LA CHATELAINE JUNIOR COLLEGE
COMPUTER SCIENCE

CLASS VIII   CHAPTER 6-Binary Number System

I. **Fill in the blanks(1 mark each)**
1. Computer stores the data in the form of numbers.
2. Bit is the smallest unit of data in computer processing.
3. A byte is a group of 8 bits.
4. The binary number 1101 is 4 bits long.
5. 2 is the base of Binary number system.
6. The number of symbols used in the Binary number system is 2.
7. Any number to the power of 0(ex.2^0) has a value 1.
8. The decimal value of 2^3 is 8.
9. The Hexadecimal equivalent of decimal 11 is B.
10. How many unique numeric symbols are used in the decimal number system? (D)ten
    A) unlimited B) nine C) one D) ten

II. **True or False(1 mark each)**
1. 10110111 is a byte and can represent data like text or sound in a computer. TRUE
2. 8 is the base of Hexadecimal Number system. FALSE
3. Hexadecimal Number system has numbers and alphabets as its allowed symbols. TRUE
4. The number of symbols used in Octal Number System is 5. FALSE
5. The Hexadecimal symbol F denotes 15 in decimal number system . FALSE

III. **Match the following(1 mark each)**
1. KB   1024 megabytes [3]
2. Byte   1024 bytes[1]
3. GB   1024 gigabytes [5]
4. MB   1024 kilobytes[4]
5. TB   8 bits[2]
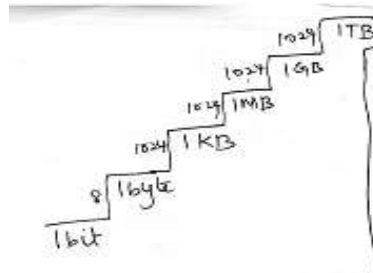
IV. **Answer in one word/two words(1 mark each)**
1. What are the possible values of a bit? 0 and 1
2. Which is the standard unit of storage in a computer? Byte.
3. What is the base of Hexadecimal number system ? 16
4. Which of the following is the correct representation of a binary number?
   a) $(124)_2$ b) 1110   c) $(110)^2$ d) $(110)_2$
5. Which of the following is not a positional number system?
   a) Roman Number System   b) Octal Number System
   c) Binary Number System   d) Hexadecimal Number System
6. What is the storage occupied by an alphabet. 1 byte/8 bits

7. What is the code for the upper case alphabets? 010
8. What is the code for the lower case alphabets? 011
9. Does A and a has the same binary number representation? No
10. What is the decimal representation of the alphabet D? 4

V. **Answer in one or two sentences(2 marks each)**
1. Rearrange the storage units in the ascending order.(from smallest to largest)
   Gigabyte, Kilobyte, Bit, Byte, Megabyte
   Bit, Byte, Kilobyte, Megabyte, Gigabyte.
2. What is the number system followed by this notation $(31)_8$.Also denote its base.
   Octal Numbersystem. The subscript 8 denotes the base.
3. What are the allowed symbols of Binary Number system? 0 and 1
4. What are the allowed symbols of a Hexadecimal System?
   0,1,2,3,4,5,6,7,8,9,A,B,C,D,E,F.
5. What are the allowed symbols of Octal Number System?
   0,1,2,3,4,5,6,7
6. What are the allowed symbols of Decimal Number System?
   0,1,2,3,4,5,6,7,8,9
7. In the binary number 1101000**1** , how is the highlighted bit is called and why?
   It is called as Least Significant bit as it has the lowest positional weight.

1	1	0	1	0	0	0	1
2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0

8. In the binary number **1**1010001 ,how is the highlighted bit is called and why?
   It is called as Most Significant bit as it has the highest positional weight.
9. If each keyboard input is one byte long, how many bytes will the following word occupy
   HELLO WORLD 11

H	E	L	L	O		W	O	R	L	D
1	1	1	1	1	1	1	1	1	1	

10. Represent the word *an* as binary code.(given decimal equivalents of a=1 and n=14)

VI. **Answer the following in brief(3 marks each)**
    Conversion Chart

I
Dec.to Bin
" to Hex
" to Oct
(Repeated Div Method)

II
Bin to Dec
Hex to Dec
Oct to Dec
(Posnl. Wt. Method)

III
Oct to Bin
→ (3 bit bin equiv of each oct. digit)
Bin to Oct
→ (Group in 3 bits & write equiv. octal)

IV
Hex to Bin
→ (4 bit bin equiv of each Hex digit)
Bin to Hex
→ (group in 4 bits & write equiv. Hex)

v Hex → Oct ⇒ (Hex – Bin–Oct)
Oct → Hex ⇒ (Oct – Bin–Hex)

