(1) What is “Moore’s Law”?  

“Moore’s Law” states that the performance (capacity*) of a computer component doubles in each 18 months.

Note: It is “capacity” that doubles, not “speed”.

(2) What is “Overflow Flag” in a processor (how is it used) for handling operations on two’s complement integers?  

The overflow flag is used to indicate if the output from a mathematical operation on two’s complement integers is correct or not (Overflow Flag = 1: the output is incorrect, Overflow Flag = 0: the output is correct).

(3) What is “processor clock cycle time”?  

Processor clock time is the time for one processor cycle and it is the inverse of the clock cycle rate of a processor (i.e., = 1/R, where ‘R’ represents the clock cycle rate of a processor).
(4) For the following performance metrics for processors, show which way each metric is better:

- **Execution time**: short | long | **short**
- **Clock rate**: low | high | **high**
- **Clock cycle time**: short | long | **short**
- **CPI**: small | large | **small**
- **MIPS rate**: small | large | **large**

(5) What are “super-scalar datapath processors”?

Super-scalar processors are the processors that have more than one scalar datapaths in a processor (as shown in a figure below):

![Diagram of super-scalar processors with multiple datapaths](image-url)