

This question paper contains 4 printed pages]

Roll No.

--	--	--	--	--	--	--	--	--	--

S. No. of Question Paper : 6208

Unique Paper Code : 222302

D

Name of the Paper : Microprocessor and Computer Programming—Paper PHHT-308

Name of the Course : B.Sc. (Hons.) Physics

Semester : III

Duration : 3 Hours

Maximum Marks : 75

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt five questions in all.

Question No. 1 is compulsory.

Attempt two questions from each Section.

1. Answer any five of the following :

5×3

- (a) The memory address of the starting address of a 1K-byte memory chip is given as B8FEH. Specify the end address.
- (b) Calculate the time required to execute the instruction STA 16-bit. The microprocessor clock frequency is 3.0 MHz.
- (c) Explain the functions of the following pins in a 8085 microprocessor :
- (i) ALE
  - (ii) TRAP
  - (iii) READY.

P.T.O.

- (d) In an 8085 microprocessor give the status of  $S_0$  and  $S_1$  signals for :
- Opcode fetch and
  - Memory read operation.
- (e) Write the addressing modes for the following instructions :
- ANI 85H
  - MOV B, C
  - LDAX D.
- (f) What is the C/C++ value for :
- $(3 * 12) \% (5 * 5)$
  - $!(3 > 5 \ \&\& \ 4 < 6)$
  - $4 + \left( \frac{3 * 4}{3 * (6 + 1)} \right)$
- (g) Find and explain errors in the following program component :

```
float i;

int p = 0;

for (i = 0; i = 10; i += 2)
{
    p = i * 2;
    cout << i, p;
}
```

- (h) Convert the following 'for' loop into a 'do-while' loop :

```
for (int i = 1; i <= n; i++)
    cout << i * i << " ";
```

(i) Evaluate (true or false) the following expressions :

(i)  $3 > 6 \ \&\& \ 7 > 4$ ,

(ii)  $3 > 6 \ \|\ 7 > 4$ ,

(iii)  $3 + 3 \ ! = 2 + 4$ .

(j) If p is a pointer; what is the meaning of :

(i) \*p

(ii) &p

(iii) (\*p)++

### Section A

(Answer any two)

2. (a) How is de-multiplexing of address and data buses done and control signals generated in 8085 microprocessor ? Explain with the help of a detailed schematic diagram.
- (b) Write a program to add two 8-bit numbers using indirect addressing mode. The starting address of program should be 31FBH. Store the input data at 2100H and the sum and carry at memory location 2102H and 2103H respectively. 10,5
3. (a) Explain each step of the following program and identify the contents of the register C, and the status of the flags S, Z, P and CY :

MVI A, FAH

LXI H, 2150H

MVI M, 9FH

ADD M

MOV C, A

HLT

P.T.O.

- (b) Describe different addressing modes in 8085 microprocessor, give *one* example of each addressing mode. 10,5
4. (a) Write an assembly language programs to add two 16-bit numbers (FCAB H and 17BD H) without using 'DAD' instruction, and the sum is to be stored in memory locations 2007H and 2008H and carry at 2009H (if any).
- (b) Draw the logic pin out diagram of 8085 microprocessor wherein all the different signals are depicted and classified in different groups. 10,5

### Section B

(Answer any two)

5. (a) Write a C/C++ program that generate first 100 prime numbers but prints every alternate value of them.
- (b) Distinguish between 'structure' and 'array'. Explain each with the help of suitable example. 10,5
6. (a) Distinguish between 'function call by value' and 'function call by reference' with the help of suitable example. Write C/C++ function to find the factorial of a number.
- (b) Write a program in C/C++ to sort a given list of numbers in ascending order using a void function. 10,5
7. (a) What is meant by 'Class' in C++ ? Explain with examples the following with reference to 'Class' :
- (i) public and private members in a class,
- (ii) constructor and destructor in a class.
- (b) Write a C/C++ program to find the imaginary roots of a quadratic equation. 10,5

Dec 2012

[This question paper contains 4 printed pages.]

Sr. No. of Question Paper : 8402

C

Roll No.....

