on 1:- (1)

128K bits

1K = 2^{10} bits

128K = 128×2^{10} = 131072 bits

(b) 32M bits

1M = 2^{20} bits

32M = 32×2^{20} = 33554432 ≈ 3.4×10^7 bits

(6)

(c) 8G bits

1G = 2^{30} bits

8G = 8×2^{30} = 8589934592 = 8.6×10^9 bits

Question 2:-

(a) 64K bits = ? M bits

$64 \times 2^{10} = y \times 2^{20}$

$y = \frac{64 \times 2^{10}}{2^{20}}$

$y = 0.0625 = 6.25 \times 10^{-2}$

(2)

64K bits = 0.0625 M bits

(b) 9G bits = ? M bits

$9 \times 2^{30} = y \times 2^{20}$

$y = \frac{9 \times 2^{30}}{2^{20}} = 9216 \approx 9.2 \times 10^3$

~~$y = 9437184 = 9.4 \times 10^6$~~

~~9G bits = 9.4×10^6 M bits~~

9G bits = 9.2×10^3 M bits

Question 3:-

(a) $(369.3125)_{10}$

First Into Binary:-

2	369
2	184 - 1
2	92 - 0
2	46 - 0
2	23 - 0
2	11 - 1
2	5 - 1
2	2 - 1
	1 - 0

101110001

$(369.3125)_{10} = (101110001.0101)_2$

0.3125 × 2 = 0.625 ⇒ 0

0.625 × 2 = 1.25 ⇒ 1

0.25 × 2 = 0.5 ⇒ 0

0.5 × 2 = 1 ⇒ 1

0101

Into Octal:

(2)

8	369
8	46 - 1
	5 - 6

561

0.3125 × 8 = 2.5

0.5 × 8 = 4.0

0 × 8 = 0

.24

$(369.3125)_{10} = \boxed{(561.24)_8}$

Into Hexadecimal:

16	369
16	23 - 1
	1 - 7

171

0.3125 × 16 = 5.0

0 × 16 = 0

.5

(5)

$369.3125 = \boxed{(171.5)_{16}}$

(b) $(10111101.101)_2$.

First Into Octal:

Making Groups of 3

010 111 101 . 101

2 7 5 5

$\boxed{(2755)_8}$

Into Hexa-Decimal:

Making Groups of 4

1011 1101 . 1010

B 13(D) 10(A)

$\boxed{(BD.A)_{16}}$

(5)

Into Decimal:

$1\times2^7 + 0\times2^6 + 1\times2^5 + 1\times2^4 + 1\times2^3 + 1\times2^2 + 0\times2^1 + 1\times2^0 + .1\times2^{-1} + 0\times2^{-2} + 1\times2^{-3}$

$128 + 0 + 32 + 16 + 8 + 4 + 0 + 1 + 0.5 + 0 + 0.125$

$\boxed{(189.625)_{10}}$

(3)

$(326.5)_8$

Into Decimal:-

$3\times8^2 + 2\times8^1 + 6\times8^0 + .5\times8^{-1} = 192 + 16 + 6 + 0.625 = (214.625)_{10}$

Into Binary:-

3 2 6 . 5

011 010 110 101

$(011010110.101)_2$

Into Hexa-Decimal:-

0000 1101 0110 . 1010

0 D (13) 6 A

$(D6.A)_{16}$

5 } Dividing into Groups Of Four.

