Revision Sheet

A-Level Computer Science · Unit 1 Information representation

20 vocabulary items · 45 marks of exam questions (7 questions)

Part 1 · Vocabulary review answer key. Section A wants the exact English spelling.

Question	Answer	Marks
1	number system	1
2	binary	1
3	hexadecimal	1
4	BCD	1
5	character set	1
6	bitmap	1
7	file header	1
8	image resolution	1
9	screen resolution	1
10	vector graphic	1
11	analogue data	1
12	digital data	1
13	sampling	1
14	sampling rate	1
15	sampling resolution	1
16	compression	1
17	lossless	1
18	lossy	1
19	dictionary methods / dictionary coding / dictionary encoding	1
20	frame rate	1

21(a)(i)	–106
21(a)(ii)	96
21(a)(iii)	**1 mark** for each bullet point: • 149 decimal • 0001 0100 1001
21(b)	1101 0010

22(a)	**1 mark** for: one tebibyte is 1024 gibibytes **and** one terabyte is 1000 gigabytes
22(b)	1001 1100
22(c)	**1 mark** for working e.g. • Dividing by 16 // converting to binary (11111011) **1 mark** for answer FB
22(d)	1000 1110

23(a)	**1 mark** for: Either • kibibyte = 1,024 bytes // 2^{10} bytes **and** megabyte = 1000 kilobytes //1 000 000 bytes // 10^3 kilobytes // 10^6 bytes Or • kibi is binary prefix **and** mega is denary prefix
23(b)(i)	1111 0011 1100
23(b)(ii)	865
23(b)(iii)	470
23(c)	**1 mark** for a correct application **1 mark** for a corresponding justification • An application that performs financial / banking calculations • ... because it is difficult to represent decimal values exactly in normal binary and financial transactions use only two decimal places and must be accurate, no accumulating errors Or • Electronic displays, e.g. calculators, digital clocks • ... because visual displays only need to show individual digits • ... because conversion between denary and BCD is easier Or • The storage of the date and time in the BIOS of a PC • ... because conversion with denary is easier

24(a)	1 mark for each correct answer ASCII = 128 // 2^7 Extended ASCII = 256 // 2^8
24(b)	**1 mark** per bullet point to **max 2** • Each character has its own **unique** code • Each character in the word is **replaced** by its code • The codes are stored **in the order in the word**
24(c)(i)	31
24(c)(ii)	53

25(a) **1 mark** for **one or two** correct ticks, **2 marks** for **three** correct ticks.

Action	Accuracy increases	Accuracy decreases	Accuracy does not change
Change the sampling rate from 40 kHz to 60 kHz.	✓		
Change the duration of the recording from 20 minutes to 40 minutes.			✓
Change the sampling resolution from 24 bits to 16 bits.		✓	

25(b) **1 mark** for answer; **1 mark** for working.

Working:

Size = 50KHz * (20 × 60) * 16 bits
= 50 000 * 1200 * 16 bits // 50 000 *1200 * 2 bytes
= 960 000 000 bits
= 120 000 000 bytes
= 120 000 kilobytes
= 120 megabytes

Answer = 120 megabytes

25(c) **1 mark** for purpose (**max 2**):

Purpose:
- to act as temporary storage // to store (downloaded) data
- ... before it is used by the receiving device
- ... to allow processes / devices to operate at different speeds // independently of each other

1 mark for each example (**max 1**):
Examples:
- printer buffer used when data is transferred from a computer to a printer
- video buffer when streaming videos
- keyboard buffer when performing data entry

26(a)

1 mark one or two correct row(s). **2 marks** for all three correct rows.

Action	Increases the file size	Decreases the file size	No change to the file size
Change the colour depth of the image file to 16 bits per pixel.		✓	
Change the screen resolution to 1366 × 768 pixels.			✓
Change the colour of the rectangle from black to red.			✓

26(b)

1 mark for each bullet point **(max 2)**.
For example:

- can be enlarged without pixelation / loss of quality
- individual components of the image can be edited
- generally a smaller **file** size

26(c)(i)

1 mark for each correct underlined part:

Uncompressed sound	RLE compressed sound
EA F1 F1 F2 F2 F2 EA	1EA 2F1 3F2 1EA
AB AB FF FF 1D 67	2AB 2FF 11D 167
32 32 80 81 81	**232 180 281**

26(c)(ii)

1 mark for each bullet point:

- all the data is required // no data can be lost
- ... otherwise text file will be corrupted / not make sense

27(a)(i)

1 mark per bullet point

- Smaller time gaps between the samples
- Makes the **digital** sound **wave** more accurate
- Smaller quantisation errors

27(a)(ii)

1 mark per bullet point

- More samples/data are taken/recorded
- … so more bits are stored altogether

27(b)(i)

1 mark per bullet point

- Reduces the file size
- Faster to transmit/download
- Original file is too large for email storage/attachment

27(b)(ii)

1 mark per bullet point to **max 2**
e.g.

- Reduce amplitude to only the range used
- … limited amplitudes mean fewer bits per sample
- Run-length-encoding
- … Where consecutive sounds are the same record the binary value of the sound and number of times it repeats
- Record the changes instead of the actual sounds