

# **IDHAYA COLLEGE FOR WOMEN**

**KUMBAKONAM – 612 001**



## ***DEPARTMENT OF PHYSICS***

<b>SEMESTER</b>	<b>:</b>	<b><i>VI</i></b>
<b>CLASS</b>	<b>:</b>	<b><i>III PHYSICS</i></b>
<b>SUBJECT- INCHARGE</b>	<b>:</b>	<b><i>Mrs. R. SASIREKABAI</i></b>
<b>SUBJECT NAME</b>	<b>:</b>	<b><i>MICROPROCESSOR &amp; 'C' PROGRAMMING</i></b>
<b>SUBJECT CODE</b>	<b>:</b>	<b><i>16SMBEPH2</i></b>
<b>TOPIC</b>	<b>:</b>	<b><i>UNIT – I to V2 MARKS (Q&amp;A)</i></b>

## UNIT – I

### Basics of digital computer

#### 1. What is digital computer and its components?

A typical **digital computer** system has four basic functional elements: (1) input-output equipment, (2) main memory, (3) control unit, and (4) arithmetic-logic unit. Any of a number of devices is used to enter data and program instructions into a **computer** and to gain access to the results of the processing operation.

#### 2. What are the types of digital computer?

Within these two categories of digital computers, a classification based on capacity and performance allows a further distinction between four types of digital computers, namely the super, mainframe, mini and microcomputers. Super computers are able to process several billion instructions a second.

#### 3. Define microprocessors?

A semiconductor device(integrated circuit) manufactured by using the LSI technique. It includes the ALU, register arrays, and control circuits on a single chip.

#### 4. Define microcomputer?

Microcomputer is small computer that contains microprocessor as its CPU. It includes microprocessor, memory and I/O.

#### 5. What is memory explain types of memory?

Memory is internal storage areas in the computer system. The term memory identifies data storage that comes in the form of chips, and the word storage is used for memory that exists on tapes or disks. RAM (random-access memory): This is the same as main memory.

#### 6. What is called hardware?

Hardware refers to the physical elements of a computer. This is also sometime called the machinery or the equipment of the computer. Examples of hardware in a computer are the keyboard, the monitor, the mouse and the central processing unit.

#### 7. What is called software?

Software is a set of instructions, data or programs used to operate computers and execute specific tasks.

## **8. Define Firmware**

Firmware is a software program or set of instructions programmed on a hardware device. It provides the necessary instructions for how the device communicates with the other computer hardware. Firmware is typically stored in the flash ROM of a hardware device.

## **9. Define ROM?**

A memory that stores binary information permanently. The information can be read from this memory but cannot be altered.

## **10. What do you mean by address bus?**

A group of lines that are used to send a memory address or a device address from the MPU to the memory location or a peripheral. The 8085 microprocessor has 16 address lines.

## **11. Why is the data bus bi-directional?**

The data bus is bi-directional because the data flow in both directions between the MPU and memory and peripheral devices.

## **12. Define Flash Memory.**

Flash memory is a nonvolatile memory, also known as flash storage, and how it retains data when devices are turned off.

## **13. What is a CCD used for?**

Fundamentally, a charge coupled device (CCD) is an integrated circuit etched onto a silicon surface forming light sensitive elements called pixels. Photons incident on this surface generate charge that can be read by electronics and turned into a digital copy of the light patterns falling on the device.

## **14. Define Cache memory**

Cache memory is a small-sized type of volatile computer memory that provides high-speed data access to a processor and stores frequently used computer programs, applications and data. It is the fastest memory in a computer, and is typically integrated onto the motherboard and directly embedded in the processor or main random access memory (RAM).

## **15. Define buses and its types.**

Various input/output devices and memory devices are connected to CPU by groups of lines called buses. There are three types of buses: Address bus, Data bus and control bus.

## **16. Define control bus?**

This is single line that is generated by the MPU to provide timing of various operations.

## **UNIT – II**

### **Intel 8085 and its Architecture**

#### **1. What is microprocessor? Give the power supply & clock frequency of 8085.**

A microprocessor is a multipurpose, programmable logic device that reads binary instructions from a storage device called memory accepts binary data. As input and processes data according to those instructions and provides result as output. The power of 8085 is +5v and clock frequency in 3MHZ.

#### **2. What are the functions of an accumulator?**

The accumulator is the register associated with the ALU operations and sometimes I/O operations. It is an integral part of ALU. It holds one of data to be processed by ALU. It also temporarily stores the result of the operation performed by the ALU.

