1. Can we implement a computer solution in hardware? If yes, why we need software then?
Ans:
Between hardware and software, hardware provides more speed, software provides more flexibility. Hardware and software are related through the Principle of Equivalence of Hardware and Software. They can solve problems equally, although solutions are often easier in one versus the other.

2. A. How many bytes are in 1 megabyte (MB)?
1,000,000 (or 2^20)
B And How many kilobytes are in 1 megabyte (MB)?
1,000 (or 2^20/2^10=2^10)

3. Briefly explain two breakthroughs in the history of computing.
Ans.
Acceptable answers include explanations of vacuum tubes, transistors, integrated circuits, VLSI, binary arithmetic, quantum computing, and parallel computing.

4. In the von Neumann model, explain the purpose of the:
a) processing unit
b) program counter
Ans.
a) The processing unit performs all of the arithmetic and logic functions.
b) The program counter is responsible for keeping track of the next instruction to fetch.

5. Under the von Neumann architecture, a program and its data are both stored in memory. It is therefore possible for a program, thinking a memory location holds a piece of data when it actually holds a program instruction, to accidentally (or on purpose) modify itself. What implications does this present to you as a programmer?
Ans.
Care must be taken when programming to make sure the code doesn't modify itself in some way. For example, if a memory location holds an instruction (which is represented by a binary number), and a value is added to that instruction, the result could be a valid instruction that is later executed, resulting in an error that is very difficult to track down. The modification of an instruction could also cause a program to crash.