Unique Paper Code : 222302

Name of the Paper : PHHT-308 : Microprocessor & Computer Programming

Name of the Course : B.Sc. (Hons.) PHYSICS, Part II

Semester : III

Duration : 3 Hours

Maximum Marks : 75

### Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **seven** questions in all.
3. Question No. 1 is compulsory.
4. Attempt **three** questions from each section.

1. Answer any **five** of the following. (5×3)

(a) A microcomputer has a 64k memory. How many bytes does this represent? If 0000H stands for the first memory location, what is the hexadecimal notation for the last memory location? Explain your answer.

(b) What are registers? Give the full form and use of: A, PC, and SP.

(c) What is the function of the following signals in 8085  $\mu P$ ?

*Reset, Ready, Hold.*

(d) Write instructions to enable all the interrupts in an 8085 system.

(e) Determine the values of the following expressions; given  $x = 2$ ,  $ch = 'C'$ :

(i)  $3/2 + 8.7$

(ii)  $(14 \geq 5) \&\& ('A' < ch)$

P.T.O.

8402

(iii)  $64 \gg x$ (iv) `static_cast<double> (17)/2`(v)  $(++x) + 3$ (vi)  $y = x > 9 ? 10 : 20$ 

(f) Determine the values of the following functions; given 'a' = 97, str = "Hello World":

(i) `abs(-24)`(ii) `ceil(89.54)`(iii) `pow(36, 0.5)`(iv) `tolower('A')`(v) `ispunct('&')`(vi) `str.size()`

(g) What is a preprocessor? Give three uses of it.

(h) How is enumerated-type data defined? Give two examples.

### SECTION A

(Do any *three* questions from Section A)

2. Draw the functional block diagram of 8085  $\mu P$ . (10)

3. What is the purpose of ALE signal? Explain with the help of timing and circuit diagrams the demultiplexing of address bus in 8085  $\mu P$ . (10)

4. (a) What are flags? Describe the various flags in the flag register of 8085  $\mu P$ . Which flags are used in *CPI* instruction and how. Which flags are affected by this instruction? (7)

(b) Write a program in assembly language to add two numbers 53H and 44H stored at memory locations 2000H and 2001H respectively. Store the result at 2002H and carry, if any, at 2003H. (3)

5. (a) Distinguish between the instructions *MOV* and *MVI*. Give one example of each. (5)
- (b) Write an assembly language program to multiply two 8-bit numbers *09H* and *04H*. Store the result in register *D*. (5)
6. (a) Explain the difference between the instructions *ANA* and *ANI*. Give one example of each. (5)
- (b) Describe the instruction *RIM* by giving an example. (5)

### SECTION B

(Do any *three* questions from Section B)

7. Explain the difference between the following Control Structures in C/C++ giving two examples of each.  
*if*, *if-else*, and *switch* (10)
8. (a) Write a program in C/C++ to find the roots of a quadratic equation. Also check whether the roots are real or imaginary? (6)
- (b) Explain the difference between the C/C++ statements (i) *break*, and (ii) *continue*. Give two examples of each. (4)
9. (a) Explain the difference between the I/O formatting manipulators : *left* and *right*. (2)
- (b) Write a C/C++ program to arrange a list of numbers in ascending order. (8)
10. (a) What are arrays? Define two-dimensional arrays by giving examples. (2)
- (b) Write a C/C++ program to multiply two  $3 \times 3$  matrices. (8)

8402

4

11. (a) Define a function. What types of values can be returned by a function ?  
Explain by giving examples. (3)
- (b) Write a C/C++ program with a function to check if a number is a prime  
number. (7)



This question paper contains 7 printed pages]

Roll No.

--	--	--	--	--	--	--	--	--	--

S. No. of Question Paper : 917

29 NOV 2014

Unique Paper Code : 222302

E

Name of the Paper : PHHT-308 : Microprocessor and Computer Programming

Name of the Course : B.Sc. (Hons.) Physics

Semester : III

Duration : 3 Hours

Maximum Marks : 75

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt *Five* questions in all.

Question No. 1 is compulsory.

Attempt *two* questions from each section.

I. Answer any *five* of the following :

5×3

(a) In a 8085A microprocessor name the machine cycle representing the following conditions :

IO/ $\overline{M}$	Status		Control signals
	$S_0$	$S_1$	
0	1	1	$\overline{RD} = 0$
1	1	1	$\overline{INTA} = 0$

P.T.O.

