

Unit 3

Instruction timing and cycles      Date - 23/4/2020

Machine Cycle → It is the time required by the microprocessor to complete the operation of accessing the memory devices or I/O devices.

In machine cycle various operations like opcode fetch, memory read, memory write, I/O read, I/O write are performed.

T-state → One time period of frequency of microprocessor is called T-state.

A state is measured from the falling edge of one clock pulse to the falling edge of the next clock pulse.

Timing Diagram → is a graphical representation. It represents the execution time taken by each instruction in a graphical format. The execution time is represented in T-states.

Instruction cycle → The time required to execute an instruction is called instruction cycle.

Machine cycles of 8085 → The 8085  $\mu P$  has 5 basic machine cycles. They are →

Opcode fetch cycle (4T)  
Memory read cycle (3T)  
Memory write cycle (3T)  
I/O read cycle (3T)  
I/O write cycle (3T)

The 3 machine cycles are —  
Opcode fetch cycle  
Memory read cycle  
Memory write cycle

Q → Explain T-states, machine cycles, instruction cycles.

Fetch and execute cycle

Fetch cycle →

The instruction cycle is divided into fetch and execute cycles. The fetch cycle is executed to fetch the opcode from memory.

Execute cycle → The execute cycle is executed to decode the instruction and to perform the work instructed by the instruction.

Opcode fetch cycle → The opcode fetch cycle is a machine cycle executed to fetch the opcode of an instruction stored in memory. Each instruction starts with opcode fetch machine cycle.

1. How many machine cycles constitute one instruction cycle in 8085?

Ans 5

2. Define opcode and operand.

Opcode (operation code) is the part of an instruction that identifies a specific operation.

Operand is a part of an instruction that represents a value on which the instruction acts.