Unit 5 · Zeros and Ones

WORKSHEET

Full marks 31

Name _____ Class _____ Roll no. ____ Date _____ Marks _____ / 31

1 Key words [4]

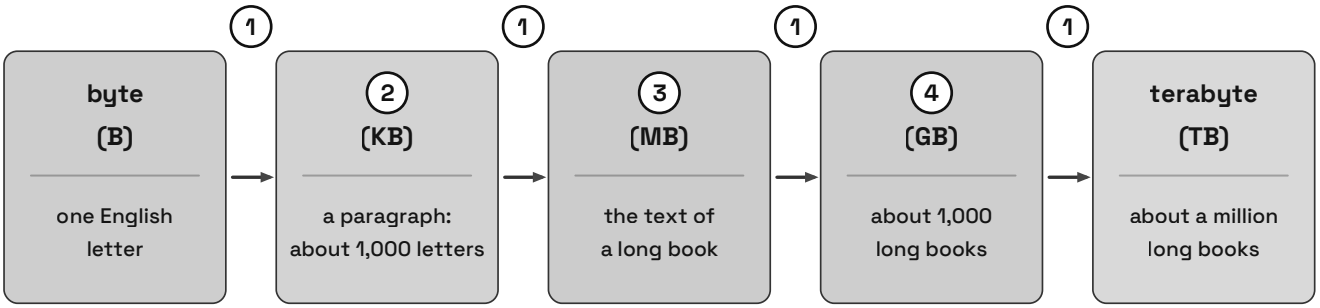
Fill in the blanks with words from the box. Two words in the box are not needed. Each blank carries 0.5 mark.

binary	bit	byte	decimal	kilobyte	megabyte	pixels	place value	resolution	transistors

A computer is built from billions of tiny switches called _____, each on or off. A single 0 or 1 is a _____, short for binary digit, and a group of 8 of them is a _____. Counting with only the digits 0 and 1 is the _____ system, in which each _____ is double the one to its right. A picture on a screen is made of tiny dots called _____, and the number of them across and down a picture is its _____. 1,024 bytes make one _____.

2 Label the diagram [2]

The diagram shows the units for counting bytes, from small to big. Write what belongs in place of 1 to 4. The same number stands for the same answer. Each carries 0.5 mark.



1. _____ 2. _____

3. _____ 4. _____

3 Multiple choice [5]

Choose the correct option for each of the following questions.

i. What is a bit? [1]

a. a small part of a computer's screen
b. a single binary digit, 0 or 1
c. a group of 8 binary digits
d. a thousand bytes

ii. How many bits are there in 2 bytes? [1]

a. 2
b. 8
c. 10
d. 16

iii. What number is the binary 110? [1]

a. 110
b. 3
c. 6
d. 12

iv. What is the biggest number you can write with 5 bits? [1]

a. 5 **b.** 16
c. 31 **d.** 32

v. A black-and-white picture is 16 pixels across and 16 down. How many bytes does it take? [1]

a. 16 **b.** 32
c. 256 **d.** 2,048

4 Binary numbers [9]

Write short answers to the following questions.

a. Change these binary numbers into decimal: i. 101 ii. 1100 iii. 10011 iv. 11111111 [2]

b. Write each number in binary: put a 1 or a 0 under each place value. [2]

Number	32	16	8	4	2	1
6						
13						
20						
45						

c. Complete the table. [3]

Number of bits	Number of patterns	Biggest number
2		3
3	8	
4		
8		

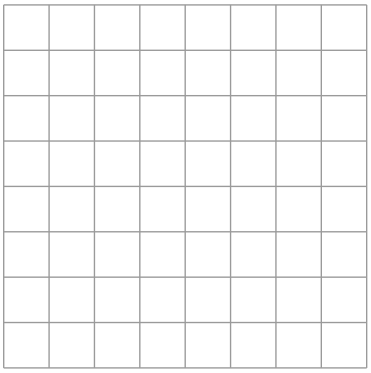
d. Why do computers use binary, only 0 and 1? Give two reasons. [2]

5 Pictures made of pixels [4]

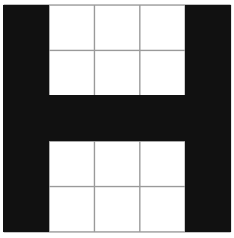
Use the rule **1 = black, 0 = white.** Read each row from left to right.

a. Color the squares from these bits, one row of bits for each row of squares. What is the picture? [2]

`00000000 · 00011000 · 00111100 · 01111110 · 11111111 · 01000010 · 01011010 · 01011010`



b. Here is a black-and-white picture, 5 pixels across and 5 down. Write its bits, one row at a time. What letter is it? [2]



6 Calculations [5]

Show your working.

a. A black-and-white picture is 40 pixels across and 30 pixels down. [3]

i. How many pixels does it have?

ii. How many bits does it take?

iii. How many bytes?

Answer: _____

b. A memory card holds 16 GB. A song takes about 4 MB. About how many songs can it hold? (Use 1 GB = 1,024 MB.) **[2]**

Answer: _____

7 Think **[2]**

Think, then answer.

Sita says her internet is "10 Mbps", so a 10 MB video will arrive in one second. Is she right? Explain.

_____

_____

_____

_____

8 Activity: Binary cards (not marked)

Make 5 cards with 1, 2, 4, 8 and 16 dots, and lay them in a row with the 16 on the left. Face up is 1, face down is 0; the number is the total of the dots you can see. Make each number, then write which cards are face up, and the number in binary.

Number	Cards face up	Binary (16 8 4 2 1)
9		
21		
31		
my age:		