

Binary Revision Questions

1 A bit pattern is shown below

00101101

1.1 Convert the bit pattern shown above to decimal

[1 mark]

$$32 + 8 + 4 + 1 = 45$$

1.2 Convert the bit pattern shown above to hexadecimal. You should show your working

[2 marks]

$$0010 = 2$$

$$1101 = 8 + 4 + 1 = 13 = D$$

Note: much easier to convert from binary to hex. Could also convert decimal to hex (but harder)

Answer: **2D** – only 1 mark for answer

2 Convert the decimal number 87 into binary

[1 mark]

01010111 – no need for working

3 Convert the hexadecimal number 4C into decimal. Show your working.

[2 marks]

$$4 \times 16 = 64$$

$$C = 12$$

$$64 + 12 = 76$$

Answer: **76** – one 1 mark for answer

4 Add together the two binary numbers shown below. Give your answer in binary.

[1 mark]

$$\begin{array}{r} 01000101 \\ + 00010011 \\ \hline 01011000 \end{array}$$

5 Add together the two binary numbers shown below. Give your answer in decimal.

[2 marks]

$$\begin{array}{r} 00010111 \\ + 00100100 \\ \hline \underline{\underline{00111011}} \end{array}$$

$32 + 16 + 8 + 2 + 1 = 59$

.....
Answer: **59** – only one mark for answer

6 Add together the three binary numbers shown below. Give your answer in binary.

[2 marks]

$$\begin{array}{r} 01001111 \\ 00010010 \\ + 01000010 \\ \hline \underline{\underline{10100011}} \end{array}$$

- One mark can be given if the three 1s in col 2 aren't dealt with correctly

7 A bit pattern is shown below.

01110110

7.1 Apply a logical binary shift of one place to the right on the bit pattern shown

[1 mark]

00111011

7.2 What is the mathematical effect of applying a logical binary shift of one place to the right on a bit pattern?

[1 mark]

Halves the number/divides by 2

8 An eight-bit binary number is called a Byte. What is the largest number that can be represented using one Byte?

[1 mark]

255

NB: 256 is wrong

9 Jasper has an image file which is 2,400 Bytes in size.

9.1 Convert 2,400 Bytes to kilobytes.

[1 mark]

$2,400 \div 1000 = 2.4 \text{ kB}$

Answer: **2.4 kB** – no need for units or working to be shown

10 Jasmine has a sound file which is 4MB in size.

10.1 What does the abbreviation MB mean?

[1 mark]

Megabyte(s)

10.2 Convert the size of Jasmine's file to Bytes. Show your working.

[2 marks]

$4\text{MB} = 4 \times 1000 \text{ kB} = 4000 \text{ kB}$

$4000 \text{ kB} = 4000 \times 1000 \text{ Bytes} = 4,000,000$

Answer: **4,000,000 (4 million)** – no need for units. If no working shown = 1 mark

11 Jilly has a text file which is 10 Bytes in size. Convert the size of Jilly's file to bits. Show your working.

[2 marks]

$10 \text{ Bytes} \times 8 = 80 \text{ bits}$

Answer: **80** – no need for units. If no working shown, 1 mark max

12 How many bits are there in 2MB? Show your working.

[2 marks]

$$2 \text{ MB} = 2 \times 1000 \text{ kB} = 2000 \text{ kB}$$

$$2000\text{kB} = 2000 \times 1000 \text{ Bytes} = 2,000,000 \text{ Bytes}$$

$$2,000,000\text{B} = 2,000,000 \times 8 \text{ bits} = 16,000,000 \text{ bits}$$

Answer: **16,000,000** bits – no working, 1 mark max

13 Josie has a bitmap image which is 10 pixels wide, 5 pixels high and uses 8 bits to represent each colour.

13.1 How many different colours can Josie's bitmap image contain?

[1 mark]

256 – 8 bits goes from 0 to 255, which is 256 different numbers

13.2 Calculate the file size of Josie's bitmap image. Show your working.

[2 marks]

$$\text{Size} = h \times w \times \text{colour depth}$$

$$= 10 \times 5 \times 8$$

$$= 50 \times 8 = 400 \text{ bits}$$

Answer: **400 bits** (size could also be given in Bytes: **50 Bytes**)

14 Jim has a sound file which is 10 seconds long. It has been sampled using 16 bit sampling resolution at a sampling rate of 10kHz.

14.1 Calculate the file size of Jim's sound file. Show your working.

[3 marks]

$$\text{Size} = \text{time} \times \text{sample resolution} \times \text{sample rate}$$

$$= 10 \times 16 \times 10,000$$

$$= 160 \times 10,000$$

$$= 1,600,000 \text{ bits}$$

Answer: **1,600,000 bits**