions carried out per second.

Total: 1 Mark

(c) The performance of the CPU is affected by the clock speed.

(i) Give **one** benefit of having a higher clock speed.

(1)

Faster Fetch-Decode-Execute cycle, therefore better & faster performance

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Examiner Comments

Faster cycle could be mark point 1, more instructions per second, or mark point 2, processes run faster.

Total: 1 Mark

This is a one mark answer

(c) The performance of the CPU is affected by the clock speed.

(i) Give **one** benefit of having a higher clock speed.

(1)

Tasks are carried out by the CPU much more quickly such as calculations made by the ALU.

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Examiner Comments

Although not a specific marking point, this response gains one mark and would be awarded as mark point 2.

Total: 1 Mark

(c) The performance of the CPU is affected by the clock speed.

(i) Give **one** benefit of having a higher clock speed.

(1)

Efficient and smooth performance

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Examiner Comments

This response is too vague to receive credit.

Total: 0 Marks

Question 1 (c)(ii)

Responses to this question were strongly-linked to candidates' answers in 1ci. If a candidate understood that the CPU would do more/work harder, they were usually able to predict that there would be overheating/more power used.

This is a one mark answer.

(ii) Give **one** drawback of having a higher clock speed.

(1)

The computer may overheat

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Examiner Comments

Overheating was a frequent answer, mark point 1.

Total: 1 Mark

(ii) Give **one** drawback of having a higher clock speed.

(1)

There may be a clash as many instructions are processed.

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Examiner Comments

This response receives mark point 4, instability or crashing of the CPU.

The candidate does not use those words but the answer is understandable.

Total: 1 Mark

This is a one mark answer

(ii) Give **one** drawback of having a higher clock speed.

(1)

requires more power and better hardware

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The response receives mark point 3.

The part about hardware is ignored because the correct answer comes first.

Total: 1 Mark

(ii) Give **one** drawback of having a higher clock speed.

(1)

More temporary memory is used up faster

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The candidate has misunderstood that memory is released after a process completes, so memory is just used and released faster, not used up.

Total: 0 Marks

Question 1 (e)(i)

There were a lot of misconceptions with this question. Many candidates assumed that the question was about reasons for using a high-level language, rather than a low-level language. Their answers were then, of course, completely the wrong way round.

(e) A program can be written in a high-level or a low-level language.

(i) Give **one** reason for writing a program in a low-level language.

(1)

Faster execution ~~an~~ of programas it is closer to the core of pC and no need to translate

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Examiner Comments

This response receives mark point 1, faster execution, and is approaching an answer for mark point 2, coding for hardware.

Total: 1 Mark

This is a one mark answer

(e) A program can be written in a high-level or a low-level language.

(i) Give **one** reason for writing a program in a low-level language.

(1)

Low level languages can be used for simple hardware mechanisms, which don't require much complexity and thus ~~can~~ can faster ~~to~~ operate on low level language prog

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Examiner Comments

This answer receives mark point 4, writing for specific hardware.

Total: 1 Mark

Question 1 (e)(ii)

'Assembler' is a technical term. Many candidates had not learned that term and wrote about the simple English definition of an assembler, ie. something that puts things together.

(ii) State the purpose of an assembler.

(1)

It assembles data or information together

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Examiner Comments

This response illustrates the use of the English definition of 'assembler', rather than the technical term.

Total: 0 Marks

(ii) State the purpose of an assembler.

(1)

Assembler translates the mneumonics of to machine code

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Examiner Comments

This candidate has described assembly language, calling it mnemonics. This is acceptable and receives the mark.

Total: 1 Mark

Question 1 (e)(iii)

This is a tick-box question. The mark scheme shows the only correct answers.

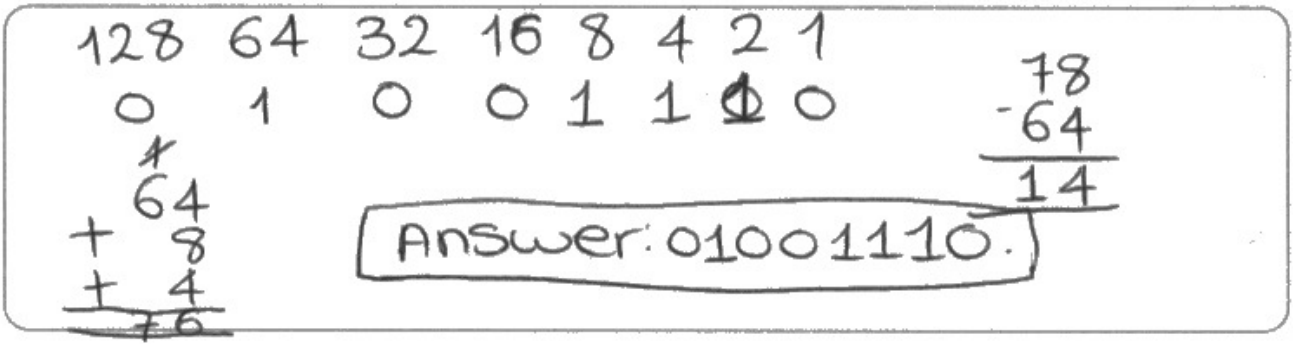
Question 2 (a)(i)

This question was generally answered correctly. Candidates seem to have been well-prepared for binary-denary conversions

(a) The denary number 78 is the ASCII code for the character **N**.

(i) Convert the denary number 78 to 8-bit binary.

(2)



ResultsPlus
Examiner Comments

The candidate has both nibbles correct.

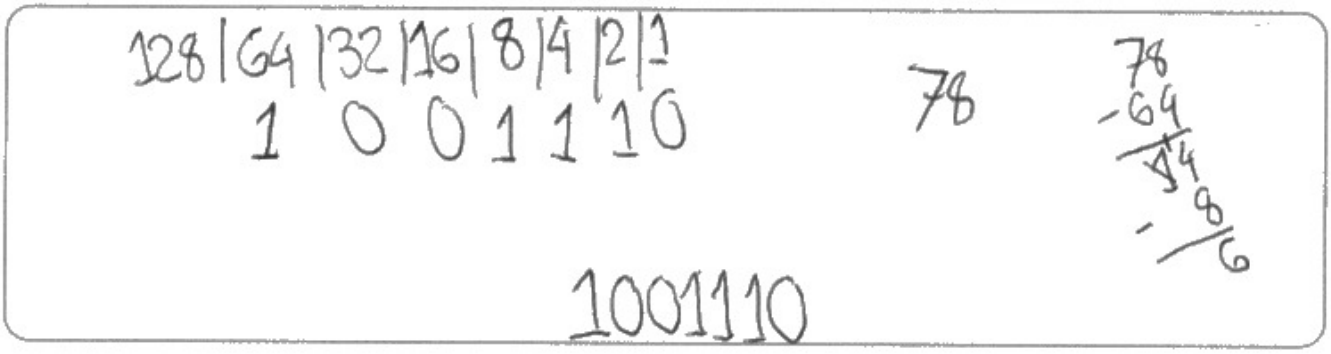
The workings and crossed-out parts are ignored because the candidate has indicated their final answer clearly.

Total: 2 Marks

(a) The denary number 78 is the ASCII code for the character **N**.

(i) Convert the denary number 78 to 8-bit binary.

(2)



ResultsPlus
Examiner Comments

The candidate has both nibbles correct.

The lack of a leading zero for the first nibble is ignored, as would be any extra leading zeros.

Total: 2 Marks

Question 2 (a)(iii)

Some less-able candidates did not know the term Unicode and wrote answers in terms of coding languages.

Most other candidates were able to achieve at least one mark, usually for knowing that Unicode can represent more characters than ASCII.

(iii) Explain **one** reason for using Unicode rather than ASCII to encode languages other than English.

(2)

ASCII is an american standard meaning ~~the~~ ~~the~~ ~~letters~~/errers in it are english meaning that for example the user wanted to write in ~~Hindi~~ Hindi or arabic script they wouldn't be ~~able~~ able to

ResultsPlus
Examiner Comments

This response receives the second part of the second example, ASCII can only represent English characters.

Total: 1 Mark

(iii) Explain **one** reason for using Unicode rather than ASCII to encode languages other than English.

(2)

- As Unicode has 2^{32} bits available
- all of the special characters for foreign languages can be encoded using Unicode but not ASCII c

ResultsPlus Examiner Comments

The use of 2^32 is taken as meaning 'more bits'. It is far too high but numbers are not required.

The answer follows example 1, Unicode has more characters because it has more bits per character.