---
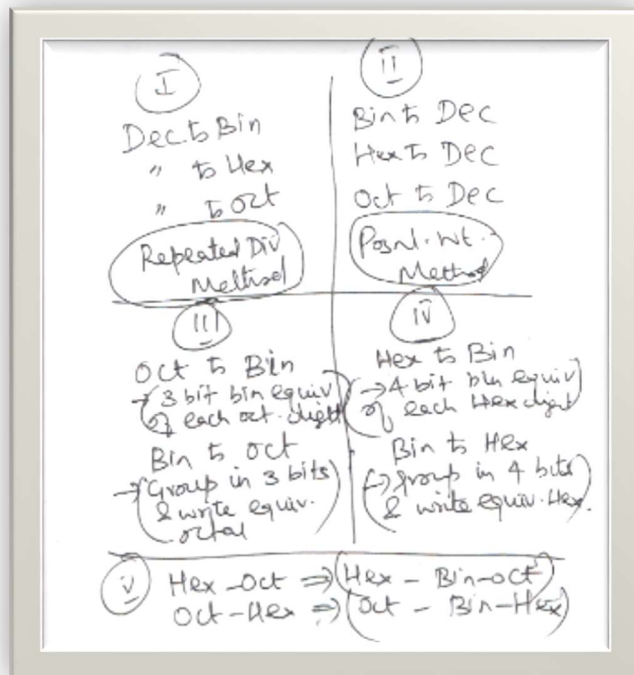
1. Convert the decimal number 26 to binary.
   Repeated Division Method

$$
\begin{array}{r}
2\,|\,26 \\
2\,|\,13-0 \\
2\,|\,6-1 \\
2\,|\,3-0 \\
2\,|\,1-1 \\
0-1
\end{array}
$$

$(11010)_2$

2. Convert $(A6)_{16}$ to decimal.
   Positional Weight Method

$$(A6)_{16}$$
$$10 \times 16^1 + 6 \times 16^0$$
$$160 + 6 = (166)_{10}$$

$(11010)_2$ to octal
Note:- Group in 3 bits & write octal equivalent

$$\underset{3}{\underbrace{011}} \quad \underset{2}{\underbrace{010}}$$

$$\therefore 32_8$$

3. Convert $(11010)_2$ into octal number

4. Convert (1101011100111)$_2$ to hexadecimal.

$$1101011100111_2 \text{ to hex}$$

(Note:- group in 4 bits & write
hex. equivalent)

$$\underset{\downarrow}{\underset{1}{\overset{8\,4\,2\,1}{0001}}} \quad \underset{A}{\underset{\times}{\overset{8\,4\,2\,1}{1010}}} \quad \underset{E}{\underset{\downarrow}{\overset{8\,4\,2\,1}{1110}}} \quad \underset{7}{\underset{\downarrow}{\overset{8\,4\,2\,1}{0111}}}$$

$$\boxed{(1\,A\,E\,7)_{16}}$$

5. Convert decimal 33 to octal.
   Repeated Division Method

$$8\,\underline{|33}$$
$$8\,\underline{|4-1} \quad \uparrow \quad \boxed{(41)_8}$$
$$0-4$$

VII. **Answer the following in detail(5 marks each)**

1. (EE2)$_{16}$ = (?)$_2$

$$\left(EE\,2\right)_{16} = (?)_2$$

Note :- write 4 bit binary
equiv. of each Hex
diget, E=14

$$\underset{1110}{\underset{8\,4\,2\,1}{E}} \quad \underset{1110}{\underset{8\,4\,2\,1}{E}} \quad \underset{0010}{\underset{8\,4\,2\,1}{2}}$$

$$\therefore \boxed{(111011100010)_2}$$

2. Convert octal 377 to binary.

$$(377)_8 = (?)_2$$

Note :- write 3 bit
equivalent binary of
each octal diget

$$\underset{011}{\underset{4\,2\,1}{\overset{3}{\downarrow}}} \quad \underset{111}{\underset{4\,2\,1}{\overset{7}{\downarrow}}} \quad \underset{111}{\underset{4\,2\,1}{\overset{7}{\downarrow}}}$$

$$\therefore \boxed{(011111111)_2}$$

3. The decimal equivalent of binary 110101 is _____.

$$(1\ 1\ 0\ 1\ 0\ 1)_2$$
$$\downarrow\ \downarrow\ \downarrow\ \downarrow\ \downarrow\ \downarrow$$
$$2^5\ 2^4\ 2^3\ 2^2\ 2^1\ 2^0$$

Note: Posnl. wt. method

$$(1 \times 2^5) + (1 \times 2^4) + 0 +$$
$$(1 \times 2^2) + 0 + (1 \times 2^0)$$

$$= 32 + 16 + 4 + 1$$
$$= \boxed{(53)_{10}}$$

4. Convert octal 54 to decimal.

$$(54)_8 = (?)_{10}$$

$$\begin{array}{cc} 5 & 4 \\ 8^1 & 8^0 \end{array} \rightarrow \text{Posnl. Wt. method}$$

$$(5 \times 8^1) + (4 \times 8^0)$$
$$= 40 + 4 = \boxed{(44)_{10}}$$

5. Convert the decimal number 210 to its Hexadecimal equivalent.

$$(210)_{10} = (?)_{16}$$

Repeated Div. Method

$$\begin{array}{r} 16 \underline{|210} \\ 16 \underline{|13 - 2} \\ 0 - 13 \\ \downarrow \\ (D) \end{array}$$

$$\therefore \boxed{D2}_{16}$$

$$\begin{array}{r} 13 \\ 16\overline{|210} \\ \underline{16} \\ 50 \\ \underline{48} \\ 2 \end{array}$$

....