#### **3. List the 16 – bit registers of 8085 microprocessor.**

Stack pointer (sp) and program counter(pc).

#### **4. List the allowed register pairs of 8085.**

B-C register pair D-C register pair H-L register pair.

#### **5. Mention the purpose of SID and SOD lines**

SID(serial input data line): It is an input line through which the microprocessor accepts serial data. SOD(serial output data line): It is an output line through which the microprocessor sends output serial data.

#### **6. What is an opcode and operand?**

Each instructions contains two parts: operation code (opcode) and operand. The first part instructions which specifies the task to be performed by the computer is called opcode. The second part of the instruction is the data to be operated on, and it is called operand.

#### **7. Define instruction cycle, machine cycle and T-state?**

Instruction cycle is defined as the time required completing the execution of an instruction. Machine cycle is defined as the time required completing one operation of accessing memory, I/O or acknowledging an external request. T –cycle is defined as one subdivision of the operation performed in one clock period.

**8. What is an instruction set?**

The instruction set of a microprocessor is the collection of the instruction that the microprocessor is designed to execute.

**9. Define the types of branching operations?**

The instructions of this group change the normal sequence of the program. There are two types of branch instructions: conditional and unconditional. The conditional branch instructions transfer the program to the specified label when certain condition is satisfied. The unconditional branch instructions transfer the program to the specified label unconditionally.

**13. What are the machine control operations used in 8085 microprocessor?**

HLT: Halt, NOP: No Operation, PUSH rp, POP etc.

**14. What is data transfer instructions?**

The data transfer instructions move data between memory and the general-purpose and segment registers, and perform operations such as conditional moves, stack access, and data conversion.

**15. What is RIM?**

RIM: Read Interrupt Mask. When this instruction is executed, the accumulator is loaded with pending interrupts, the restart interrupts masks and the contents of SID.

**16. What are the two categories of an interrupts?**

Four Maskable interrupt, One Non Maskable interrupt

**UNIT III**  
**ASSEMBLY LANGUAGE PROGRAMMING**

**1. Find one's complement of an 8 bit no.**

Program

Address	Machine codes			Mnemonics	Comments
	B1	B2	B3		
8000	3A	01	85	LDA 8501H	get data in accumulator
8003	2F			CMA	Take its complement
8004	32	02	85	STA 8502H	Store result in 8502H
8007	76			HLT	Halt

RESULT

**DATA INPUT 8501-96 H DATA OUTPUT 8502 -69 H**

**2. Find two's complement of an 8 bit no.**

Program

Address	Machine codes			Mnemonics	Comments
	B1	B2	B3		
8000	3A	01	85	LDA 8501H	get data in accumulator
8003	2F			CMA	Take its 1's complement
8004	3C			INR	Take its 2's complement
8005	32	02	85	STA 8502H	Store result in 8502H
8008	76			HLT	Halt

RESULT

**DATA INPUT 8501-96 H DATA OUTPUT 8502 -6A H**

**3. Shift an 8 bit number left by one bit.**

Program

Address	Machine codes			Mnemonics	Comments
	B1	B2	B3		
8000	3A	01	85	LDA 8501H	get data in accumulator
8003	87			ADD A	Shift it left by one bit
8004	32	02	85	STA 8502H	Store result in 8502H
8007	76			HLT	Halt

RESULT

**DATA INPUT** 8501-65 H **DATA OUTPUT** 8502 –CA H

**4. Shift an 8 bit number left by 2 bits.**

Program

Address	Machine codes			Mnemonics	Comments
	B1	B2	B3		
8000	3A	01	85	LDA 8501H	get data in accumulator
8003	87			ADD A	Shift it left by one bit
8004	87			ADD A	Again Shift it left by one bit
8005	32	02	85	STA 8502H	Store result in 8502H
8008	76			HLT	Halt

RESULT

**DATA INPUT** 8501-15 H **DATA OUTPUT** 8502 –54 H

**5. Shift a 16 bit number left by one bit.**

Program

Address	Machine codes			Mnemonics	Comments
	B1	B2	B3		
8000	2A	01	85	LHLD 8501H	get data in H-L pair
8003	29			DAD	Shift it left by one bit
8004	22	03	85	SHLD 8503H	Store result in 8503H
8007	76			HLT	Stop

RESULT

**DATA INPUT** 8501-96 H    **DATA OUTPUT** 8503-2C H

8502-75 H

8504-EB H

**6. Shift a 16 bit number left by two bits.**

Program

Address	Machine codes			Mnemonics	Comments
	B1	B2	B3		
8000	2A	01	85	LHLD 8501H	get data in H-L pair
8003	29			DAD	Shift it left by one bit
8004	29			DAD	Again Shift it left by one bit
8005	22	03	85	SHLD 8503H	Store result in 8503H
8008	76			HLT	Stop

