(1) What is the advantage of using “normalized” format in IEEE-754 standard?

The primary advantage of using “normalization” is to have one additional bit for the significand bits. Thus, the 23 significand bits work as if they were 24 significand bits. The effect of having one more significand bit is to improve the accuracy.

**Note:** Having an additional significand bit does not make the number significantly large.

(2) Show the binary bit patterns for the largest positive number in IEEE-754 floating-point numbers.

```
Sign Bit: 0
Exponent Bits: 111110
Significand Bits: 11111111111111111111
```

(3) What are the five different types of the numbers IEEE-754 floating-point numbers that can not be accurately represented by a processor?

**Note:** This question does not ask descriptions of the five different types of the numbers. Instead, it asks the name of the five different types of the numbers.

“Negative Overflow”, “Negative Underflow”, “Positive Underflow”, “Positive Overflow”, and “Precision Errors”
(4) What are the five basic steps in a processor datapath?

IF (Instruction Fetch)  
ID (Instruction Decode)  
EX (Execution or ALU Operation)  
ME (Memory Access)  
WB (Write Back)

(5) What is “processor clock cycle”?

The processor clock cycle is the minimum work unit (or the minimum time unit) in a processor, where a processor can perform one minimum action (i.e., one stage in a processor datapath). Each processor clock cycle is just like “one hurt beat” in a processor.