Total: 2 Marks

(iii) Explain **one** reason for using Unicode rather than ASCII to encode languages other than English.

(2)

ASCII is only applicable in languages with a latin alphabet. Unicode can be used for any alphabet.

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The answer follows the second example: Unicode is for all languages, ASCII is only for the Latin alphabet.

Total:2 Marks

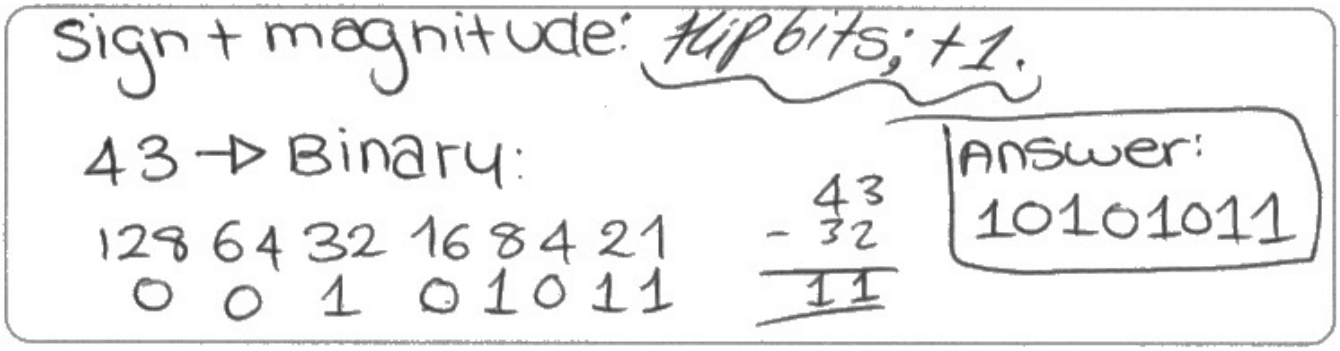
Question 2 (b)

Many candidates had difficulty with the sign and magnitude requirements of this question.

It does not seem to have been as well-prepared as other binary calculations.

(b) Convert the denary number –43 to 8-bit binary using sign and magnitude representation.

(2)



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Examiner Comments

The answer is indicated clearly and is correct.

The other workings and figures are ignored.

Total: 2 Marks

(b) Convert the denary number –43 to 8-bit binary using sign and magnitude representation.

(2)

128 64 32 16 8 4 2 1
1 1 0 1 0 1 1

1101011

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Examiner Comments

The answer receives one mark for the most significant bit being 1.

The rest of the answer does not have enough digits.

Total: 1 Mark

Question 2 (c)

Most candidates were able to score on binary addition.

The topic seems to have been well-prepared by candidates and centres.

(c) Complete the table by adding these two 8-bit binary integers. (2)

	1	1		1			
0	0	1	1	0	1	0	0
0	0	0	1	0	1	1	0
0	1	0	0	1	0	1	0

ResultsPlus
Examiner Comments

The answer is correct, very few one mark-answers were seen.

Total: 2 Marks

Question 2 (d)(i)

More-able candidates were able to work out that the minimum colour depth for five colours was three bits.

Less-able candidates were still able to give unique binary patterns with more than three bits, achieving one mark.

(d) A bitmap image is made up of pixels.

(i) An image has five colours.

Complete the table by adding a unique binary pattern for each colour.

Each pattern must use the **same minimum colour depth**.

(2)

Colour	Binary pattern
Green	2
Black	5
White	0
Red	4
Blue	3

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Examiner Comments

Although there are no repeating patterns and the numbers given would have fitted into three bits, the question specified a binary pattern. Therefore, this response receives no marks.

Total: 0 Marks

(d) A bitmap image is made up of pixels.

(i) An image has five colours.

Complete the table by adding a unique binary pattern for each colour.

Each pattern must use the **same minimum colour depth**.

(2)

Colour	Binary pattern
Green	001 ~~00001~~
Black	010 ~~010~~
White	100
Red	011
Blue	101

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Examiner Comments

The response shows three bits and a unique pattern for each colour.

Total: 2 Marks

(d) A bitmap image is made up of pixels.

(i) An image has five colours.

Complete the table by adding a unique binary pattern for each colour.

Each pattern must use the **same minimum colour depth**.

(2)

$2^3 = 8$

Colour	Binary pattern
Green	10000000
Black	1100 0000
White	1110 0000
Red	1111 0000
Blue	11111000

ResultsPlus
Examiner Comments

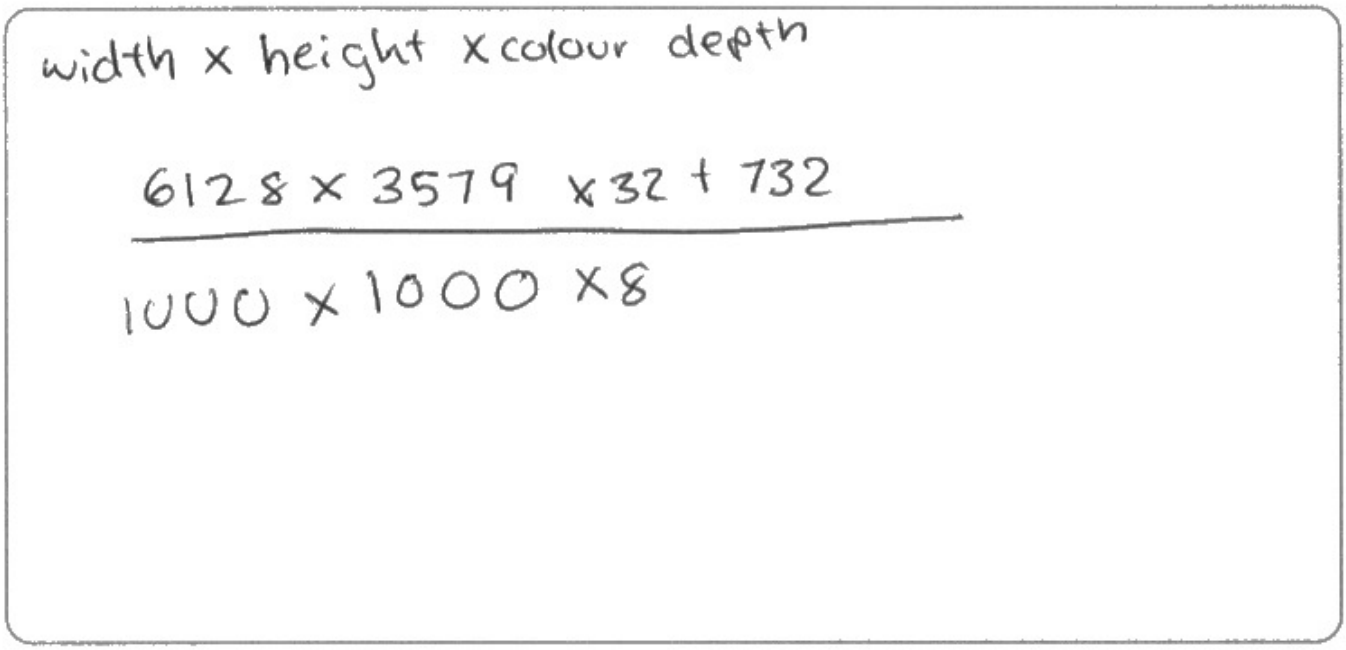
The patterns are unique for each colour but use more than three bits.

Total: 1 Mark

Question 2 (d)(ii)

This question requires candidates to construct a mathematical expression for a file size, based on several pieces of information.

A frequent mistake was to use the figure of 1024 instead of 1000 when dealing with the megabytes part. There was a great deal of variation in how the expressions were constructed.

