Q. $(00111110.01011001)_2 = (\ )_{16}$

0011 | 1110 . 0101 | 1001

3 E . 5 9 → $(3E.59)_{16}$

Q. 10111

11 0001 → 10111 + 110001 → 1001000

1001000

Q. 1011001

111010 → 1011001 + 111010 → 10010011

10010011

Q. 11100 − 0110 = 110

Q. 916 + 1010 = 0011 = 111

Q. 11101 − 1011 = 0010

Q. 1001 − 0111 = 0010

Q. 10010011 + 10000111 = 100001100

Q. 100 × 1010

000

1 00 ×

00 0 ××

01000

Q. 0010 × 1101

0010

0000×

0010××

0010××

011010

Q. 10101 − 00111 → 1's complement → 11000

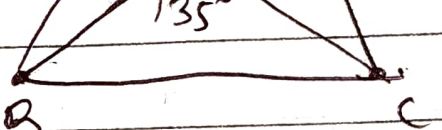
10101 + 11000 = 01101

01101 + 00001 → 01110

10110 Ans

Q. 10101 → 1's complement → 01000

10101 + 01000 = 11101



(1) $(1\,1\,1\,0\,1\,1)_2 = (\quad 59 \quad)_{10}$ (positions $5\,4\,3\,2\,1\,0$; 2^0)

(2) $1\times2^5 + 1\times2^4 + 1\times2^3 + 0\times2^2 + 1\times2^1 + 1\times2^0$

$2^5 + 2^4 + 2^3 + 2 + 1$

59

(3) $(1\,1\,1\,0\,0\,1\,0\,1)_2$ (positions $7\,6\,5\,4\,3\,2\,1\,0$) $= 1\times2^7 + 1\times2^6 + 1\times2^5 + 1\times2^2 + 1\times2$

$= 2^7 + 2^6 + 2^5 + 2^2 + 1$

$= 229$

(4) $(1\,1\,1\,0\,1)_2$ (positions $4\,3\,2\,1\,0$) $= 29$

(5) $(0\,1\,0\,1\,1\,0\,1)_2$ (positions $6\,5\,4\,3\,2\,1\,0$) $=$

$4\,3\,2\,1\,0 \cdot 2^{-1} - 2 - 3 - 4$

←

(4) $(1\,1\,1\,0\,1)_2$ (positions $4\,3\,2\,1\,0$) $= 2^4\times1 + 2^3\times1 + 2^2\times1 + 2^0\times1$

$= 29$

(5) $(0\,1\,0\,1\,1\,0\,1)_2$ (positions $6\,5\,4\,3\,2\,1\,0$) $= 2^5\times1 + 2^3\times1 + 2^2\times1 + 2^0\times1$

$= 45$

Convert to decimal

(i) $(715)_8 \rightarrow 7\times8^2 + 1\times8^1 + 5\times8^0$

$\Rightarrow 461$

(ii) $(825)_8 \rightarrow 8\times8^2 + 2\times8^1 + 5\times8^0$

$\Rightarrow 533$

(iii) $(845)_8 \rightarrow 8\times8^2 + 4\times8^1 + 5\times8^0$

$\Rightarrow 549$

(iv) $(765)_8 \rightarrow 7\times8^2 + 6\times8^1 + 5\times8^0$

$\Rightarrow 501$

(v) $(665)_8 \rightarrow 6\times8^2 + 6\times8^1 + 5\times8^0$

$\Rightarrow 437$

(v) $(34.72)_8 \rightarrow 3\times8^1 + 4\times8^0 \cdot 7\times8^{-1} + 2\times8^{-2}$

$\Rightarrow 28.90625$

(vi) $(ABCDEF)_{16} \rightarrow (10\times16^5) + (11\times16^4) + (12\times16^3) + (13\times16^2) + (14\times16) + (15\times16^0)$

$\Rightarrow 11259375$

A → 10
B → 11
C → 12
D → 13
E → 14
F → 15

(vii) $(1F.01B)_{16} = (1\times16^{1}) + (15\times16^{0}) + (0\times16^{-1}) + (1\times16^{-2}) + (11\times16^{-3})$

$= 31.046875$

(viii)

