# MICROPROCESSOR (KCS 403)

## 2 Marks Important Questions
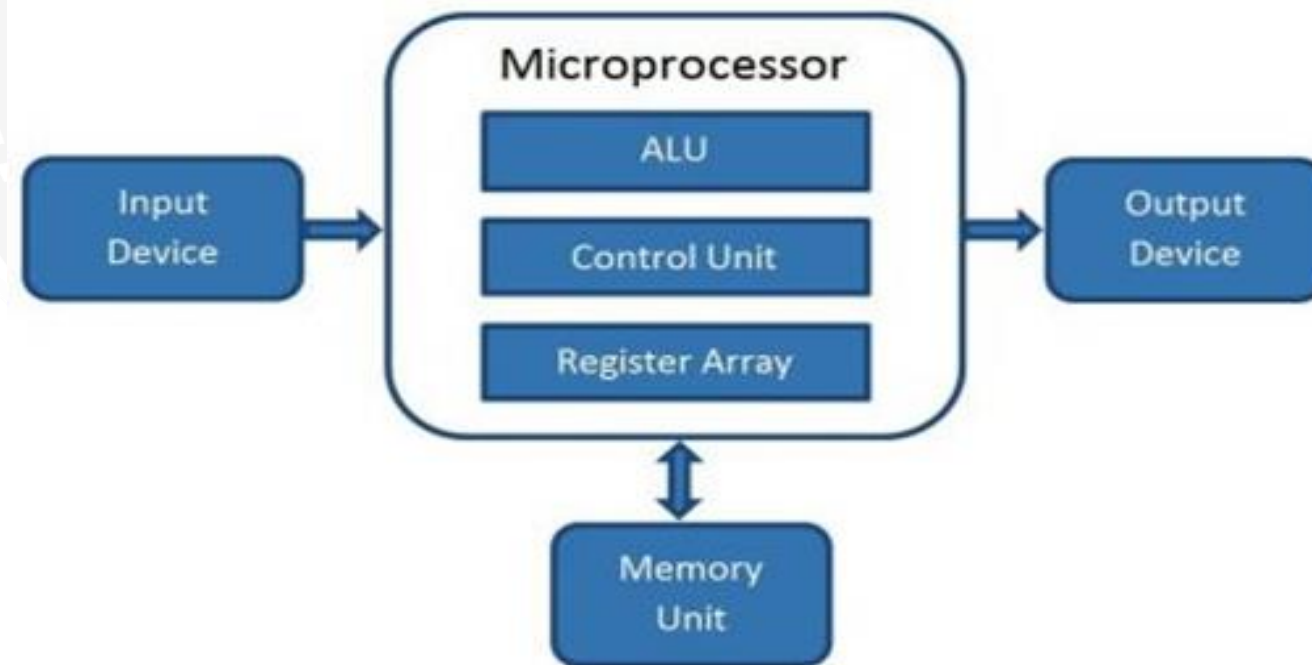
## Q.1- What do you mean by microprocessor?

A microprocessor is basically the brain of the computer. We can also call it simply a processor or CPU. Furthermore, a microprocessor is basically a computer processor that is mounted on a single IC (Integrated Circuit). It means that all the functions of the processor are included on a single chip.

## Q.2- Discuss in brief about the evolution of Microprocessor.

| Name | Year | Transistors | Clock speed | Data width |
|---|---|---|---|---|
| 8080 | 1974 | 6,000 | 2 MHz | 8 bits |
| 8085 | 1976 | 6,500 | 5 MHz | 8 bits |
| 8086 | 1978 | 29,000 | 5 MHz | 16 bits |
| 8088 | 1979 | 29,000 | 5 MHz | 8 bits |
| 80286 | 1982 | 134,000 | 6 MHz | 16 bits |
| 80386 | 1985 | 275,000 | 16 MHz | 32 bits |
| 80486 | 1989 | 1,200,000 | 25 MHz | 32 bits |
| Pentium | 1993 | 3,100,000 | 60 MHz | 32/64 bits |
| Pentium II | 1997 | 7,500,000 | 233 MHz | 64 bits |
| Pentium III | 1999 | 9,500,000 | 450 MHz | 64 bits |
| Pentium IV | 2000 | 42,000,000 | 1.5 GHz | 64 bits |
| Pentium IV "Prescott" | 2004 | 125,000,000 | 3.6 GHz | 64 bits |
| Intel Core 2 | 2006 | 291 million | 3 GHz | 64 bits |
| Pentium Dual Core | 2007 | 167 million | 2.93 GHz | 64 bits |
| Intel 64 Nchalem | 2009 | 781 million | 3.33 GHz | 64 bits |

Q.3- Write the applications of microprocessor.

- Calculators.

- Accounting system.

- Games machine.

- Complex Industrial Controllers.

- Traffic light Control.

- Data acquisition systems.

- Multi user, multi-function environments.