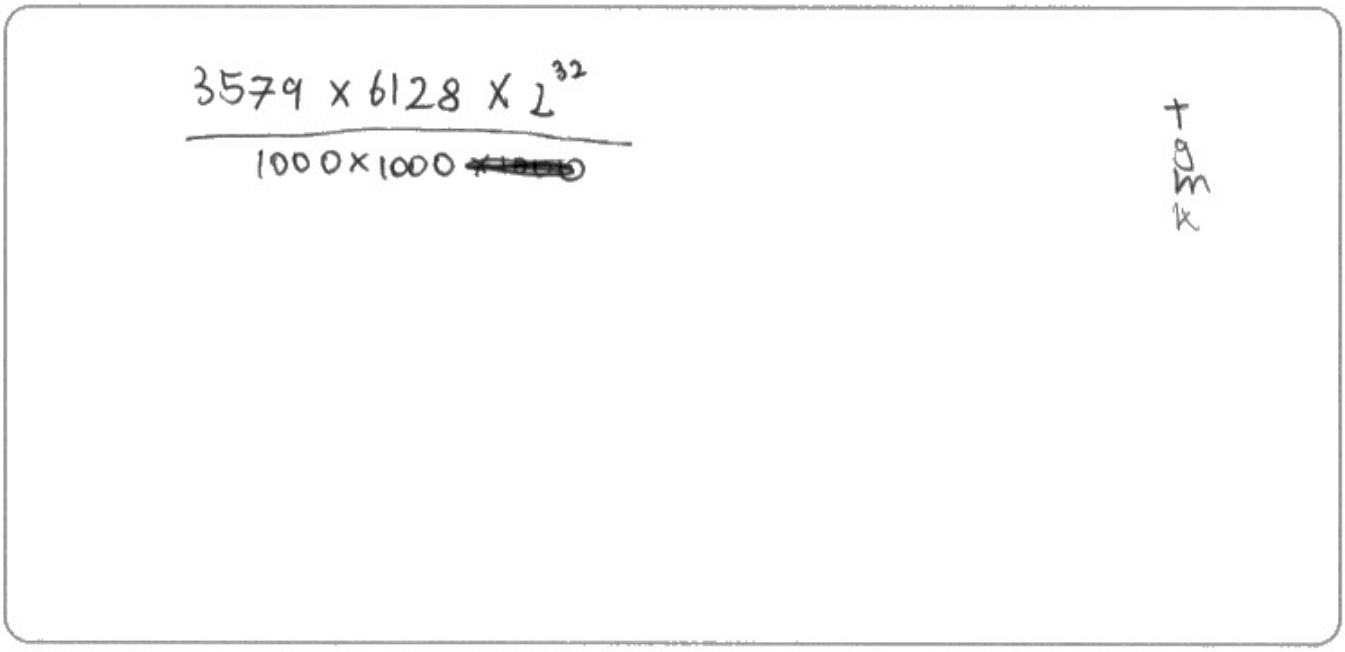


ResultsPlus
Examiner Comments

This answer is correct and laid out clearly.

Brackets would have been useful around the multiplications on the top line but are not essential.

Total: 4 Marks



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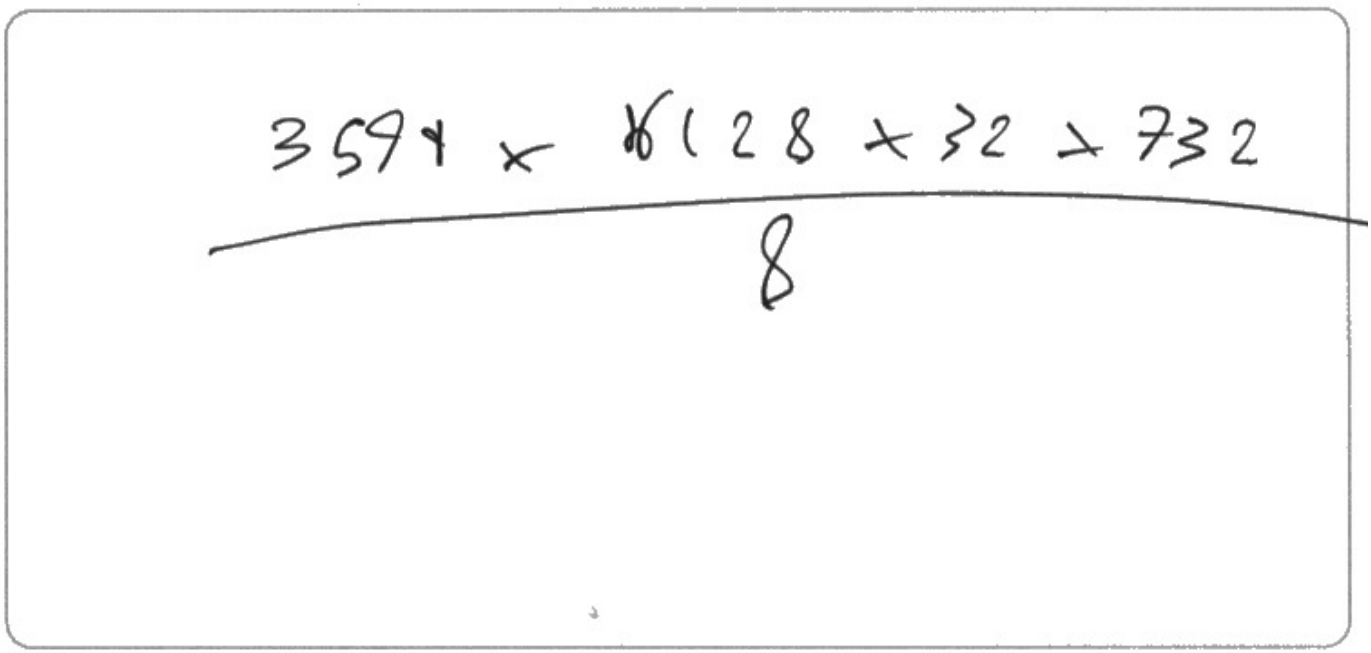
Examiner Comments

The candidate receives 1 mark for the 1000 x 1000.

In the top line, the 32 should not be a power of 2. The 732 bytes for the metadata is missing, as is a divide by 8 to change bits to bytes.

Total: 1 Mark



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Examiner Comments

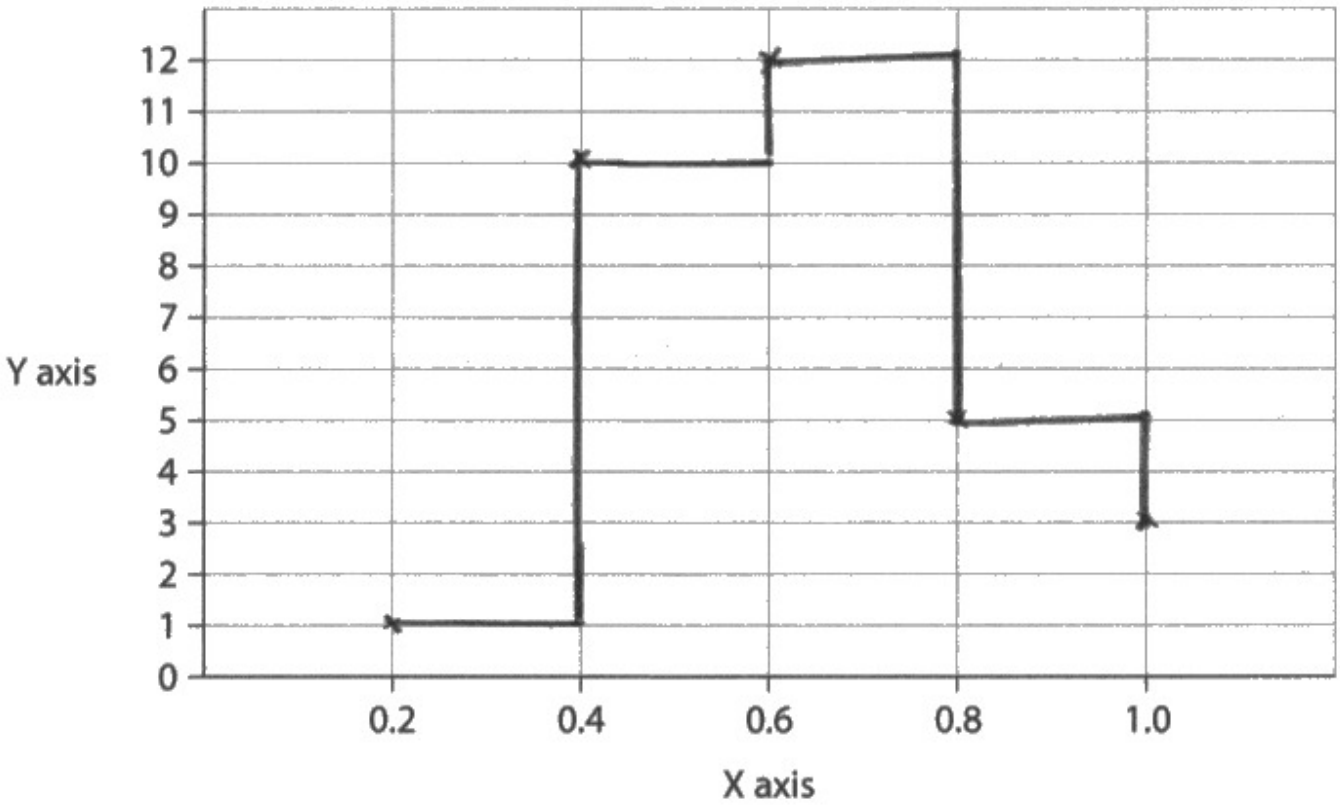
This response receives marks for the multiplication on the top line and the divide by 8.