2	27	
2	13	1
2	6	1
2	3	0
.	1	1

$\Rightarrow (11011)_2$

(ix) $0.125 \times 2 = 0$

$0.25 \times 2 = 0$

$0.5 \times 2 = 1$

0.001

2
8
10
16

(x) $(567)_{10} \rightarrow (\quad)_8$

8	567	=
8	70	7
8	8	6
	1	0

(xi) $965_{10} \rightarrow (\quad)_8$

8	965	
8	120	5
8	15	0
	1	7

$\Rightarrow (1705)_8$

0	3509
1	

DB5

0.DB64

	0	000
	1	001
	2	010
5	3	011
3	4	100
6	5	101
5	6	110
6	7	111
0		

421 → 110100101

100 010 001

~~100100~~

$(145)_8$ =

1	4	5
421	421	421
001	100	101

$\Rightarrow (001\,100\,101)_2$

$(234)_8$ =

2	3	4
421	421	421
101	011	100

$\Rightarrow (101\,011\,100)_2$

4	0100
5	0101
6	0110
7	0111
8	1000
9	1001
A	1010
B	1011
C	1100
D	1101
E	1110
F	1111

$(234.56)_8 = (010\,011\,100.101110)_2$

$(124.05)_8 = (001010100.000101)_2$

Assignment-1

Q1. ① $(47A \cdot BC)_{16} = (\ )_{10}$ (positions 3 2 1 0)

$= 4\times16^3 + 7\times16^2 + 8\times16^1 + 10\times16^0 + 11\times16^{-1} + 12\times16^{-2}$

$= (18314.734375)_{10}$

② $(975.55)_{10} = (\ )_2$

2	975	
2	487	1
2	243	1
2	121	1
2	60	1
2	30	0
2	15	0
2	7	1
2	3	1
2	1	1
	0	1

$0.55\times2 = 1.10$
$0.10\times2 = 0.20$
$0.20\times2 = 0.40$
$0.40\times2 = 0.80$
$0.80\times2 = 1.60$
$0.60\times2 = 1.20$
$0.20\times2 = 0.40$
$0.40\times2 = 0.80$

$(975.55)_{10} \Rightarrow (1111001111.10001100)_2$

③ $(11001100.10)_2 = (\ )_{16}$ (positions 7 6 5 4 3 2 1 0)

$= 1\times2^7 + 1\times2^6 + 1\times2^3 + 1\times2^2 + 1\times2^{-1}$

$= (204.5)_{10}$

④ $(15.235)_{10} = (\ )_8$

$= 8\,|\,15$

1	7
0	1

$0.235\times8 = 1.88$
$1.88\times8 = 7.04$
$7.04\times8 = 0.32$
$0.32\times8 = 2.56$
$2.56\times8 = 4.48$
$4.48\times8 = 3.84$

$(15.235)_{10} \Rightarrow (17.170244)_8$

⑤ $(251)_{10} = (\ )_2 = (\ )_8 = (\ )_{16}$

$\Rightarrow 2\,|\,251$

2	125	1
2	62	1
2	31	0
2	15	1
2	7	1
2	3	1
	1	1

$\Rightarrow (251)_{10} = (11111011)_2$

8	251	
8	31	3
8	3	7
	0	3

$\Rightarrow (251)_{10} = (373)_8$

16	25	
16	F	B
	0	F

$\Rightarrow (251)_{10} = (FB)_{16}$

(6) $(141)_{10} = (\ )_2 = (\ )_8 = (\ )_{16}$

2	141	
2	70	1
2	35	0
2	17	1
2	8	1
2	4	0
2	2	0
	1	0

$\Rightarrow (141)_{10} = (10001101)_2$

8	141	
8	17	5
8	2	1
	0	2

$\Rightarrow (141)_{10} = (215)_8$

16	141	
16	8	D
	0	8

$\Rightarrow (141)_{10} = (8D)_{16}$

(7) $(0\,1\,1\,0\,1\,0\,1\,1\,1\,1\,0\,1\,0\,0\,1\,1\,0\,0)_2 = (\ )_{10} = (\ )_8 = (\ )_{16}$

~~$2\times10^{16} + 2\times10^{15} + 2\times10^{13} + 2\times10^{11} + \dots$~~

$\Rightarrow 1\times2^{16} + 1\times2^{15} + 1\times2^{13} + 1\times2^{11} + 1\times2^{10} + 1\times2^{9} + 1\times2^{8} + 1\times2^{6} + 1\times2^{3} + 1\times2^{2}$

