Chhetri Academy

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GCSE COMPUTER SCIENCE

2.1

Edexcel 1CP2 | Specification point 2.1.2

How computers represent and manipulate unsigned integers and two's complement signed integers

Untiered

Answers and examiner comments

1	2020	Untiered
question groups	available papers	tier

Using this booklet

1. Answer numbers match the companion question booklet.
2. Follow the original question number on marking tables.
3. Examiner comments are included where available.

Name _____ **Date** _____

Some entries use full source marking material in an appendix. Any unavailable mark schemes are identified beside the relevant answer.

7(a)	An explanation to include **two** from: Binary can represent two states (1) because computer circuits use transistors, which can either be on or off (1)		**2**

Question Number	Answer	Additional Guidance	Mark
7(b)	<table><tr><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>0</td><td>0</td><td>0</td></tr><tr><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td></tr><tr><td>1</td><td>1</td><td>1</td><td>1</td><td>0</td><td>1</td><td>1</td><td>1</td></tr></table> Award **one** mark for first two rows being correct Award **both** marks if last row is correct		**2**

Question Number	Answer	Additional Guidance	Mark
7(c)	An explanation such as: A two's complement of an 8-bit number can only represent positive integers up to 127 (1) because the rest of the bit combinations (with the most significant bit as '1') represent negative integers (1)		**2**

Question Number	Answer	Additional Guidance	Mark
7(d)	Indicative content: (Digital) audio quality is represented using binary. A number of bits (referred to as bit-depth) are used to 'describe' each sample. A lossy algorithm will reduce the bit-depth. However, it will improve the experience of users who want to stream/download the published files. It will not use frequency/amplitude masking (as is the case with lossless compression algorithms). Lossless algorithms are more complex so will take longer to run. The quality of the audio file is reduced when using a lossy algorithm and may not be as acceptable to a listener as one that has been compressed using a lossless algorithm. Depending on the level of compression, listeners may not be able to distinguish between the original and compressed file. Lossless algorithms will allow the musician to work on files at a later date at their original quality/sample rate/resolution. Files that have been compressed using a lossless algorithm will take longer to upload and require more storage/cost (and reverse).		**6**

Level	Mark	Descriptor
	0	No rewardable content
Level 1	1-2	A comparison may be attempted but with limited application of knowledge and understanding of key concepts/principles of computer science to the theoretical context. The comparison will contain basic information with some attempt made to link knowledge and understanding to the given context.
Level 2	3-4	A comparison will be given with adequate application of knowledge and understanding of key concepts/principles of computer science to the theoretical context. Lines of reasoning are occasionally supported through a linkage. The comparison shows some linkages and lines of reasoning with some structure.
Level 3	5-6	A comparison will be given with comprehensive application of knowledge and understanding of key concepts/principles of computer science to the theoretical context. Line(s) of reasoning are supported throughout by sustained application of relevant evidence. The comparison shows well-developed and sustained lines of reasoning which are clear, coherent and logically structured.