

* $[E | S | M] \rightarrow 22 \text{ bit} = 32 \text{ bit}$
 $\downarrow \quad \downarrow$
 9 excess 256

o $(13.875)_{10} \rightarrow (1101.111)_2 \Rightarrow 0.1101111 \times 2^4$

$\underline{1000001000110111000...}$ | $\frac{32}{4} = 8 \text{ digit}$
82378000H Ans
 \downarrow
 $5 + 3 = 8 \text{ digit}$

* Floating point Representation

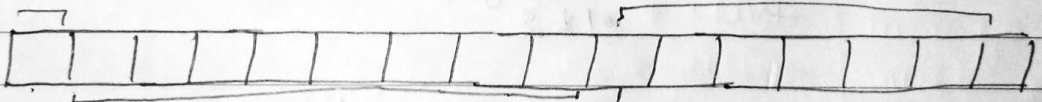
Part 3

* Range

\rightarrow Normalized $\rightarrow .1$
 \rightarrow De normalize $\rightarrow .0$

$[S | E | M]$
 1 8 7

\Rightarrow excess 128



\downarrow
 if 0 then Denormalized else
 normalized

P.T.O

* Normalized

- largest +ve number

$$\begin{array}{c} 0 \\ \hline 5 \end{array} \quad \begin{array}{c} 11111111 \\ \hline e \end{array} \quad \begin{array}{c} 1111111 \\ \hline m \end{array}$$

$$\bullet 1111111 * 2^{255-128}$$

$$\bullet 1111111 * 2^{127} \Rightarrow (1-2^{-7}) * 2^{127}$$

$$1111111 * 2^{120}$$

$$127 * 2^{120} \quad \underline{\text{Ans}}$$

- Smallest -ve number

$$\begin{array}{c} 1 \\ \hline 5 \end{array} \quad \begin{array}{c} 11111111 \\ \hline e \end{array} \quad \begin{array}{c} 1111111 \\ \hline m \end{array}$$

$$- \bullet 1111111 * 2^{255-128}$$

$$- \bullet 1111111 * 2^{127} \Rightarrow (1-2^{-7}) * 2^{127}$$

$$- 127 * 2^{120}$$

- Smallest +ve normalized number :-

$$0 \quad 00000000 \quad \bullet \quad 10000000$$

$$\downarrow$$

$$+ve \quad \bullet 1 * 2^{0-128}$$

$$\bullet 1 * 2^{-128}$$

$$1 * 2^{-129}$$

$$2^{-129} \quad \underline{\text{Ans}}$$

- largest -ve & normalized number

1 0000 0000 1000000

↓

— 01 * 2⁰⁻¹²⁸

— 01 * 9⁻¹²⁸

— 2⁻¹²⁹

Ans

Ans

* Denormalized number

- largest +ve denormalized number

$01111111 \ 011111$
 \downarrow
 $+ \ 01111111 * 2^{255-128} \Rightarrow 111111 * 2^{126}$
 $\ 01111111 * 2^{127} \quad (1 - 2^{-6}) * 2^{-126}$
~~11111111 * 2~~
 $111111 * 2^{120}$
 $63 * 2^{120}$

• Smallest -ve denormalized number

441. — 63 * 2/20 Au

- Smallest +ve normalized number

$$\frac{0}{5} \quad \frac{00000000}{e} \quad \frac{0000001}{M}$$

$$+ .000000001 * 2^{0-128}$$

$$2^{-7} * 2^{-128}$$

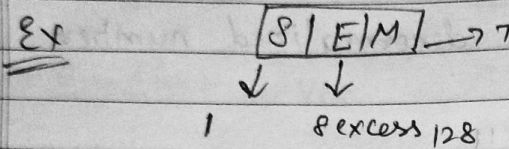
2-135 Aug 2

$$\begin{array}{l} \cdot |x > 2^{-1} \\ \cdot 0| \rightarrow 2^{-2} \\ \quad \quad \quad \downarrow \\ \quad \quad \quad \} \end{array}$$

- largest -ve denormalized number

$$-2^{-135} \text{ Ans}$$

Note • By default number will be in normalized form because there are very less chances of denormalized number



$(3.5)_{10} \rightarrow$ Convert into normalized form

$1101 \Rightarrow$ Binary

$0.111 \times 2^2 \Rightarrow$ Normalized number

Note Rule \Rightarrow After point number should be '0' in denormalized form

$0.111 \times 2^2 \Rightarrow$ Normalized number

many form of denormalized number

• $0.111 \times 2^3 \Rightarrow$	denormalized number
• 0.0111×2^4	_____ "
• 0.000111×2^5	_____ "
• 0.0000111×2^6	_____ "

$0.111 \times 2^3 \Rightarrow$

0	1000	00	11	0	111	000
4180 H						