RESULT

**DATA INPUT** 8501-96 H    **DATA OUTPUT** 8503-2C H

8502-75 H

8504-EB H



### 7. Mask off LSB 4 bits of an 8 bit number

Program

Address	Machine codes			Mnemonics	comments
	B1	B2	B3		
8000	3A	01	85	LDA 8501H	get data in accumulator
8003	E6	F0		ANI,F0	Mask off the least significant 4 bits
8005	32	02	85	STA 8502H	Store result in 8502H
8008	76			HLT	stop

RESULT

**DATA INPUT** 8501-A6 H    **DATA OUTPUT** 8502 –A0 H

### 8. Mask off MSB 4 bits of an 8 bit number.

Program

Address	Machine codes			Mnemonics	comments
	B1	B2	B3		
8000	3A	01	85	LDA 8501H	get data in accumulator
8003	E6	0F		ANI,0F	Mask off the most significant 4 bits
8005	32	02	85	STA 8502H	Store result in 8502H
8008	76			HLT	stop

RESULT

**DATA INPUT** 8501-A6 H    **DATA OUTPUT** 8502 –06 H

### 9. Find the square from look up table.

Program

Address	Machine codes			Mnemonics	Comments
	B1	B2	B3		
8000	3A	00	85	LDA 8500H	get data in accumulator
8003	6F			MOV L,A	Get data in register L
8004	26	26		MVI H,86 H	Get 86 in register H
8006	7E			MOV A,M	Square of data in accumulator
8007	32	01	85	STA 8501 H	Store square in 8501 H
800A	76			HLT	Stop

### RESULT

**DATA INPUT** 8500-07 H    **DATA OUTPUT** 8501 –49 H

## UNIT-IV

### BASIC STRUCTURE OF "C"

#### 1. Define C tokens?

In passage of text individual and punctuation marks are called tokens. Similarly, in a C program the smallest individual units are known as C tokens.

#### 2. Types of C tokens?

Keyword(Float while), constant(-15.5), Identifiers(main amount), strings("ABC" "YEAR"), Special symbol ([ ] { } ), operators(+\_\* ,)

#### 3. What are the Rules for identifiers?

- First character must be an alphabet(or underscore)
- Must consist of only letters,digits or underscore.
- Only first 31 characters are significant.
- Cannot use a keyword

**4. What are the section in 'C' program?**

Documentation section, Link section, Definition section, Global declaration section, Main()function section and sub program section

**5. What are the characters in 'c' program?**

Letter, Digits, special characters and white space

**6. Define constant and its types?**

Constant in C refer to fixed value that do not change during the execution of a program. It's types are

(i) Numeric constant, (ii) Integer constant ,(iii)real constant (iv) character constant, (vi)single character constant and (vii)string constant.

**7. What is integer constant?**

An integer constant refers to a sequence of digits. There are three types of integers,namely decimal integer,octal integer and hexadecimal integer.

**8. What is real constant?**

Integer number are inadequate to represent quantities that vary continuously,such as distance, height, temporary,prices,are represent by number containing fractional parts like 17.548.such number are called real(or floatingpoint)constant.

**9. Write the general form or real constant?**

The general form is **mantissa&exponent**

The mantissa is either a real number expressed in decimal notation or an integer. The expressed is an integer number with an optional plus or minus sign. The letter separating the mantissa and the exponent can be written in either lowercase oruppercase.

**10. Define single character constant?**

A single character constant (or simply character constant)contains a single character enclosed within a pair of single quotes marks.Ex: character constant '5' 'x' ','

**11. Define string constant?**

The string constant is a sequence of character enclosed in double quotes. The character may be letter, number,special character and blank space.

Ex:"welldone" "hello!"

**12. Define variables?**

Variables are a data name that may be used to store a data value. A variables may take different value at different times during execution.

**13. What are the rules for variables?**

- a. They must begin with a letter.
- b. ANSI standard recognizes a length 31 characters.

Uppercase and lowercase are significant.

It should not be a keyword.

White space is not allowed.

**14. Define types of data types?**

Primary (or) fundamental data types

Derived data type

User defined data type.

**15. What are the fundamental data type?**

Integer(int), character(char), floating point(Float), double precision floating point (double) and void.

**16. What is operator?**

An operator is a symbol that tells the computer to perform certain mathematical or logical manipulations. Operators are used in programs to manipulate data and variables.