$\Rightarrow (110412)_{10}$

$\Rightarrow$

421	421	421	421	421	421
011	010	111	101	001	100
↓	↓	↓	↓	↓	↓
3	2	7	5	1	4

$\Rightarrow (327514)_8$

8421	8421	8421	8421	8421
0001	1010	1111	0100	1100
↓	↓	↓	↓	↓
1	A	F	4	C

$\Rightarrow (1AF4C)_{16}$

(8) ~~(25.5)8~~ $(235.4)_8 = (\quad)_{16}$

16	235	
16	9	D
	0	9

$0.5 \times 16 = 8.0$

~~$0.4 \times 16 = 8.0$~~

$\Rightarrow (90.8)_{16}$

(9) $(5214)_{10} = (\quad)_{16}$

16	5214	
16	325	E
16	20	5
16	1	4
	0	1

$\Rightarrow (145E)_{16}$

(10)

2	1011	
2	505	1
2	252	1
2	126	0
2	63	0
2	31	1
2	15	1
2	7	1
2	3	1
2	1	1
	0	1

$\Rightarrow (1011)_{10} = (1111110011)_2$

(xi) $(5A8)_{16} = (\ )_8$

$= 5\times16^2 + 10\times16^1 + 8\times16^0 = (1448)_{10}$

8	1448	
8	181	0
8	22	5
8	2	6
	0	2

$\Rightarrow (5A8)_{16} = (2650)_8$

(xii) $(5214.254)_{10} = (\ )_{16}$

$5\times16^3 + 2\times10^2 + 16 + 4 + 2\times16^{-1} + 5\times16^{-2} + 4\times(16)^{-3}$

$(21012.145507812)_{16}$

(xiii) $(7F2.97)_{16} = (\ )_8$

0 11 111 110 010 . 100 101 110

3 7 6 2 . 4 5 6

$(3762.456)_8$

(xiv) $(24.25)_{10} = (\ )_2 = (\ )_{16}$

2	24	
2	12	0
2	6	0
2	3	0
	1	1

$0.25\times2 = 0.50$

$0.50\times2 = 1.00$

$\Rightarrow (.1000.01)_2$

$\Rightarrow (18.4)_{16}$.

(xvii) $(56)_{10} = (\ )_2 = (\ )_{16}$

2	56	
2	28	0
2	14	0
2	7	0
2	3	1
2	1	1
	0	1

$\rightarrow (111000)_2$

$\Rightarrow (1C)_{16}$.

(xviii) $(133.15)_{10} = (\ )_2 = (\ )_{16}$

2	133	
2	66	1
2	33	0
2	16	0
2	8	0
2	4	0
2	2	0
2	1	0
	0	1

$\rightarrow (1000\,0101 \cdot (0010\,0011))_2$

$\downarrow$

$0010\ 0010\ 1101 \cdot 0010\ 0110$

$\cdot\ 4\ 5 \cdot 2\ 6$

$(45.26)_{16}$

$0.15 \times 2 = 0.3$	
$0.3 \times 2 = 0.6$	
$0.6 \times 2 = 1.2$	
$0.2 \times 2 = 0.4$	
$0.4 \times 2 = 0.8$	
$0.8 \times 2 = 1.6$	
$0.6 \times 2 = 1.2$	

(xix) $(752)_8 = (\ )_{16}$

$0001 \mid 1110 \mid 1010$

$1 \quad E \quad A \rightarrow (1EA)_{16}$ ✓

(xx) $(678)_{10} = (\ )_3$

3	678	
3	226	0
3	75	1
3	25	0
3	8	1
	2	2

$\rightarrow (221010)_3$ ✓

Que 2. Peripheral is a hardware input or output device that gives a computer additional functionality.

