

Name: \_\_\_\_\_

### Computer Processor Test (Out of 36 Marks)

1. In the space provided, describe the type of roles each of these parts have in the modern day CPU: (12)

**ANSWERS SHOULD BE SIMILAR TO THE THESE:**

<b>Instruction Pointer</b>	<b>This tells the CPU where the instruction or data is stored. Before a CPU can process data, it needs to know where the information should be taken from.</b>
<b>Instruction Fetch</b>	<b>Takes the instruction and data from the part of the memory that the instruction pointer specifies.</b>
<b>Instruction Decoder</b>	<b>Takes the instruction from Fetch, and decodes it so that it can be used by other parts of the CPU or the Computer.</b>
<b>Register</b>	<b>One of the more basic parts of memory where the data is stored. It can store data which has been processed or will be processed.</b>
<b>ALU</b>	<b>Arithmetic Logic Unit- used by the CPU to perform the calculations; completes the functions that the instructions tell it to perform.</b>
<b>Control Unit</b>	<b>It specifies when the different operations on the CPU are to be done. For example, it tells the instruction fetch when to fetch data, or the instruction decoder when to decode data.</b>

2. Using some of the CPU parts above, take me through how a piece of data is gathered and processed in the CPU. (5)

First, the instruction pointer tells the instruction fetch where in the memory the instruction is. The fetch takes the instruction and gives it to the decoder, which determines the steps that are necessary to fulfill the instructions. The information is then sent to the ALU, which performs the instructions that need to be performed. This includes adding, subtracting, or manipulating the data further. Finally, the instructions are sent out into the computer where they are needed.

3. Which part is the FPU similar to? What is the role of the FPU in a Processor, and what type of data can it handle really well? (3)

The FPU is similar to the ALU, except it acts as a sort of specialist. It could handle extremely large and extremely small numbers much better than the FPU, allowing greater processing speeds. Also, it can simultaneously process multiple graphics and sounds at a time.

4. What type of information is stored in the Cache? (2)

Information which is needed most by the computer, such as a word processing file or loops.

5. a) What is the MHz Myth? (2)

The MHz Myth is the myth that the speed of the processor is only determined by the MHz.

b) Why does it make it misleading to measure CPU speed solely on MHz? (6)

For a CPU to be fast, it has to have a combination of fast frequency (MHz), efficiency in calculations (FPU and ALU), a bus as wide as possible (currently 32-bit, although Intel and AMD are already working on 64-bit models) as well as a pipeline which has to be as short and efficient as possible. The longer the pipeline, the more time it takes for the CPU to output data. The AMD Athlon has an excellent FPU, which gives its "slower" CPU an edge over the faster clocked Intel Pentium 4. The Athlon also features a shorter, more efficient pipeline, which makes it an excellent choice for personal and professional computers.

6. Why does a CPU benefit from a more efficient pipeline? Why do CPUs with a longer pipeline suffer more from pipeline tax than short ones do? (6)

Pipeline tax causes the CPU to empty all of the data that is currently inside the pipeline. This of course means that the data has to be resent again. The more efficient CPUs benefit because their pipeline is not as long, which means two things. Not as much data is emptied, and the data that has to come in again does not have a lot of "distance" to travel anyways. This is why the more efficient CPUs have an edge over the less efficient CPUs.