10106468 N.Ellul

10. a) 8bit float

- 3 bit exponent 111
- 4 bit mantissa 1111
- 1 bit sign

0.5

↓

0.1 in binary fixed point

↓

Normalized → $1.0 \times 2^{(-1)}$

↓

mantissa = 0000

Convert exponent using excess-3

$-1 + 3 = 2 \rightarrow 010$

sign

0 010 0000 = 0.5

b) 11101010

- 1 → sign
- 6 − 3 = 3 → 2^3
- 1.1010

$2^3 \times 1.1010 = 1101.0$

↓

13

∴ 11101010 = −13

11.

a) Whats the smallest positive number = 00010000

- Large negative exponent
  - 001 in excess 3 is $1 - 3 = -2$
- small mantissa
  - 0000 (only implied 1 stays)

1.0000×2^{-2}

$0.01 = 0.25$

∴ Smallest positive number is 0.25

Assuming 0 is not considered Positive

b) What is the smallest number? 101064168 N.E|U|

- The largest negative number
  - Largest exponent → 110
    - 6 − 3 = 3 (excess-3)
  - Largest mantissa → 1111

implicity: $1.1111 \times 2^{3} = 1111.1$

15.5

−15.5 since negative bit