2) Given, $\beta = 2$, $m = 2$, $e \in [-2, 3]$

The convention is :-

$$\pm (1.d_1 d_2)_2 \times 2^e$$

Smallest number will be

$$= (1.00) \times 2^{-2}$$

$$= 1 \times \frac{1}{4} = \frac{1}{4} = 0.25$$

The Largest number will be

$$= (1.11) \times 2^3$$

$$= 1 \times 2^0 . (1 \times 2^{-1} + 1 \times 2^{-2}) \times 2^3$$

$$= 1 . \left(\frac{1}{2} + \frac{1}{4}\right) \times 8$$

$$= 1.75 \times 8 = 14$$

(Ans.)

4) $B = 2, \quad m = 4, \quad e_{min} = -1, \quad e_{max} = 3$

Normalized system convention:

$\pm (1 \cdot d_1 d_2 d_3 d_4)_2 \times 2^e \; ; e \in [-1, 3]$

~~There are 16 possible numbers~~

The four mantissa bits can be filled with 0 and 1 in 16 possible ways.

For 1 exponent of e, there are 16 numbers

$\therefore$ " 5 " " e, " " 16×5 "

$= 80$ numbers

$\therefore$ There are 80 unique numbers.

(Ans.)

5) Largest number will be

$= (1.1111)_2 \times 2^3$

$= 1.(2^{-1} + 2^{-2} + 2^{-3} + 2^{-4}) \times 8$

$= 1.9375 \times 8$

$= 15.5$

(Ans.)