- (b) How RST 5.5 and RST 7.5 are enabled using instruction SIM ? Explain the significance of all bits in SIM.
- (c) The memory address of the starting address of a 1 K byte of memory chip is given as C000 H. Specify the end address.
- (d) Distinguish between LDAX B and LDA 16-bit address, instructions in 8085. Give one example of each.
- (e) Write an assembly language program to find 2's complement of an 8 bit number stored in memory location 2300H.
- (f) Specify the number of times the following loop are executed :

(i) MVI A, 04H

loop : ORA A

RAL

JNC loop

(ii) LXI B, 0100H

loop : DCX B

NOP

JNZ loop

(g) What is the output of the following program ?

```
#include<iostream>
```

```
using namespace std;
```

```
int main()
```

```
{
```

```
int n;
```

```
for(n = 10; n > 0; n ...)
```

```
{
```

```
cout << n;
```

```
if(n == 5)
```

```
break;
```

```
}
```

```
return 0;
```

```
}
```

(h) What are runtime, syntax and logical errors ? Give *one* example of each.

P.T.O.

(i) What is the output of the following program ?

```
#include<iostream>
```

```
using namespace std;
```

```
int main()
```

```
{ for(int i=0; i<11; i++)
```

```
{ if(i%3 == 0) cout << i + 1 << "\t";
```

```
else if(i%5 == 0) cout << i*i << "\t";
```

```
else if(i%7 == 0) cout << 2*i - 1 << "\t";
```

```
else cout << i << "\t";
```

```
}
```

```
}
```

(j) Variables  $i = 4$  and  $j = 6$ . What will be the output of the following ?

(i) `cout << --i << " ";`

`cout << i++;`

(ii) `cout << ++j << " ";`

`cout << j--;`

## Section A

(Answer any two)

2. (a) Explain the following registers in 8085 microprocessor :
- (i) Program Counter (PC)
  - (ii) Stack Pointer (SP)
  - (iii) Accumulator (A)
  - (iv) Register pairs
  - (v) Memory register (M). 10
- (b) Write a program in assembly language to add two 8 bit numbers 6 BH and 7 FH, taking into account any carry generated. 5
3. (a) Write a short program in assembly language, explaining each step, to load accumulator 'A' with data 56H and verify whether the data byte in memory location 2050H is equal to accumulator contents or not. If both data bytes are equal, then jump to memory location 2100H, else jump to 2200H. (Assume data in location 2050H is 8BH). 10
- (b) Draw the logic pin out diagram of 8085 microprocessor wherein all the different signals are depicted and classified in different groups. 5

P.T.O.

4. (a) Describe the various flags used in 8085 microprocessor and show their bit position. Which flags are affected by the following instructions ?

(i) RAL

(ii) ADI 8-bit

(iii) JZ 16-bit

(iv) MOV B, C. 10

(b) Write an assembly language program to calculate Z by the following equation :

$$Z = X + Y - 2,$$

where X and Y are two 8-bit numbers stored in two different memory locations 2000H and 2001H respectively. 5

### Section B

(Answer any two)

5. (a) Write a C/C++ program that generates first 100 prime numbers but prints every alternate value of them. 10

(b) What are the different data-types supported by C/C++ ? 5

(a) Write a C/C++ program to write the first 20 natural numbers along with their square roots using :

(i) while/do-while loop and

(ii) for loop.

10

(b) Bring out the difference between 'while' and 'do-while' loops with the help of appropriate flow-charts.

5

(a) What is an array ? Write a C/C++ program to find largest of a given list of ten numbers using an array.

10

(b) What is recursion ? Write a recursive function to find factorial of a number.

5

This question paper contains 4 printed pages]

Roll No.

--	--	--	--	--	--	--	--	--	--	--

S. No. of Question Paper : 5762

Unique Paper Code : 222302

F

Name of the Paper : Microprocessor and Computer Programming (PHHT-308)

Name of the Course : B.Sc. (Hons.) Physics

Semester : III

02 DEC 2015

Duration : 3 Hours

Maximum Marks : 75

(Write your Roll No. on the top immediately on receipt of this question paper.)

