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PAGE NO.:
DATE: / /

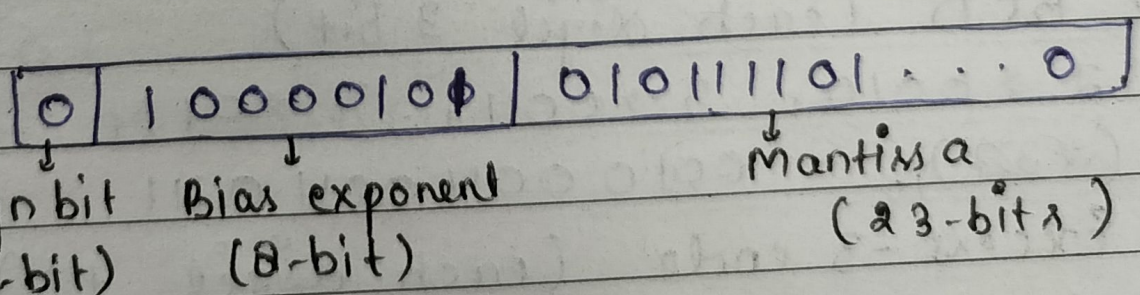
Assignment

Ans-1 Unsigned magnitude
(+35 only, as negative can't be shown)
+35 → 00100011

- Signed magnitude
sign bit → 0 → + , 1 → -
+35 = 00100011
-35 = 10100011
- 1's Complement
+35 = 00100011
-35 = 11011100
- 2's Complement
+35 → 00100011
-35 → 1's complement +1 → 11011100
+1
11011101

Ans-2 $(87.625)_{10} \rightarrow (1010111.101)_2$
$(1010111.101)_2 \rightarrow 1.0101111101 \times 2^6$ (implicit normalised form)

Biased exponent → 6+127 = 133
$(133)_{10} \rightarrow (10000101)_2$



Ans-3 $(+32.25)_{10} \rightarrow (100000.01)_2$
$(100000.01)_2 \rightarrow 1.00000001 \times 2^5$ (implicit normalised form)

PAGE NO.:
DATE: / /

Biased exponent → 5 + 127 = 132

$(132)_{10} = (10000100)_2$

1	10000100	0000001...0

Sign bit (1-bit) | Bias exponent (8-bit) | Mantisa (23-bit)

Ans-4 00111110011011000000000000000000

Sign bit = 0

exponent = 01111100 = 124

actual = 124 - 127 = -3

Mantisa = 1.1101101...0

value = 1.1101101×2^{-3}

$= \frac{1.1101101}{8} = 0.233398437$5 approx.

Ans-5(a) BCD (each digit 4-bit)

6 → 0110, 2 → 0010, 4 → 0100, 8 → 1000

$(6248)_{10}$ → 0110 0010 0100 1000

(b) Excess-3 code (each digit 3-bit)

6 → 9 → 1001, 2 → 5 → 0101, 8 → 11 → 1011, 4 → 7 → 0111

$(6248)_{10}$ = 1001 0101 0111 1011

(c) Gray code

Binary → 1100001101000

Gray → 1010001011100

Ans-6(a) BCD (each digit 3-bit)

2 → 0010, 3 → 0011, 7 → 0111

$(2337)_{10}$ = 0010 0011 0011 0111

(b) Excess-3 code (each digit +3)

2 → 5 → 0101, 3 → 6 → 0110, 7 → 10 → 1010

$(2337)_{10}$ → 0101 0110 0110 1010

PAGE NO.:
DATE: / /

Ans-7. a) BCD (each digit → 4-bit)
$(2467)_{10}$ → 0010 0100 0110 0111

b) Excess-3 Code (each digit → 3-bit)
$(2467)_{10}$ → 0101 0111 1001 1011

Ans-8 a) BCD (each digit → 4-bit
$(1432)_{10}$ → 0001 0100 0011 0010

b) excess-3 code (each digit +3)
$(1432)_{10}$ → 0100 0111 0110 0101

Ans-9 a) BCD (each digit → 4 bit
$(6742)_{10}$ → 0110 0111 0100 0010

b) Excess-3 code
$(6742)_{10}$ → 1001 1010 0111 0101

Ans-10
1000 1001 0111

a) BCD
1000 1001 0111 → 897

b) excess-3
1000 1001 0111 → (8-3)(9-3)(7-3) = 564

c) Binary
1000 1001 0111 → 2199

Ans-11
1110 0010 1

Gray code → 1001 0011 1

Ans-12
0001 1110 1

Binary number → 0001 0100 1

PAGE NO.:
DATE: / /

Ans 13 a) Gray code for 1011 → 1110
b) As only 1 bit changes between successive values → reduces misread errors in mechanical / electronic transitions

Ans-14 a) Binary : 0111 → 1000 (4-bit changed)

b) 0111 → Binary → Gray → 0100
1000 → Binary → Gray → 1100

c) In binary, multiple simultaneous bits flips may register incorrectly. In Gray, only 1-bit flips → safe, reliable detection.