The 732 should be added and the symbol used is not clear enough to award that mark.

Total: 2 Marks

Question 3 (a)(i)

This is a graph-plotting question and should be looked at in conjunction with 3aii and 3aiii, where the axes are labelled.



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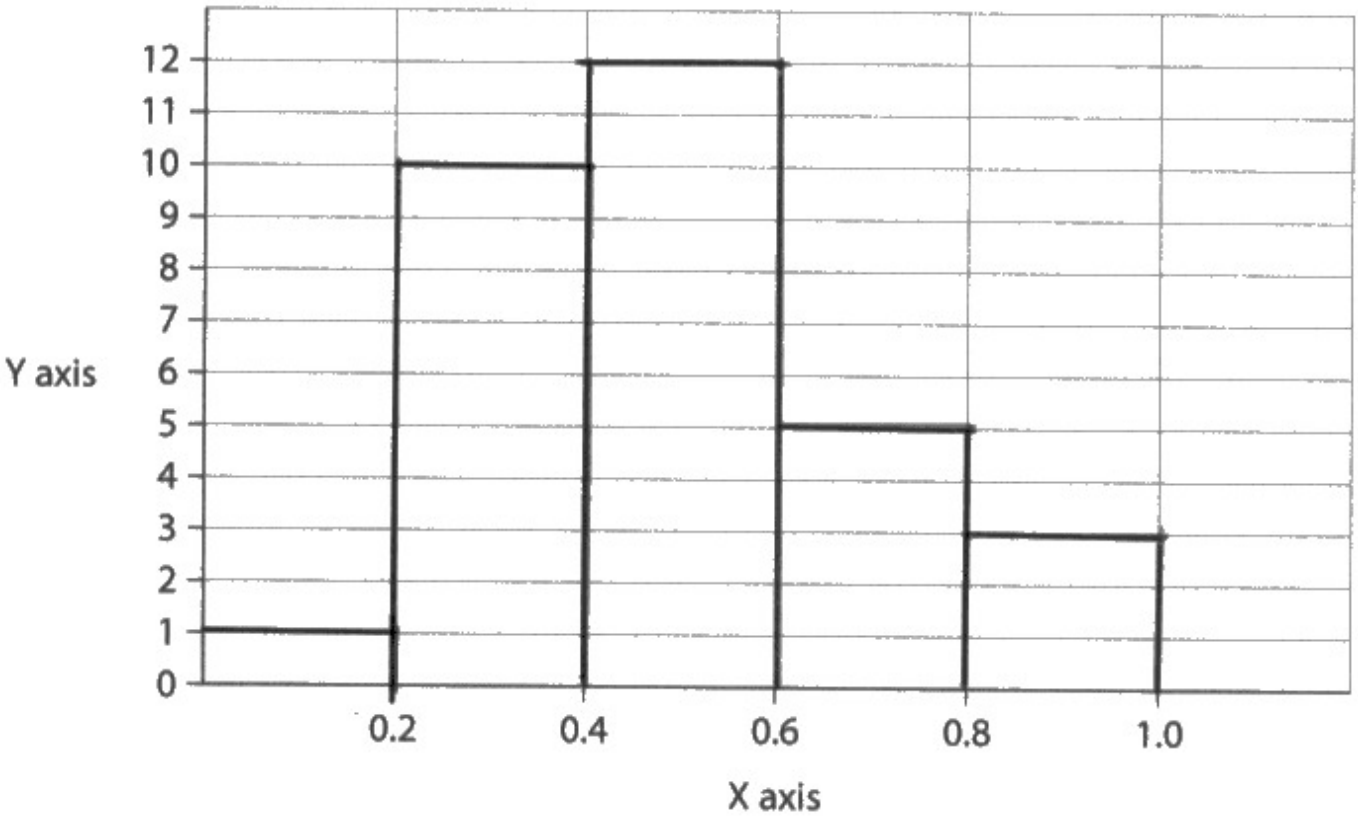
Examiner Comments

The response receives marking point1, correct plots, and marking point 3, a digital wave form.

The wave form does not have to be complete, or exactly as shown in the mark scheme: it just needs to be step-like and join the candidate's plots.

Total: 2 Marks



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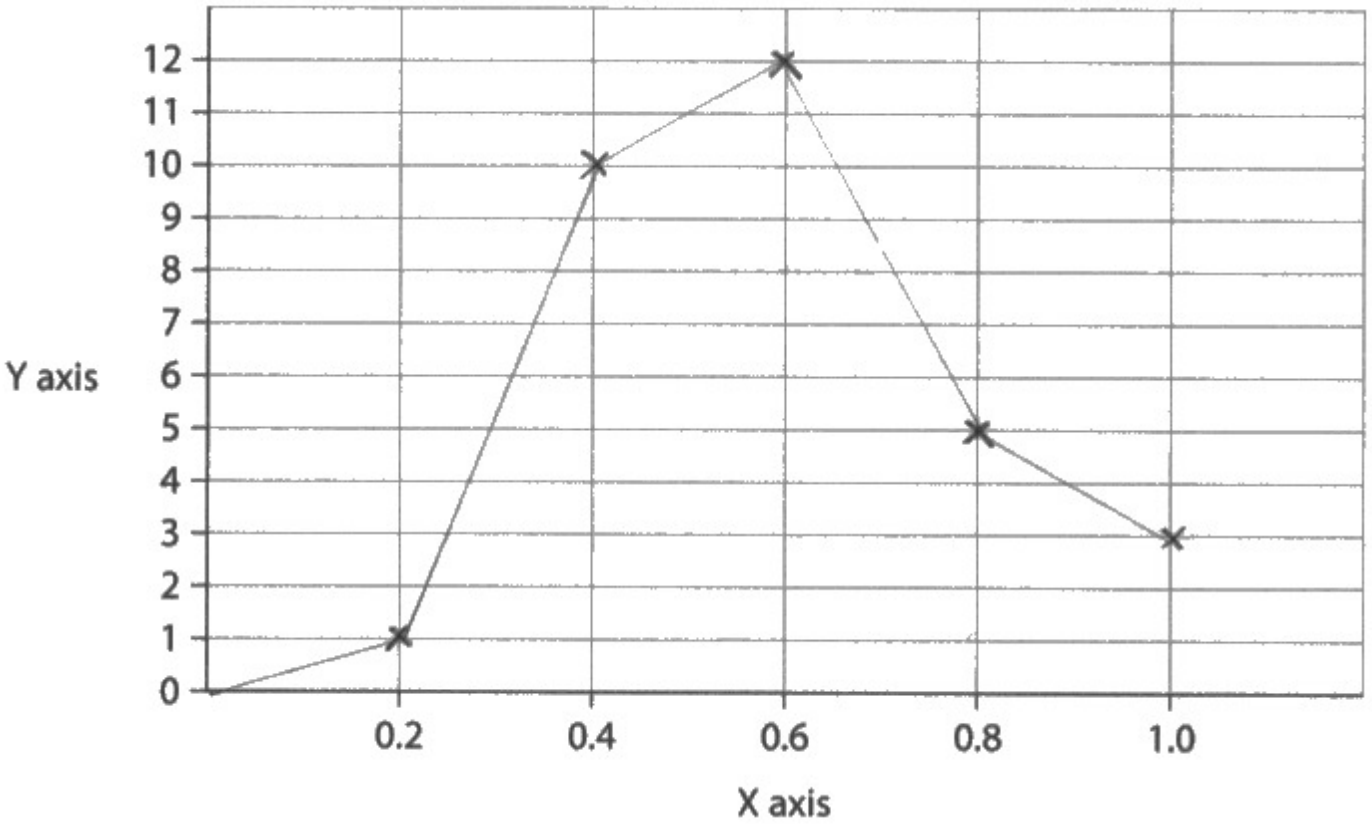
Examiner Comments

The candidate receives full marks.

The use of columns in the graph is ignored, because the top line is a digital wave form with a correct origin and joining the plots.