- Military applications.

Q.4- What are the features of 8085 Microprocessor?

- 8-bit data bus.

- 16-bit address bus, which can address upto 64KB.

- A 16-bit program counter.

- A 16-bit stack pointer.

- Six 8-bit registers arranged in pairs: BC, DE, HL.

- Requires +5V supply to operate at 3.2 MHZ single phase clock.

## Q.5- Discuss briefly about the Registers in Microprocessor.

A processor register is one of a small set of data holding places that are part of the computer processor. A register may hold an instruction, a storage address, or any kind of data (such as a bit sequence or individual characters). Some instructions specify registers as part of the instruction.

## Q.6- What do you understand by the Interrupts in Microprocessor?

Interrupt is the method of creating a temporary halt during program execution and allows peripheral devices to access the microprocessor. The microprocessor responds to that interrupt with an ISR (Interrupt Service Routine), which is a short program to instruct the microprocessor on how to handle the interrupt.

## Q.7- What do you mean by ALE.

It is an Address Latch Enable signal. It goes high during first T state of a machine cycle and enables the lower 8-bits of the address, if its value is 1 otherwise data bus is activated.

## Q.8- What do you mean by Program Counter.

This 16-bit register deals with sequencing the execution of instructions. The microprocessor uses this register to sequence the execution of the instructions. The function of the program counter is to point to the memory address from which the next byte is to be fetched.

## Q.9- What do you mean by ALU.

The ALU performs numerical and logical operations. ALU performs the following arithmetic and logical operations.

Addition, Subtraction

Logical AND, Logical OR, Logical Ex - OR

Complement (logical NOT)

Increment, Decrement

Left shift, Right shift etc.

ALU includes the accumulator, the temporary register, the arithmetic and logic circuits and flags. It always stores the results of operations in an Accumulator.

## Q.10- What do you mean by accumulator.

The accumulator is an 8-bit register included as a part of the Arithmetic Logic Unit (ALU). This register is used to store 8-bit data and to perform arithmetic and logical operations. The result of an operation is stored in the accumulator.
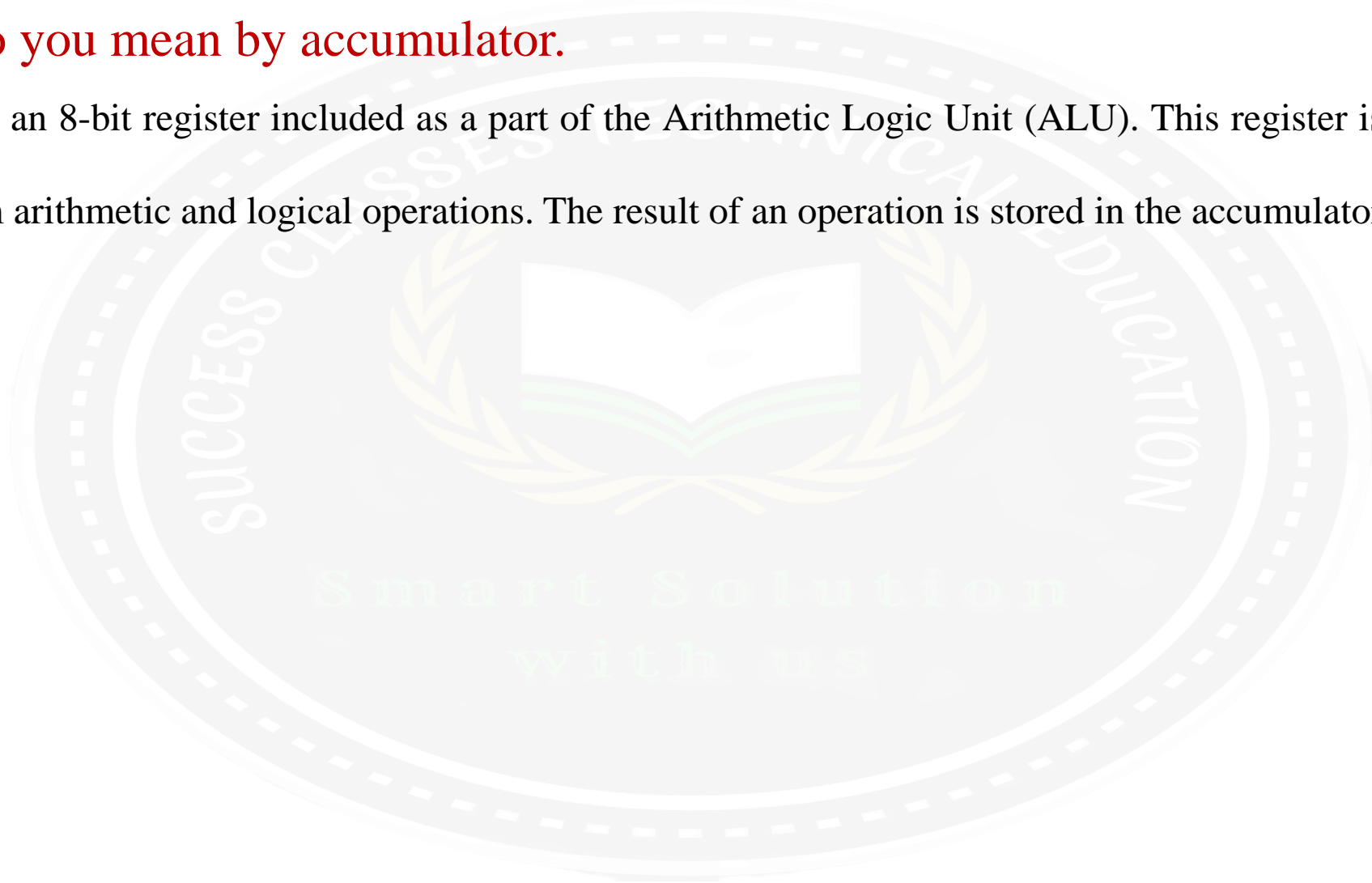
## Q.1- Write the features of 8086 Microprocessor.

