# 1 What is multiprogramming?

Multiprogramming is a simple form of parallel processing where multiple programs run at the same time on a system. The operating system executes part of one program, then part of another, and so on, allowing multiple programs to run at the same time.

# 2 Which of the following instructions should be allowed only in kernel mode?

(a) Disable all interrupts.

# 3 Give two reasons why caches are useful…

1. They reduce access time to data by storing frequently accessed data closer to the processor, reducing the need to access slower memory or storage devices.
2. They reduce the amount of data traffic between the processor and memory, which can improve overall system performance.

Caches solve the problem of the speed mismatch between the processor and memory or storage devices. They store frequently accessed data in a faster and smaller memory, reducing the need to access slower and larger memory or storage devices.

If a cache can be made as large as the device for which it is caching, it would eliminate the need for the device. However, making a cache as large as the device is not always practical or cost-effective. Larger caches require more memory and power and can introduce additional latency and complexity to the system.

# 4 Write 4 points to compare between muti-core systems vs multi-processors.

1. Multi-core systems have multiple processors on a single chip, while multi-processors systems have multiple processors on separate chips.
2. Multi-core systems have lower latency and higher bandwidth communication between processors, while multi-processors systems have higher latency and lower bandwidth communication between processors.
3. Multi-core systems have lower power consumption and heat generation, while multi-processors systems have higher power consumption and heat generation
4. Multi-core systems are easier to program and manage, while multi-processors systems are more complex to program and manage

# 5 Define the ALU and identify THREE (3) operations of ALU.

The Arithmetic Logic Unit (ALU) is a digital circuit that performs arithmetic and logical operations.

1. Addition: Adding two binary numbers to produce a sum.
2. Subtraction: Subtracting one binary number from another to produce a difference.
3. Logical AND: Performing a logical AND operation on two binary numbers to produce a result.

# 6 What is the Difference Between L1 L2 and L3 Cache?

L1, L2, and L3 cache are different levels of cache memory in a computer system. L1 cache is the smallest and fastest cache, located closest to the processor. L2 cache is larger and slower than L1 cache, and L3 cache is larger and slower than L2 cache. L1 cache is usually dedicated to a single processor core, while L2 and L3 cache can be shared between multiple cores.