Total: 3 Marks



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Examiner Comments

The candidate receives mark point 1, the plots, and mark point 2, a correct start point of 0.0 for an analogue wave form.

Total: 2 Marks

Question 3 (a)(ii)

This is a graph-plotting question and should be looked at in conjunction with 3ai, the graph and 3aiii, the other axis label

(ii) Give a suitable label for the X axis.

(1)

Sample number

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Examiner Comments

The candidate simply copies the label from the data table given in 3ai.

Total: 0 Marks

(ii) Give a suitable label for the X axis.

(1)

seconds

ResultsPlus
Examiner Comments

The answer is correct regarding mark point 3.

Total: 1 Mark

Question 3 (a)(iii)

This is a graph-plotting question and should be looked at in conjunction with 3ai, the graph and 3aii, the other axis label

(iii) Give a suitable label for the Y axis.

(1)

Denary value

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Examiner Comments

The candidate simply copies the label from the data table given in 3ai.

Total: 0 Marks

(iii) Give a suitable label for the Y axis.

(1)

Amplitude

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Examiner Comments

The answer is correct, mark point 1.

Total: 1 Mark

Question 3 (b)(i)

The main difficulty with this question was candidates giving disadvantages of lossy algorithms, rather than lossless ones. This may be because questions about compression techniques have been framed that way in past papers and candidates have learned a stock answer.

(b) Alyssa uploads music files to her cloud storage.

(i) She compresses the files before she uploads them using a lossless algorithm.

Give **one** disadvantage of using a lossless rather than a lossy algorithm for this purpose.

(1)

It requires more storage space

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The response receives one mark for mark point 3.

Total: 1 Mark

(b) Alyssa uploads music files to her cloud storage.

(i) She compresses the files before she uploads them using a lossless algorithm.

Give **one** disadvantage of using a lossless rather than a lossy algorithm for this purpose.

(1)

~~less quality lost~~. Less file compression, so it is compressed less, unlike lossy.

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This answer receives one mark for mark point 2.

Total: 1 Mark

(b) Alyssa uploads music files to her cloud storage.

(i) She compresses the files before she uploads them using a lossless algorithm.

Give **one** disadvantage of using a lossless rather than a lossy algorithm for this purpose.

(1)

The sound will maintain its quality & fidelity

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Examiner Comments

This answer gives an advantage, rather than a disadvantage.

Total: 0 Marks

Question 3 (b)(ii)

This was a question about cloud storage. Most candidates received some credit.

Frequent responses referenced easy access via the internet and being available on any connected device.

(ii) Explain **one** benefit to Alyssa of storing her music files in the cloud.

(2)

Immediatly will be backed up by the internet. Another benefit is that it you only need to pay for amount of storage you ~~use and need~~ use.

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Examiner Comments

Although there are two parts to the answer, automatic backup and only pay for used storage do not form a linked explanation and only receive one mark.

Total:1 Mark

(ii) Explain **one** benefit to Alyssa of storing her music files in the cloud.

(2)

The Data (music files) is not lost if an electrical failure or fire occurs in her hardware devices, the data is still stored in the cloud storage and can be accessed anywhere via the 'internet.

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This response includes parts from two marking points.

- Mark point 4, files not lost if there is a hardware problem,
- Mark point 3, files can be accessed via the internet.

In this case, the two different points form a coherent and linked explanation.

Total: 2 Marks

Question 3 (b)(iii)

This is a further question about cloud storage, looking for security issues. Most candidates achieved some marks but less-able candidates only referenced hacking, with insufficient detail for a mark.

(iii) Give **one** possible security issue associated with storing music files in the cloud.

(1)

It can accessed by hackers who target the cloud storage company. The higher authorisations have access to it.

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This answer could gain the mark from mark point 1, storage host targeted, or mark point 2, employees of the storage company have access.

Total: 1 Mark

(iii) Give **one** possible security issue associated with storing music files in the cloud.

(1)

Their might be an interuption or a hacker between ✗ her and the cloud

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Examiner Comments

"There might...be a hacker" is not enough for mark point 1.

The answer receives one mark for mark point 5, interception during upload/download.

Total: 1 Mark

(iii) Give **one** possible security issue associated with storing music files in the cloud.

(1)

if the password is leaked

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Examiner Comments

There is not enough here for a mark.

Total: 0 Marks

Question 3 (b)(iv)

The question asks candidates to complete a table to describe parts of a URL.

The 'official' definitions were set by the Internet Engineering Task Force (IETF) in 1998, but it is understood that a number of major companies that run internet infrastructure use slightly different terms. The Mark Scheme includes the more widespread of these, as well as those of the IETF.

(iv) One of Alyssa's music files is stored at https://www.cloudisfab.com/re12/ru2.mp3

Complete the table by adding a description of each URL component.

(4)

URL component	Description
https	Hypertext transfer protocol (safe) ✗ means data between ~~their~~ reciepient and sender is encrypted
www.cloudisfab.com	Domain name - can be converted in IP address by DNS
re12	~~webpage~~ Web page
ru2.mp3	Name of the music file ~~not~~ formatted in mp3

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This answer receives credit for parts 1,2 and 4.

The 3rd part, web page, is not correct.

Total: 3 Marks

(iv) One of Alyssa's music files is stored at https://www.cloudisfab.com/re12/ru2.mp3

Complete the table by adding a description of each URL component.

(4)

URL component	Description
https	Transfer protocol used in the server name
www.cloudisfab.com	Domain name indicating the location of server address
re12	name of the folder or space in which data is stored
ru2.mp3	'ru2' is the name of the file and '.mp3' is the audio extension name

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This receives full marks.

Extra words, eg. transfer added to protocol in part one, are ignored, as long as they do not change the meaning.

Total: 4 Marks

(iv) One of Alyssa's music files is stored at https://www.cloudisfab.com/re12/ru2.mp3

Complete the table by adding a description of each URL component.

(4)

URL component	Description
https	Internet domain
www.cloudisfab.com	Domain ~~name~~ name
re12	Page number
ru2.mp3	~~a website~~ file name

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This answer receives marks for parts 2 and 4.

Total: 2 Marks

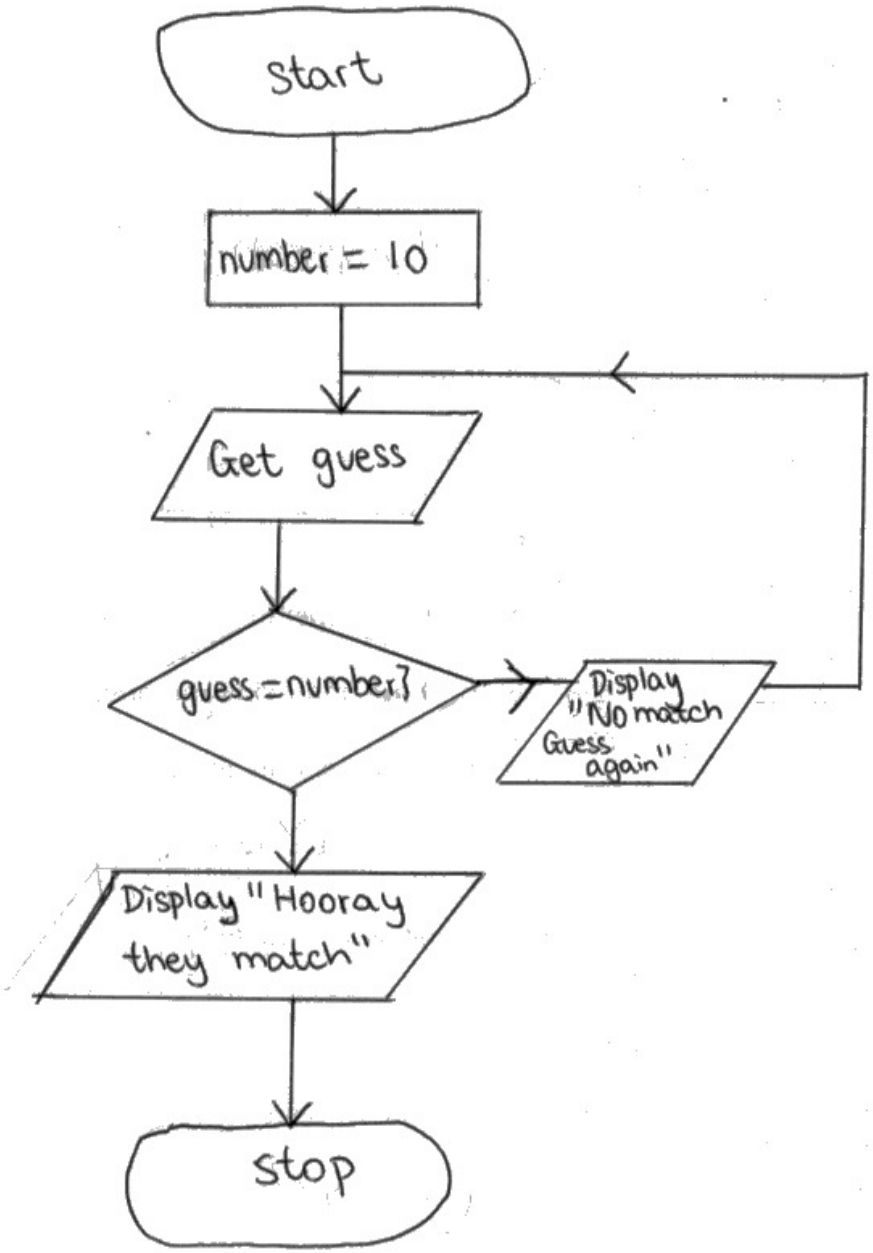
Question 4 (a)(i)

This question is a practical, asking the candidates to draw a flowchart for a simple algorithm.

