A1.2

Data representation and computer logic

CHAPTER ASSIGNMENT · 24 MARKS

Name _____ Class _____ No. _____ Date _____

Answer every question in the space given. Show your working. You may use the chapter page to help you.

Questions from the Guru Jazzy chapter page, for classroom use.

Exam-style questions

1. Convert 11010110 to hexadecimal, showing your working. [2]

2. Calculate the file size in kilobytes of a 640 × 480 bitmap with 1024 colours, ignoring metadata. [2]

3. Calculate the storage in MB for one minute of 48 kHz, 24-bit stereo audio. [3]

4. Explain why UTF-8 is preferred to UTF-32 for web pages. [3]

5. Distinguish between spatial and temporal video compression. [2]

6 Represent −12 in 8-bit two's complement, showing each step. [3]

7 Outline one advantage and one disadvantage of floating point over fixed point. [2]

8 A greenhouse fan runs if the manual switch M is on, or if it is hot H and the door D is closed. Using D = 1 for open, write a Boolean expression and construct the truth table. [4]

9 Use a Karnaugh map to simplify NOT A · B · NOT C + NOT A · B · C + A · B · C. [3]

Chapter quiz

Q1 What is the largest value in 8-bit unsigned binary?

A	B	C	D
127	128	255	256

Q2 What is 2C in decimal?

A	B	C	D
32	44	212	28

Q3 An advert offers 200 Mb/s. What is that in megabytes per second?

A	B	C	D
25 MB/s	200 MB/s	1600 MB/s	20 MB/s

Q4 How many bytes is 1 MiB?

A	B	C	D
1,000,000	1,024,000	1,048,576	1,000,024

Q5 Which Unicode encoding uses 1 to 4 bytes per character and stays compatible with ASCII?

A	B	C	D
UTF-8	UTF-16	UTF-32	Extended ASCII

Q6 How many colours does a 5-bit colour depth allow?

A	B	C	D
5	10	25	32

Q7 What is the 8-bit two’s complement form of −1?

A	B	C	D
10000001	11111110	11111111	00000001

Q8 Why might a clock display use BCD?

A	B	C	D
It uses fewer bits	Each decimal digit maps directly to its own code	It compresses the time	It handles negative numbers

Q9 Which system is designed so neighbouring values differ by exactly one bit?

A	B	C	D
Excess-N	Gray code	One’s complement	BCD

Q10 A · B + C has no brackets. What happens first?

A	B	C	D
A · B	B + C	Left to right, always	It is invalid

Q11 How many rows does a truth table for 3 inputs have?

A	B	C	D
3	6	8	9

Q12 Why are K-map headings in Gray code order?

A	B	C	D
It looks tidier	Neighbouring cells differ by one variable, so groups show what to remove	Binary is not allowed	It reduces the rows

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End of assignment · Check your answers against the chapter at gurujazzy.com/subjects/ib-computer-science/a1-2-data-logic/