(d) $(F3C7.A)_{16}$

Into Binary:- → 0111

F 3 C 7 . A

1111 0011 1100 0111 . 1010

$(1111\ 0011\ 1100\ 0111.1010)_2$

Into Octal:-

001 111 001 111 000 111 . 101 000

1 7 1 7 0 7 5 0

$(171707.5)_8$

Into Decimal:-

$15\times16^3 + 3\times16^2 + 12\times16^1 + 7\times16^0 + 10\times16^{-1}$

$= 61440 + 768 + 192 + 7 + 0.625$

$= 62407.625$

$(62407.625)_{10}$

5

(4)

Question 4:-

(a) 7562.45 to Octal

8	7562
8	945 - 2
8	118 - 01
8	14 - 6
	1 - 6

16612

$0.45 \times 8 = 3.6$
$0.6 \times 8 = 4.8$
$0.8 \times 8 = 6.4$
$0.4 \times 8 = 3.2$

.3463

(2)

$7562.45 = \boxed{(16612.3463)_8}$

(b) 1938.257 to ~~Binary~~ Hexa-Decimal.

16	1938
16	121 - 2
	7 - 9

792

$0.257 \times 16 = 4.112$
$0.112 \times 16 = 1.792$
$0.792 \times 16 = 12.672$

(2)

$1938.257 = (792.41C)_{16}$

(c) 175.175 into Binary

2	175
2	87 - 1
2	43 - 1
2	21 - 1
2	10 - 1
2	5 - 0
2	2 - 1
	1 - 0

10101111

$0.175 \times 2 = 0.35$
$0.35 \times 2 = 0.70$
$0.70 \times 2 = 1.40$
$0.40 \times 2 = 0.80$
$0.80 \times 2 = 1.60$
$0.60 \times 2 = 1.20$

(2)

$(10101111.001011)_2$

25.305 into base 8 ⑤

8	25
	3 – 1
	31

(2)

0.305 × 8 = 2.44
0.44 × 8 = 3.52
0.52 × 8 = 4.16

$(31.234)_8$

Question 5

(a) $(BEE)_r = (2699)_{10}$

Determining if it is 16:

$B \times 16^2 + E \times 16^2 + E \times 16^0 = 11 \times 16^2 + 14 \times 16^2 + 14 \times 16^0 = 3264$

It is not equal to 2699, so the r is not 16

Now, Checking if it is 15:

Note:- the least value r can have is 15, because below 15 base system, E is not represented

$B \times 15^2 + E \times 15^2 + E \times 15^0 = 11 \times 15^2 + 14 \times 15^2 + 14 \times 15^0 = 2699$

So, $r = 15$

(b) $(365)_r = (194)_{10}$

Note:- The least value r can have is 7, because below base 7 system, 6 cannot be represented.

So, Checking for Base 7:

(2)

$3 \times 7^2 + 6 \times 7^2 + 5 \times 7^0 = 147 + 42 + 5 = 194$

So, $r = 7$

Question 6:-

ⓐ In an ASCII code, the uppercase and the lowercase letters have a dif of 32, Forexample B→66 AND b→98 (98-66=32)

$\sum_{i=0}^{n-1} 2^i$ $2^5 = 32$ 6th ✓ (1.5) 5 is the number that is only used to generate the value for the coding scheme you use.

So, it is the [5th] bit position that must be complemented

if we have n bits than we have n positions similarly if we have 8 bits than we have 8 position and to calculate the value of that position we use (n-1) like (6-1)=5

ⓑ 1001000 1100101 1101100 1101100 1101111 0101110

1001000	1100101	1101100	1101100	1101111	0101110
$1\times2^6+1\times2^3$	$1\times2^6+1\times2^5+1\times2^2+1\times2^0$	$1\times2^6+1\times2^5+1\times2^3+1\times2^2$	$1\times2^6+1\times2^5+1\times2^3+1\times2^2$	$1\times2^6+1\times2^5+1\times2^3+1\times2^2+1\times2^1+1\times2^0$	$1\times2^5+1\times2^3+1\times2^2+1\times2^1$
72	101	108	108	111	46
In	The	ASCII	Code	Message	:-
H	e	l	l	o	.