It requires some analysis of the given boxes to determine what the algorithm involves, as well as the ability to construct the flowchart.

Most candidates were able to gain some marks. The marks were generally higher than expected, probably because candidates had significant algorithm experience with Paper 2.

Draw your flowchart here.



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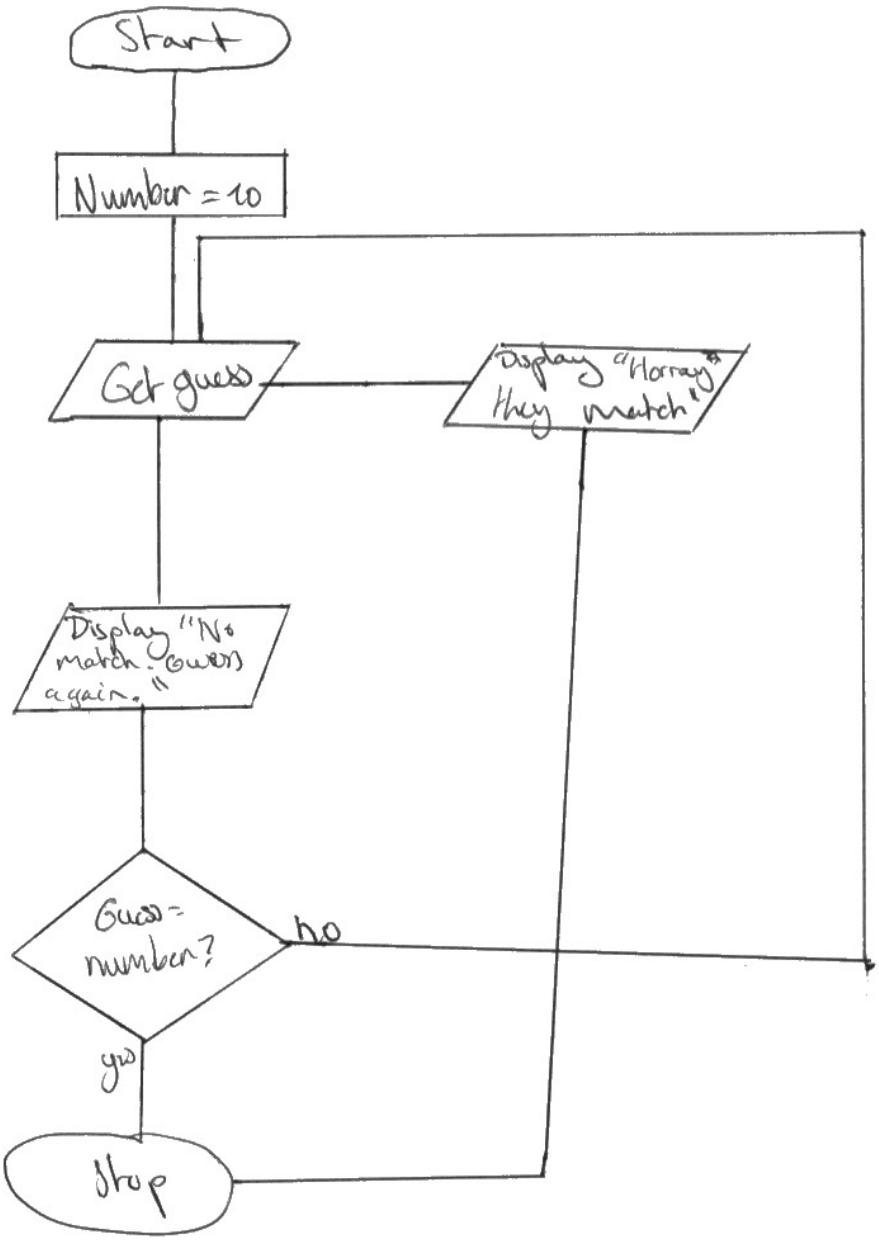
Examiner Comments

This is a correct flowchart: it only loses a mark because the candidate has failed to include Yes, No, labels on the decision.

Total: 4 Marks

Draw your flowchart here.



ResultsPlus
Examiner Comments

The answer receives mark point 1, start, stop.

Mark point 2 number = 10 and Get guess boxes in the right place.

Mark point 3 loop back after wrong guess. Note the loop back does not need to go via a message.

Total: 3 Marks

Question 4 (b)(i)

This question is essentially a multiple choice. The correct answer is D.

Question 4 (b)(ii)

This question is essentially a multiple choice. The correct answer is B.

Question 4 (c)(i)

This is a practical question that asks candidates to complete a trace table for a provided algorithm, written as pseudocode.

The marks were generally higher than expected, probably because candidates had significant algorithm experience with Paper 2.

Reba inputs: red, orange, red, red, orange, –1

The outputs are not as she expects.

(i) Complete the trace table to show the outputs.

(4)

Colour	Score	RedPoints	OrangePoints	NumOranges	Outputs
	0	0	0	0	score = 0 no. reds = 0 no. oranges = 0 line 21 line 22 line 23
red	1	1	0	0	S = 1 R = 1 O = 0
orange	9	1	8	1	S = 9 R = 1 O = 8
red	10	2	8	1	S = 10 R = 2 O = 8
red	11	3	8	1	S = 11 R = 3 O = 8
orange	19	3	16	2	S = 19 R = 3 O = 16
–1	19	3	16	2	S = 19 R = 3 O = 16

ResultsPlus
Examiner Comments

This answer receives full marks.

The columns contain the correct numbers. The outputs are not displayed as shown in the mark scheme but the candidate has given a key with the correct words on the first line.

There is no requirement for those words to be on separate lines, as long as they are on the same line as the score, or one line below.

Total: 4 Marks

Reba inputs: red, orange, red, red, orange, –1

The outputs are not as she expects.

(i) Complete the trace table to show the outputs.

(4)

Colour	Score	RedPoints	OrangePoints	NumOranges	Outputs
	0	0	0	0	
red	1	1			Score = 1 Red points = 1 orange points = 0
orange	8		1 2	1	Score = 8 Red points = 0 Orange points = 8
red	1	1			Score = 1 Red points 1 orange points = 8
red	1	1			Score = 1 Red points = 1 orange points = 8
orange	8		8	1	Score = 8 Red points = 0 orange points = 8
–1					Score = 0 Red points = 0 orange points = 8

ResultsPlus
Examiner Comments

The numbers are incorrect, losing the first three marking points.

The outputs are on the correct line, but use incorrect words and do not match the values in the table.

Total: 0 Marks

Reba inputs: red, orange, red, red, orange, –1

The outputs are not as she expects.

(i) Complete the trace table to show the outputs.

(4)

Colour	Score	RedPoints	OrangePoints	NumOranges	Outputs
	0	0	0	0	
red	0	1	0	0	
orange	9	1	8	1	
red	8	2	8	1	
red		3	8	1	
orange		3	16	2	
–1	19				End: 19 red: 3 orange: 16

ResultsPlus
Examiner Comments

The answer has the correct values in the columns and gets the first three marking points.

The outputs are in the right place and have correct values, but use the wrong words.

Total: 3 Marks

Question 4 (c)(ii)

This question asked the candidates to spot the mistake in the pseudocode and give its line number. The only possible answer is line 23.