**17. Define types of operator?**

Arithmetic operators, relational operators, logical operators, Assignment operators, increment and decrement operators, conditional operators, bitwise operators  
And special operators.

**18. Define integer arithmetic?**

When both the operands in a single arithmetic expression such as  $a+b$  are integers, the expression is called an integer expression, and the operation is called integer arithmetic.

**19. Define real arithmetic?**

An arithmetic operation involving only real operands is called real arithmetic.

## UNIT V

### PRELIMINARIES AND FUNTIONS

#### 1. What are decision making statement?

C languages possesses such decision making capabilities by supporting the following statements

- If statement
- Switch statement
- Conditional operator statement
- Go to statement

#### 2. Examples of if statement

- 1.if(bank balance is zero)borrow money
- 2.if(room is dark)put on lights.

#### 3. General form of simple if statements.

```
If
{
Statement_block;
}
Statement_x;
```

#### 4. General form of if-else statement?

```
If(test expression)
{
True block statement(s)
}
{
False block statement(s)
}
Statement x
```

#### 5. Types of if statement .

1. simple if statement
2. if..else statement
3. nested if statement
4. else if ladder.

## 6. General form of if...else statement?

```
if(test condition)
{
if(test condition -2);
{
Statement-1;
}
Else
{
Statement-2;
}
}
else
{
Statement-3
}
Statement-x
```

## 7. General form of else is ladder.

```
if(condition-1)
Statement-1;
else if(condition-2)
Statement-2;
else if condition-3)
Statement-3;
else if(condition-n)
Statement-n;
else
default statement
statement-x;
```

## 8. Define switch statement?

C has a built in multiway decision statement known as switch. The switch statement tests the value of given variable against a lists of case values and when a match is found a block of statements associated with that case is executed.

### **9. General form of switch statement?**

```
Switch(expression)
{
Case value-1;
block-1;
break;
case value-2;
block-2
break;
....
....
default:
default block
break;
}
Statement-x;
```

### **10. Define looping?**

In looping a sequence of statements are executed until some conditions for termination of the loop are satisfied. A Program loop therefore consists of two segments, one known as the body of the loop and the other as known as control statement.

### **11. Define entry controlled loop and exit control loop?**

In entry controlled loop the control conditions are tested before the start of the loop execution.

In exit controlled loop the test is performed at the end of the body of the loop and therefore the body is executed.

### **12. Rules for switch statement?**

- 1.The switch expression must be an integral type
- 2.Must be constants
- 3.Labels must be unique etc.

### **13. Define go to statement?**

C supports the goto statement to branch unconditionally from one point to another in the program. Although it may not be essentials to use the goto statement in a highly structured language like C, there may be occasions when the use of goto might be desirable.

**14. Define basic format of the while statement?**

```
While(test condition)
{
  Body of the loop
}
```

**15. Define three constructs for performing loop operation?**

The C language provides for three constructs for performing loop operation. There are

1. The while statement
2. The do statement
3. The for statement

**16. Define process of looping?**

1. Setting and initializing of a condition variable.
2. Execution of the statements in the loop
3. Test for a specified value of the condition variable for execution of the loop.
4. Increment or updating the condition variable.

**17. General form of do statement?**

```
do
{
  Body of the loop
}
While(test-condition);
```

**18. General form of for statement?**

```
for(initialization; test condition; increment)
{
  Body of the loop
}
```

**19. Define array?**

An array is a fixed size sequenced collection of elements of the same data type. It is simply a grouping of like-type data. In simplest form, an array can be used to represent a list of numbers, or a list of names.

**20. Types of arrays.**

1. One dimensional arrays,
2. Two dimensional arrays,
3. Multi-dimensional array.



**21. What are data types?**

1. Derived types
2. Fundamental types
3. User defined types.

**22. Define one dimensional array?**

A list of items can be given one variable name using only one subscript and such a variable is called a single subscripted variable or a one dimensional array.

**23. General form of array declaration is**

Type variable-name(size);

**24. Syntax of initialization of array.**

Type array-name[size]={list of values};

**25. Define two dimensional array**

The array variables that can be stored a list of values. There could be situations where a table of values will have to be stored.

Syntax: type array\_name[row\_size][column size];

**26. Define multi-dimensional array**

C allows arrays of three or more dimensions. The exact limit is determined by the compiler. The general form of multi-dimensional array is

Syntax: type array name [s1][s2][s3].....[sm];

**27. General form of get char and put char.**

Variable name=get char ( )

Put char (variable name)