Different types of printers are :-

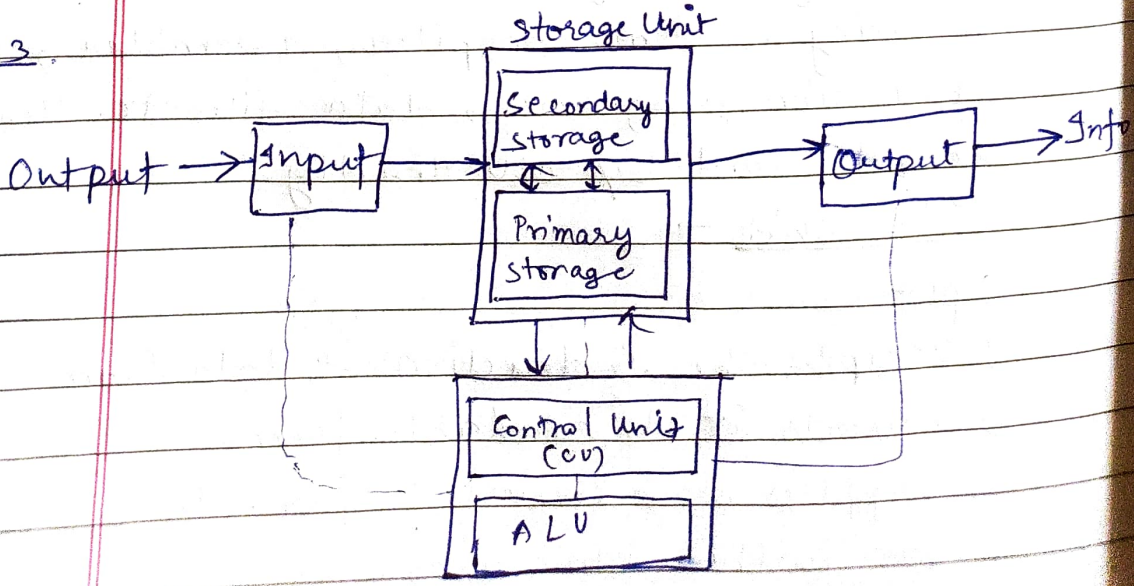
① Laser Printer → It uses laser technology to print text, pictures etc. Produces fast results, low noise, small and not much expensive.

② LED Printer → It uses LED instead of laser lights. It has no moving parts and hence more reliable, Consumes less energy, fast printing and affordable price.

③ Inkjet Printer → Uses cartridges or tubes of ink and propelling nozzle strikes paper to print.

④ Dot-Matrix Printer → It is an old generation printer, it uses pins ranging 9 to 24 which is attached to its printing head. which further strikes on paper to make characters.

Que 3.



① CPU → It is the brain of the computer where all kind of processing is done. It takes input from the user and process it according to the set of instruction called program.

It has two major parts →

① Arithmetic and Logic Unit

② Control Unit

→ It does all the logical operations.

→ It is mainly used to generate the electronic signals for the synchronization of various operations.

② Memory → It is an analogous type of notebook where one may note down various things for future reference.

→ Primary Memory → It is the main memory and the fastest; primarily used to store data & program temporarily during the execution of a program.

→ Secondary Memory → It is used to store the operating system, compiler, assembler, application programs, data files etc. those are not read by CPU directly.

③ I/O Unit →

→ Input

① accepts the instructions & data from user.

② Converts it to readable form.

③ Supplies the converted form to system for further processing.

→ Output

① Accepts the result produced by the computer and provides it to the user.

② Converts to high level language.

Que 4. Difference b/w assembly & machine language :-

→ Assembly language →

① It is the intermediate form programming language between high level programming language & machine language.

② Programmer can understand it but system cannot.

③ It is a set of instructions which is same irrespective of platform

→ Machine language →

① It is a low level language.

② CPU can directly understand machine language No need of compiler or assembler.

③ It differs from platform to platform.

Que 5.

Time Sharing	Multi-Tasking
① The process of sharing a computing resource among many users by means of multiprogramming & multitasking at the same time.	① The concurrent execution of multiple tasks or processes over a certain period of time.
② Allows multiple users at a time.	② Allows multiple tasks at a time.

6. Optical Storage → It is one of the type of storage that is semi-permanent. Even without electricity it will store the data. It uses light to create different grooves in the substance to which write the data on it. It is currently being discarded as a storage medium. Examples are CD, DVD. Although it is not completely dead yet. We still use Blu-ray disks.

Magnetic Storag → It uses a coating of special substance that is magnetized. To store data in it. This is the method of storing data that has seen the most widespread use and is still being used now. Example - Hard disk drive.

Tracks → are a stripe of circular data in a magnetic disk. It is the area that can be used for writing and reading data.

Sectors are a subdivision of tracks they are thus so that the operating system can locate data easily if there are no track or sector the operating system has to store the exact location which will take a lot of space & time.

7. An operating system is a software that is designed to connect the user usable programs and the hardware without each program having to design itself for any

different hardware. The job of O.S. is to convert the code to the machine language that can further be processed
Eg → Linux, Android, Windows etc.

(8) Compiler → It converts the entire code into machine code at once, and is slow due to this.

Interpreter → Converts the code line by line into machine language. And is a fast.