(3) ✓

Question 7:-

(10)

Decimal Number	7-Bit	8-Bit Parity	Hexa-Decimal
6	0000110	10000110	1000 0110 → 8 6 → 86 ✓
15	0001111	10001111	1000 1111 → 8 15 → 8F ✓
24	0011000	10011000	1001 1000 → 9 8 → 98 ✓

on 8:-

(7)

$(255)_8$ in

(a) Binary

2	255
2	127 - 1
2	63 - 1
2	31 - 1
2	15 - 1
2	7 - 1
2	3 - 1
2	1 - 1

$(11111111)_2$

(b) BCD

255 :-

2 5 5

0010 0101 0101

$(001001010101)_2$

(c) ASCII

(8)

ÿ (Latin small letter y with diaeresis)

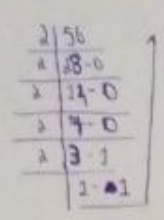
(d) 255 → 11111111

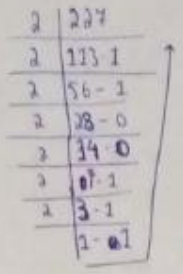
With odd Parity:-

$(111111111)_2$

Question 9:- (8)

(a) 56 AND 227





111000

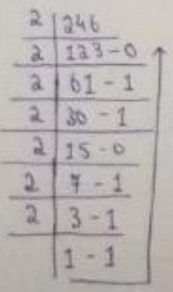
11100011

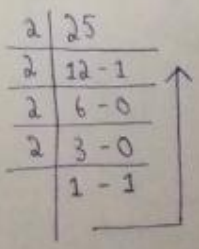
(3)

```
  1 1
  11100011
+   111000
----------
  10001101
```

→ Answer = 1+2+8+16+256 = 283

(b) 246 AND 25





(3)

```
  1 1 1
  11110110
+   11001
----------
  100001111
```

→ Answer = 1+2+4+8+256 = 271

10 AND 284

9

2	2110
2	1055 - 0
2	527 - 1
2	263 - 1
2	131 - 1
2	65 - 1
2	32 - 1
2	16 - 0
2	8 - 0
2	4 - 0
2	2 - 0
	1 - 0

2	284
2	142 - 0
2	71 - 0
2	35 - 1
2	17 - 1
2	8 - 1
2	4 - 0
2	2 - 0
	1 - 0

```
   ①①①①
 100000111110
 +  100011100
 ------------
 100101011010  → Answer
```

$(100101011010)_2$ = ~~...~~ 2 + 8 + 16 + 64 + 256 + 2048

= 2394.

Question 10 :-

ⓐ 01110000 + 10101111

```
  ①①
  01110000
 +10101111
 ---------
 100011111  → Answer.
```

ⓑ 11011001 + 11100111

```
  ①①①①①①①
   11011001
 + 11100111
 ----------
  111000000
```

ⓒ 01100101 − 11101000

01100101 + (−11101000)

01100101 + (00011000) } 2's Complement Taken.

```
  01100101
 +00011000
 ---------
  01111101
```

First Carry is not generated so the number is Negative and in its 2's Complement Form

Now, Again Taking Answer's 2's Complement

i.e

$10000011 = 1\times2^7 + 1\times2^1 + 1\times2^0 = 131$

So, the Answer is −131.

(10)

Q11:-

$\bar{A}(A+B) + (B+A\bar{A})(A+\bar{B}) = A+B$

$A\bar{A} + \bar{A}B + (B+A)(A+\bar{B})$ Distributive Law AND Identity $X.X=X$

$A\bar{A} + \bar{A}B + AB + B\bar{B} + A\bar{A} + A\bar{B}$ Distributive Law (Multiplication)

$0 + \bar{A}B + AB + 0 + A + A\bar{B}$ Identity $X\bar{X} = 0$

$B(A+\bar{A}) + A(B+\bar{B})$ Distribut Law To Take Common $X+X.Z=X$

$B(1) + A(1)$ Identity $X+\bar{X}=1$

$B + A = A+B$

$A+B = A+B.$ (5) Commutative Law $X+Y = Y+X$