Question 4 (c)(iii)

This question is linked to 4cii, since if a candidate selected the wrong line in 4cii it was very unlikely that they would be able to correct the contents of that line, as required here in 4ciii.

(iii) Write a replacement line of pseudocode to correct the error.

SEND ("Number of oranges: " & NumOranges) TO DISPLAY (1)

(Total for Question 4 = 14 marks)

ResultsPlus
Examiner Comments

This is a correct answer.

Minor errors such as incorrect use of capitals would be ignored.

Total: 1 Mark

(iii) Write a replacement line of pseudocode to correct the error.

Receive Colour OR input from keyboard (1)

ResultsPlus
Examiner Comments

The answer is incorrect and shows that the candidate cannot identify the error in the pseudocode in Q4cii.

Total: 0 Marks

Question 5 (a)(i)

The question concerns how artificial intelligence (AI) could identify an illness from symptoms.

Many of the answers were fairly simplistic, mainly saying that the AI would match symptoms to illnesses.

More-able candidates understood that the AI would need a database or other data store, against which to match symptoms.

5 Viza Health Centre is located in the North East of England.

(a) The health centre uses artificial intelligence to provide a symptom-checking service for its patients.

Patients log on to the website and input their symptoms.

(i) Describe how artificial intelligence could identify what is wrong with them.

(2)

by checking symptoms with known illnesses

ResultsPlus
Examiner Comments

This is a typical, simple answer, matching symptoms to an illness.

Total: 1 Mark

5 Viza Health Centre is located in the North East of England.

(a) The health centre uses artificial intelligence to provide a symptom-checking service for its patients.

Patients log on to the website and input their symptoms.

(i) Describe how artificial intelligence could identify what is wrong with them.

(2)

The symptoms inputed are checked ~~us~~ by AI and compares ~~it~~ the symptoms with data ~~so~~ store on the server, it matches the data accordingly ~~and displays~~ the and displays the output like the illness related.

ResultsPlus
Examiner Comments

The candidate shows that they know the AI must have a set of data to match the symptoms, in order to identify an illness.

This follows example 4 from the Mark Scheme.

Total: 2 Marks

Question 5 (a)(ii)

This question asks why patients may not wish to use the online, artificial intelligence system. There are numerous possible answers, many of which would apply to any online system. Weaker candidates therefore did a bit better than expected.

(ii) Give **one** reason why a patient may not want to use this online service.

(1)

Since it is an online service, the ~~poten~~ patients can be exposing their confidential information to an unsuspecting eaves dropping attack.

ResultsPlus
Examiner Comments

This answer meets mark point 7, security issues. A frequent issue for many online systems.

Total: 1 Mark

(ii) Give **one** reason why a patient may not want to use this online service.

(1)

The artificial intelligence may provide a wrong diagnosis to ~~the~~ the patient which is a risk to the medical health & safety of the patient, making it unreliable

ResultsPlus
Examiner Comments

This shows a frequent incorrect answer.

There is no information available about the reliability of the system, versus a human doctor.

Had the candidiate said that there might be a problem of trusting the diagnosis, it would receive mark point 8.

Total: 0 Marks

(ii) Give **one** reason why a patient may not want to use this online service.

(1)

It may not be accurate, patient trusts human doctor's ability more than AI's, patient feel their personal data might be leaked.

ResultsPlus
Examiner Comments

The answer gives two marking points, although only 1 mark is available:

- the trust issue, mark point 8
- worries about personal data leaking, mark point 7.

The initial words about accuracy can be ignored.

Total: 1 Mark

Question 5 (b)(i)

This question, and the following 5bii, ask the candidates to identify network types used in a specific scenario.

(b) The health centre has clinics in two buildings: Cleveland and Stockton.

The network server is in the Cleveland building.

(i) Name the type of network used to access the server from within the Cleveland building.

(1)

Local Area Network

ResultsPlus Examiner Comments

This is the correct answer.

The acronym LAN would also be acceptable.

Total: 1 Mark

(b) The health centre has clinics in two buildings: Cleveland and Stockton.

The network server is in the Cleveland building.

(i) Name the type of network used to access the server from within the Cleveland building.

(1)

Wi-Fi

ResultsPlus Examiner Comments

The candidate identifies a transmission medium, not a network type.

Total: 0 Marks

Question 5 (b)(ii)

This question, and the previous 5bi, ask the candidates to identify network types used in a specific scenario.

(ii) Name the type of network used to access the server from the Stockton building.

(1)

WAN

ResultsPlus Examiner Comments

This is the correct answer.

Total: 1 Mark

(ii) Name the type of network used to access the server from the Stockton building.

(1)

WLAN

ResultsPlus Examiner Comments

The answer of WLAN is incorrect.

No benefit of doubt can be given, because LAN would also be incorrect, even though WAN would be correct.

Total: 0 Marks

Question 5 (d)(i)

This question concerns how differences between a solid state drive and a hard drive make the solid state one better for a laptop.

Less-able candidates tended to produce simple answers about the solid state drive being smaller or lighter but did not always extend their explanation as to why that made it better for a laptop.

(d) Doctors use laptops when they visit patients in their homes.

(i) The laptops have solid state drives.

Explain **one** reason why a solid state drive is better than a magnetic hard drive for the laptops.

(2)

It's ~~durable~~ more durable and ~~has more~~ it's easy to carry.

ResultsPlus
Examiner Comments

This answer has part of mark point 1, more durable, and part of mark point 2, easy to carry, but the two statements do not make a linked explanation.

Total: 1 Mark

(d) Doctors use laptops when they visit patients in their homes.

(i) The laptops have solid state drives.

Explain **one** reason why a solid state drive is better than a magnetic hard drive for the laptops.

(2)

SSD's are less fragile so if the computer experiences minor damage from a fall for instance, the SSD will not be affected

ResultsPlus
Examiner Comments

This answer addresses mark point 1.

It receives the mark for a solid state drive being less fragile, but does not extend the explanation for a second mark.

Total: 1 Mark

(d) Doctors use laptops when they visit patients in their homes.

(i) The laptops have solid state drives.

Explain **one** reason why a solid state drive is better than a magnetic hard drive for the laptops.

(2)

Because It is smaller, lighter and more portable, than a hard drive which is in the laptop.

ResultsPlus
Examiner Comments

This is a fairly simple answer that receives both marks.

It follows mark point 2.

Total: 2 Marks

Question 5 (d)(ii)

This question concerns how a solid state drive stores data.

There were some very good, technical answers about floating gate transistors and charge traps, and how they represent 1s and 0s.

(ii) Describe how data is stored on a solid state drive.

(2)

It is stored through an electric ~~type~~ push ~~with~~ which store electrons into pools. If pool is full then it's binary is 0 if it's empty then it's 1.

ResultsPlus Examiner Comments

This is a good description, that covers marking points 3, 5 and 6.

Total: 2 Marks

(ii) Describe how data is stored on a solid state drive.

(2)

Solid state drive traps a pool of electrons and uses electricity to change the state of the transistors.

ResultsPlus Examiner Comments

This is a reasonable attempt, but really only addresses mark point 2, transistors acting as charge traps.

The information about using electricity to change the state, does not answer the question.

Total: 1 Mark

(ii) Describe how data is stored on a solid state drive.

(2)

Solid state devices use chips called NAND flash which have transistors that trap electrons in a pool. Empty pools represent 1 and pools with electrons represent 0.

ResultsPlus
Examiner Comments

This is good answer that covers mark points 1, 2, 5 and 6.

However, only two marks are available.

Total: 2 Marks

Question 5 (d)(iii)

This is a tick box question, essentially a multiple choice. The only correct answers are shown in the Mark Scheme.

Question 6 (a)(i)

This question asks for a benefit of a network topology. The diagram shows it to be a ring.

More-able candidates tended to explain about data flow and lack of collisions, whilst the less-able tended to opt for easier, cheaper.

The latter answers needed more information to receive a mark.

A frequent incorrect answer was that adding workstations had no effect on network speed. This showed a misunderstanding that data transmission rates, which stay the same, are not the same as network speed.

(i) Explain **one** benefit of this network topology.

(2)

Ring network is beneficial because it can easily add another Desktop PC

ResultsPlus
Examiner Comments

This is mark point: easy to add a workstation.

There is no extension mark.

Total: 1 Mark

(i) Explain **one** benefit of this network topology.

(2)

It is cheap as not a lot of cabling is needed.
There are no data collisions as all the data travels in one direct the same direction.

ResultsPlus
Examiner Comments

This answer receives mark point 1: no data collisions because data flows in one direction.

