

## Bài Tập Biểu Diễn Dữ Liệu

1. Answer the following question:
 

Sign bit is 1 and the Exponent field is all 1's and the Mantissa field is all 0's, so this is the special case where the value is -(vocung)

  - a. What is the decimal value of the float **0xFF800000**? ta có: bit sign: 1 bit | bit n = 8 | bit m = 23  
 $2^{(-10)}$
  - b. We are storing scientific data on the order of **2-10** using **32-bit floats**. What is the **minimum number** of these data points, **when multiplied together** (e.g. **a\*b\*c** is 3), that cause **underflow numerical issues**?  
 The smallest denormalized number is given by the encoding of all 0's with a 1 in the least significant bit (i.e. the Mantissa is 22 zeros followed by a one). This has the value of  $2^{(-23)} \times 2^{(-126)} = 2^{(-149)}$ . We then need to multiply  $2^{(-10)}$  fifteen times in a row before we hit  $2^{(-150)}$
2. Answer the following questions
  - a. What is the decimal value of the float **0x3F400000**?
  - b. What is the decimal value of the float **0xC0800000**.
3. Convert decimal number into 32bit IEEE floating point
  - a. -121.6875
  - b. 1.375
  - c. 0.041015625
  - d. -571.3125
  - e. 4091.125
4. Convert float number to decimal
  - a. 0x43263000
  - b. 0x3F820000
  - c. 0xBF820000
  - d. 0x4F840000
  - e. 0x3C860000
- 5.