DATA REPRESENTATION PAPER 2

Section A

1) • Explain how **two's complement** handles negative binary numbers.
2) • What are **binary column weightings**, and how are they applied?
3) • Write out the **steps** to add two 8-bit binary numbers.
4) • Convert the two's complement binary number **11110011** to decimal.
5) • Explain how **floating-point representation** is used for decimal numbers.
6) • Compare the **advantages and disadvantages** of ASCII vs. Unicode.
7) • Write a **binary subtraction** example using two's complement.
8) • Convert the decimal number **156** to an 8-bit binary number.
9) • How do **character sets** like ASCII and Unicode handle control codes?
10) • Describe the process of **sampling rate selection** in sound recording.
11) • Explain the differences between **ASCII and Extended ASCII**.
12) • Convert **F3A** in hexadecimal to both binary and decimal.
13) • Describe **color models** used in vector graphics.
14) • How does **sampling resolution** influence audio fidelity?
15) • Explain the importance of **color depth** in vector graphics.
16) • Describe the role of **image headers** in bitmap files.
17) • How do **prefixes** like kibibyte (KiB) differ from kilobyte (KB)?
18) • Describe the process of **hexadecimal addition** with an example.
19) • What factors affect the **file size** of a digital image?
20) • Explain **binary multiplication** with an example.
21) • Convert **1101101** in binary to hexadecimal.
22) • Explain how **metadata** is stored in image files.
23) • Describe how **audio compression** algorithms reduce file size.
24) • Convert **1110111** to an equivalent hexadecimal and decimal.
25) • Explain **vector image scaling** and its impact on quality.
26) • How does **resolution** differ between digital and printed images?
27) • Describe the **process of encoding sound** using bit depth and rate.
28) • What is the binary representation of **255** in an 8-bit system?
29) • Explain the role of **sampling rate** in audio quality.
30) • Describe the difference between **compression artifacts** in JPEG and PNG.
31) • How does **lossy compression** affect audio quality?

32) • Write out the **binary subtraction** of **1001 - 0011**.
33) • Explain **frame rate** and its role in video file size.
34) • Convert **1B9** from hexadecimal to binary.
35) • Describe **Run-Length Encoding (RLE)** and its applications.
36) • Convert **1024 bytes** to kilobytes, in both SI and IEC.
37) • Explain how **unicode** supports multi-language text.
38) • Describe the concept of **sampling** in sound digitization.
39) • Write out an example of **binary multiplication**.
40) • What are **vector graphics commands** used in SVG files?
41) • Explain **audio compression** using **perceptual music shaping**.
42) • Convert **4E3** from hexadecimal to decimal.
43) • How does **color depth** affect bit depth in images?
44) • Describe **pixel density** and its measurement in displays.
45) • Explain the **difference between ASCII and Unicode** with examples.
46) • Convert **16 KB** to bytes using both SI and IEC standards.
47) • Describe the **relation between resolution and pixel density**.
48) • How is **ASCII encoding** used in computer systems?
49) • Convert the binary **100111** to decimal and hexadecimal.
50) • Explain the differences between **JPEG and PNG** in file compression

Section B

1) • Write pseudocode to declare an **enumerated data type** for colors.
2) • Explain **pointer dereferencing** with an example in pseudocode.
3) • Describe the **limitations of serial file organization**.
4) • Explain **collision handling** in open hashing.
5) • Write a hashing function that uses **ASCII values** of characters.
6) • Describe the advantages of **sequential file organization**.
7) • Explain **two's complement** subtraction with an example.
8) • Write a pseudocode for a **closed hashing function**.
9) • Describe the role of **collision resolution** in hashing.
10) • Convert the denary number **47** to binary and hexadecimal.
11) • Explain **file indexing** and its impact on data retrieval.
12) • Define the purpose of a **key field** in sequential files.
13) • How does **binary multiplication** differ from decimal multiplication?
14) • Describe **overflow errors** in floating-point arithmetic.
15) • Explain **normalization** of binary floating-point numbers with an example.
16) • Write pseudocode for **direct access file retrieval**.
17) • Describe **two's complement representation** for -30.
18) • Explain the importance of **bit-shifting** in normalization.
19) • Define **hashing algorithm** for numeric key fields.
20) • Write pseudocode to normalize a **floating-point binary number**.
21) • Describe the advantages and disadvantages of **composite data types**.
22) • What are the potential **collisions in hashing algorithms**?
23) • Write pseudocode for a **binary search on sequential file organization**.
24) • How do **hashing algorithms** work in large datasets?
25) • Define **Run-Length Encoding** with a detailed example.
26) • Write pseudocode to perform **two's complement addition**.
27) • Explain how **underflow errors** occur in binary systems.
28) • Describe the concept of **range** in floating-point numbers.

29) • Explain the use of **two’s complement in negative binary numbers**.
30) • Describe the importance of **precision in floating-point systems**.
31) • Write an algorithm to convert a **binary floating-point number** to denary.
32) • Explain the use of **overflow area in hashing**.
33) • Describe the role of **key fields in hashing algorithms**.
34) • How does **bit-shifting** impact binary arithmetic?
35) • Define **direct access file organization**.
36) • Write pseudocode for **binary subtraction** using two’s complement.
37) • Explain the difference between **open and closed hashing**.
38) • Describe **binary floating-point multiplication**.
39) • Define the term **indexing** in file organization.
40) • Explain the purpose of **underflow in binary numbers**.
41) • Write a **collision resolution algorithm** for hashing.
42) • Explain **mantissa and exponent** in binary floating-point notation.
43) • Describe the use of **ASCII values in a hashing function**.
44) • Write a program to simulate **serial file organization**.
45) • How do **hashing algorithms** prevent data overlap?
46) • Explain the process of **file compression** using RLE.
47) • Describe **memory efficiency** in direct access file handling.
48) • Write pseudocode to **convert hexadecimal to binary**.
49) • Explain **two’s complement arithmetic** in binary systems.
50) • Describe **overflow and underflow** in floating-point representation.