The most prominent features of a 8086 microprocessor are as follows −

- It has an instruction queue, which is capable of storing six instruction bytes from the memory resulting in faster processing.

- It was the first 16-bit processor having 16-bit ALU, 16-bit registers, internal data bus, and 16-bit external data bus resulting in faster processing.

- It uses two stages of pipelining, i.e. Fetch Stage and Execute Stage, which improves performance.

- Fetch stage can pre-fetch up to 6 bytes of instructions and stores them in the queue.

- Execute stage executes these instructions.

- It has 256 vectored interrupts.

- It consists of 29,000 transistors.

## Q.2- Give the basic difference between 8085 and 8086 microprocessor.

- **Size** − 8085 is 8-bit microprocessor, whereas 8086 is 16-bit microprocessor.

- **Address Bus** − 8085 has 16-bit address bus while 8086 has 20-bit address bus.

- **Memory** − 8085 can access up to 64Kb, whereas 8086 can access up to 1 Mb of memory.

- **Instruction** − 8085 doesn't have an instruction queue, whereas 8086 has an instruction queue.

- **Pipelining** − 8085 doesn't support a pipelined architecture while 8086 supports a pipelined architecture.

- **I/O** − 8085 can address $2^8 = 256$ I/O's, whereas 8086 can access $2^{16} = 65,536$ I/O's.

- **Cost** − The cost of 8085 is low whereas that of 8086 is high.

## Q.3- Write in brief about the Bus interface unit (BIU) in Microprocessor.

BIU takes care of all data and addresses transfers on the buses for the EU like sending addresses, fetching instructions from the memory, reading data from the ports and the memory as well as writing data to the ports and the memory. EU has no direct connection with System Buses so this is possible with the BIU. EU and BIU are connected with the Internal Bus.

## Q.4- Write in brief about the Execution unit (EU) in Microprocessor.

Execution unit gives instructions to BIU stating from where to fetch the data and then decode and execute those instructions. Its function is to control operations on data using the instruction decoder & ALU. EU has no direct connection with system buses, it performs operations over data through BIU.

## Q.5- What do you mean by pipelining in 8086 microprocessor.

Pipelining is the feature of fetching the next instruction while executing the current instruction. Instructions are stored in memory, therefore, it has to be fetched, decoded and then executed. Pipelining boost performance as fetching and executing is done alongside at the same time.

## Q.1- What do you understand by the term Instruction sets?

An instruction set is a group of commands for a processor in machine language. The term can refer to all possible instructions for a processor or a subset of instructions to enhance its performance in certain situations.

## Q.2- Discuss briefly about the concept of Assembly language.

An assembly language is a programming language that communicates with the hardware of a computer directly. An assembly language allows a software developer to code using words and expressions that can be easier to understand and interpret than the binary or hexadecimal data, the computer stores and reads.

Q.3- What is the purpose of Branch operations?

The branch instructions are used to change the sequence of instruction execution. Branch instructions are used to implement control flow in program loops and conditionals (i.e., executing a particular sequence of instructions only if certain conditions are satisfied).

Q.4- All Instructions

## Q.1- What do you understand by the Peripheral Devices?

A peripheral device is an internal or external device that connects directly to a computer or other digital device but does not contribute to the computer's primary function, such as computing. It helps end users access and use the functionalities of a computer.

## Q.2- What do you understand by the DMA Controller?

- DMA stands for Direct Memory Access. It is designed by Intel to transfer data at the fastest rate. It allows the device to transfer the data directly to/from memory without any interference of the CPU.

- Using a DMA controller, the device requests the CPU to hold its data, address and control bus, so the device is free to transfer data directly to/from the memory. The DMA data transfer is initiated only after receiving HLDA signal from the CPU.

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