

### 3.3.3 Floating Point Numbers

1.

	-1	1/2	1/4	1/8	1/16	1/32	1/64	1/128	-8	4	2	1
a.	0	1	0	0	0	1	0	1	0	0	1	1
b.	0	0	1	1	1	1	1	1	0	0	0	1
c.	1	0	1	1	1	0	0	0	0	1	1	1
d.	1	0	0	0	0	0	0	0	0	1	0	1
e.	1	0	1	0	0	0	0	0	1	0	1	1
f.	1	0	1	0	0	0	0	0	1	1	0	0

- a.  $(1/2 + 1/32 + 1/128) * 2^3 = 4.5/16 = 4.3125$  [2]
- b.  $(1/4 + 1/8 + 1/16 + 1/32 + 1/64 + 1/128) * (2^1)^1 = (63/64)^1 = 0.984375$  [2]
- c.  $(-1 + 1/4 + 1/8 + 1/16) * (2^7)^1 = (-72)^1 = -72$  [2]
- d.  $(-1 + 0) * (2^5)^1 = (-32)^1 = -32$  [2]
- e.  $(-1 + 1/4) * (2^{-5})^1 = -3/4 * 1/32 = (-3/128)^1 = -0.0234375$  [2]
- f.  $(-1 + 1/4) * 2^4 = -3/4 * 1/16 = -3/64 = -0.046875$  [2]

2.

- a.  $0.1001 * 2^{31}$   
01001000 0011<sup>1</sup> [2]
- b.  $-100.1^1$   
 $-0.1001000 * 2^{31}$   
10111000 0011<sup>1</sup> [3]
- c.  $110.01^1$   
 $0.11001 * 2^{31}$   
01100100 0011<sup>1</sup> [3]
- d.  $0.1^1$   
 $0.1 * 2^{01}$   
0.1000000 0000<sup>1</sup> [3]
- e.  $-110.01^1$   
 $011001 * 2^3$   
 $01100100 * 2^{31}$   
10011100 0011<sup>1</sup> [3]
- f.  $-0.1$   
 $-0.1 * 2^0$   
 $-0.1000000 * 2^{01}$   
 $11000000 * 2^{01}$   
 $10000000 * 2^{-1} * 2^{01}$   
 $10000000 * 2^{-1}$   
10000000 1111<sup>1</sup> [4]

**Total Marks = 30**