Branch : CSE & IT **Batch : English**

Computer Organization and Architecture

Floating Point Representation

DPP

1. [NAT]

Consider the following 1EEE single precision floating point number shown below.

010000111101 0000 0000 0000 0000 0000

The decimal equivalued of above number is_____.

2. [MCQ]

Consider the hexadecimal representation in IEEE754 signal precision floating number system: 0X43758000. What is the decimal value represented by it?

(a) 245.5 (b) 244.5

(c) 240.5 (d) None of the above

3. [MCQ]

In IEEE 754 single precision floating point standard the number

1111 11111 0000 0000 0000 0000 0000 000 represents.

(a) NAN

(b) $-\infty$

(c) A negative normalized number

(d) None of the above

4. [MCQ]

Consider the following hexadecimal value in the IEEE 754 signal precision floating point number: 0XC4127000, then what is the value represented by it in decimal?

(a) (-585.75) (b) (-586.75)

(c) (–580.75) (d) None of these

5. [MCQ]

What is IEEE 754 32 bits floating point format representation of 16?

(a) 010 00011 0000 0000 0000 0000 0000 0000

(b) 011 000011 0000 0000 0000 0000 0000 000

(c) 0100000111 0000 0000 0000 0000 0000 000

(d) None of the above

6. [MCQ]

Consider the following binary value in 1EEE 754 signal precision floating point number representation.

0 10000111 1111010 0000 0000 0000 0000 what decimal value is it representing?

(a) 300 (b) 400

(c) 500 (d) None of these

Answer Key

1. **(416)**
2. **(a)**
3. **(b)**
4. **(a)**
5. **(a)**
6. **(c)**

Hints & Solutions

1. (416)

S	E	M
1 bit	8 bits	23 bits

0	10000111	101 0000 0000 0000 0000 0000

Value $= 1.M \times 2^{E-127}$
$= 1.1010 \times 2^{135-127}$
$= (1.1010)_2 \times 2^8$
$= (1.625 \times 2^8)$
$= (416)_{10}$

2. (a)

010000 110111 01011 00000 00000 00000
Actual exponent = stored – binary
= 134 – 127
= 7
$= 1.11\ 101011 \times 2^7$
$= 1.111\ 01\ 011 \times 2^7 \times 2^{-8}$
$= 1111\ 010111 \times 2^{-1}$
$= \frac{491}{2} = 245.5$

3. (b)

1	11111111	0000 0000……0
1bit	8bits	23bits
S	E	M

The value + ∞ and – ∞ are represented with an exponent of all ones and a mantissa of all zeros. The sign bit distinguishes between – ∞ and + ∞.

4. (a)

C4127000

1	10001000	00100100111 0000 0000 0000

Exponent = 136 – 127
Actual exponent = 9
So, the number will be $= -1.\ 00100100111 \times 2^9$
$= 100\ 1001\ 00111 \times 2^9 \times 2^{-11}$
$= -2343 \times 2^{-2}$
$= -585.75$
∴ (a) is correct option.

5. (a)

$(16)_{10} = (10000)_2$
$10000 = 1.0000 \times 2^4$
Exponent = 4
Mantissa = all zeros
Exponent stored = 4 + 127 (bias)
= 131

0 10000011 0000 0000 0000 0000 0000 000
Sign bit exponent mantissa

6. (c)

S	E	M
0	10000111	111101 0000 0000 0000 00000

Sign bit is + so it is 0
Exponent = 135 – 127
= 8
Mantissa = 1111101
$= 1.111101 \times 2^8$
$= (1.953125) \times 256$
$= 500$

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