Total: 2 Marks

Question 6 (a)(ii)

This questions asks why the internet needs to use a mesh topology.

The question is near the end of the paper and targeted at more-able candidates.

Frequent incorrect responses involved descriptions of a simple/local mesh network but with no link to the requirements of the internet.

(ii) The internet is the world's largest mesh network.

Explain **one** reason why a mesh topology is essential for the internet.

(2)

One reason is because large amounts of data are constantly being sent across the internet, and so a mesh network is essential for providing several routes for data to travel between networks, and so reducing the number of collisions and keeping transmission speeds high

ResultsPlus
Examiner Comments

This is a good answer that follows mark point 2.

The internet is mentioned specifically and the link made from how a mesh topology works.

Total: 2 Marks

(ii) The internet is the world's largest mesh network.

Explain **one** reason why a mesh topology is essential for the internet.

(2)

it allows systems to connect to others and if one system goes down, ~~not~~ everyone else's ~~does~~ stays up.

ResultsPlus
Examiner Comments

This is a typical answer that gives information about a mesh, although using the term system instead of node.

It makes no link to the internet or its requirements.

Total: 0 Marks

Question 6 (b)(i)

This question asks the candidates to identify a network type used in a specific scenario. The only answers are a personal area network (PAN) or a wireless PAN (WPAN).

(b) Santiago works on his laptop whilst travelling by train.

There is a free Wi-Fi connection on the train, but Santiago doesn't use it.

He prefers to set up a network between his smartphone and his laptop to connect to the internet.

(i) Name this type of network.

(1)

A personal ~~area~~ area network (PAN)

ResultsPlus
Examiner Comments

This is the correct answer.

Total: 1 Mark

(b) Santiago works on his laptop whilst travelling by train.

There is a free Wi-Fi connection on the train, but Santiago doesn't use it.

He prefers to set up a network between his smartphone and his laptop to connect to the internet.

(i) Name this type of network.

(1)

He used a hotspot which is cellular data. Lan

ResultsPlus
Examiner Comments

This example shows frequent incorrect response, a hotspot.

Although the scenario does describe a hotspot situation, it is not a network type.

The candidate has also given LAN as a second, incorrect answer.

Total: 0 Marks

Question 6 (b)(ii)

This question is about the advantages of a Personal Area Network as described in the scenario, compared with a public Wi-Fi connection.

Candidates may have identified a PAN in 6bi but are not disadvantaged if they were incorrect.

(ii) Explain **one** advantage for Santiago of using the network he has set up to connect to the internet, rather than the free Wi-Fi connection.

(2)

less chance of data being stolen over the network

ResultsPlus
Examiner Comments

This answer receives the 'stated security issue' mark from mark point 2.

The candidate does not expand the explanation for a second mark.

Total: 1 Mark

(ii) Explain **one** advantage for Santiago of using the network he has set up to connect to the internet, rather than the free Wi-Fi connection.

(2)

It is harder to hack into and access because it is private and secured. But also it is faster than the free wifi since there is less traffic.

ResultsPlus
Examiner Comments

This answer receives two marks for both mark point 1 and mark point 2.

Total: 2 Marks

Question 6 (c)(i)

This question asks what is meant by an audit trail. This is a technical term.

(c) Santiago uses audit trails to help protect the network.

(i) State what is meant by an **audit trail**.

(1)

It keeps a record of the activities that has took place in the computer. It's a cyber security.

ResultsPlus
Examiner Comments

This answer is correct for mark point 1.

Total: 1 Mark

(c) Santiago uses audit trails to help protect the network.

(i) State what is meant by an **audit trail**.

(1)

An audit trail is a ~~record~~ collection of records that stores data on who used the network, how & when (time) it was accessed, what they did, etc.

ResultsPlus
Examiner Comments

This answer is correct for mark point 2.

Total: 1 Mark

Question 6 (c)(ii)

This question follows on from 6ci and asks how an audit trail can help keep a network secure.

Candidates who did not know what an audit trail was in 6ci, will have found this difficult.

(ii) Give **one** way the data from audit trails can be used to help keep the network secure.

(1)

* Audit trails show when changes happened, so the people who made the changes can be caught ~~by~~ ~~camera when~~ checking who was inside the audit room when the change happened

ResultsPlus
Examiner Comments

This answer is mark point 3, tracing a problem back to a perpetrator.

Total: 1 Mark

(ii) Give **one** way the data from audit trails can be used to help keep the network secure.

(1)

Audit trails can be used to identify any suspicious activity that ~~could occur or~~ has occured prior to a cyberattack, & before it can happen.

ResultsPlus
Examiner Comments

This answer is mark point 1, identifying suspicious activity.

Total: 1 Mark

Question 6 (d)

This is the extended writing, levels-based essay.

It asks about finding and fixing network vulnerabilities using ethical hacking, commercial analysis tools, and a review of policies.

Most candidates could make a point about ethical hacking: rather fewer wrote about policies. Very few seemed to understand what commercial analysis tools were.

(d) Santiago wants to find and fix network vulnerabilities before the reputation of the company suffers.

Discuss the methods he can use.

You should consider:

- ethical hacking Penetration modeling
- commercial analysis tools
- review of network and user policies.

(6)

Ethical hacking:

pentesting, assigning some legal hackers in order to attack Network (white-hackers) find the problems to fix.

It helps to Identify where is the weakness, to improve

Modeling testing cyberattacks.

Commercial analysis tools:

Keep everything updated, update patched software, ensure antispyware, antimalware. Use a bug help of programmer to revise code, use systems to check on code (Identify errors). protect server keeping it under protect place, to prevent them from getting stealed

* review of Network and user policies:

Ensure everyone employees had read the Network policies

* Strong passwords, change the defaults.

* make employees aware of social engineering (phishing, [illegible], shoulder surfing)

* Prevent using of flash drives as they might contain malware.

ResultsPlus
Examiner Comments

There are some reasonable statements about ethical hacking and policies but they are too brief.

The section on commercial tools doe not say much, and anti-malware is incorrect.

This response reaches lower Level 2.

Total: 3 Marks

(d) Santiago wants to find and fix network vulnerabilities before the reputation of the company suffers.

Discuss the methods he can use.

You should consider:

- ethical hacking
- commercial analysis tools
- review of network and user policies.

(6)

He could use ethical hacking where he pays a hacker to try and hack into his network to expose security flaws. when exposed the hacker will give the information about flaws to Santiago so that they can be fixed. However this takes time as some flaws are well hidden and can be expensive due to having to pay for Hacker

Comercial analysis tools would recognise only basic flaws to network security, does not have the same power as a hacker due to its inability to improvise as a result of it being preprogrammed. Is cheap however.

Review of Network and user policies. by making clear the consequences if the network is misused like qa (getting losing job) and having users sign them. This discourages missuse (like going on insecure websites that would make the network vunrerable. This is a cheap way to prevent vunerability through missuse however it does not show other vulnerabilities so they will not be fixed if only this method is used.

ResultsPlus
Examiner Comments

The sections on ethical hacking and policies are sensible and give some idea of what is involved.

The commercial tools aspect is weaker, but enough to reach Level 3.

Total: 5 Marks

(d) Santiago wants to find and fix network vulnerabilities before the reputation of the company suffers.

Discuss the methods he can use.

You should consider:

- ethical hacking
- commercial analysis tools
- review of network and user policies.

(6)

- Santiago could try to brute force his way in from another computer to find the vulnerabilities and fix it himself

- He could also use a trusted VPN which encrypts all his bandwidth making him safe from possible cyber attacks

- He should also use anti viruses that include web guards that protect and go against any possible threats

- He could also take legal action since it is against the network and user policy

ResultsPlus
Examiner Comments

Bullets one and four have something to do with ethical hacking and policies respectively.

The VPN and anti-virus may be supposed to be about commercial tools but are not correct for that.

This response just reaches the upper half of Level 1.

Total: 2 Marks

Paper Summary

Based on their performance on this paper, candidates should:

- read the scenarios/question terms carefully, looking for specific mentions of eg. technical details or concerns of the people involved
- avoid the pre-planning of answers based on the sample assessment material or previous examinations. Although many of the questions will be similar, the context and emphasis will be different
- look for the key words and number of marks. eg. explain one benefit, for two marks, will require a linking of two facts or statements about the topic
- ensure that flowcharts, diagrams, graphs etc. are clear and legible, especially any labels
- do not cross out replaced answers until **after** they have actually been replaced
- indicate if a replaced or extended piece of work has been written elsewhere in the paper

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