Question No. 1 is compulsory.

Attempt two questions each from Section A and Section B.

Attempt five questions in all.

1. Answer any five questions out of the following :

5×3=15

(a) How many T-states are required for the instructions ?

(i) MOV A, B

(ii) MOV A, M

(iii) MVI B, 54H

(b) Differentiate between RLC and RAL through an example.

(c) Name the different interrupts present in the 8085 microprocessor. Arrange them in the decreasing order of their priorities. Out of these interrupts which one is/are vectored interrupt(s).

(d) Explain the following pins in the 8085 microprocessor IC :

(i) HOLD

(ii) READY

(iii) TRAP.

P.T.O.



( 2 )

(e) Giving examples in C/C++ programming explain syntax, logical and runtime errors.

(f) If the following code is executed what will be the output ?

```
void main( )
{
    int x, y;
    x = 27;
    y = --x;
    cout << "x =" << x << ", y =" << y << endl;
    x = 27;
    y = x--;
    cout << "x =" << x << ", y =" << y << endl;
}
```

(g) Differentiate between the *while* and *do....while* looping statements giving examples.

(h) What will be the output of the following program if during runtime the value for the variable *x* is given as 7 ?

```
void main( )
{
    int x;
    cin >> x;
    cout << "\n";
    int y = 1;
    for(int i = 2; y <= x; i++)
    {
        cout << "," << y;
        y *= i;
    }
}
```

## Section A

(Answer any two)

- (a) Draw a labelled pin out diagram of the 8085 microprocessor. 5
- (b) Explain why there is a need for demultiplexing the Bus  $AD_7 - AD_0$ . Explain with the help of timing and circuit diagrams the demultiplexing of address bus in 8085 microprocessor. 10
- (a) What are the various addressing modes in the 8085 microprocessor? Explain each mode with an example. 5
- (b) What is the machine code for the instruction MOV A, H given that the register code for register H =  $(100)_2$  and the accumulator =  $(111)_2$ . Also the code for MOV =  $(01)_2$ . 4
- (c) Describe the timing diagram for the following instruction : 6

Memory Address	Mnemonic	Hex Code
2050H	MVI B, 5AH	06H
2051H		5AH

- (a) Write an assembly language program to addition the 16-bit number 675AH from another 16-bit number A6BCH. 6
- (b) Write an assembly language program to add the numbers 05 with 08 and get the result in decimal. 5
- (c) What operations do the following instructions perform : 4

(i) PUSH D

(ii) LDAX D

P.T.O.

## Section B

(Answer any two)

5. (a) If the expression given below is evaluated what value will be assigned to the variable z, if the variables x and y have values 52 and 25 respectively :

$$z = (x \leq y ? x : y);$$

4

- (b) What is recursion ? Write a program in C/C++ to calculate the factorial of a number using the recursion technique.

7

- (c) What will be the output for the following code :

4

```
void main( )
```

```
{
```

```
    int x = 75;
```

```
    x += 10;
```

```
    x -= 5;
```

```
    x *= 2;
```

```
    x /= 3;
```

```
    x %= 10;
```

```
    cout<<"x = "<<x;
```

```
}
```

6. (a) Write a program in C/C++ to print first 25 natural numbers and their squares. 5
- (b) What are the fundamental data types supported by the standard C++ ? 4
- (c) Write a C/C++ program to multiply two 2×2 matrices. 6
7. (a) Differentiate between a structure and an array through an example of each. 4
- (b) Write a program which sorts a given list of 10 numbers either in ascending order. 6
- (c) What do you understand by the terms *function prototype* and *function overloading* ? Explain with examples. 5

This question paper contains 4 printed pages]

Roll No. 

--	--	--	--	--	--	--	--	--	--	--

S. No. of Question Paper : 847

Unique Paper Code : 222302

G

Name of the Paper : **Microprocessor and Computer Programming (PHHT-308)**

Name of the Course : **B.Sc. (Hons.) Physics**

Semester : **III**

Duration : **3 Hours**

Maximum Marks : 75

(Write your Roll No. on the top immediately on receipt of this question paper.)

Question No. 1 is compulsory.

Attempt *two* questions each from Section A and Section B.

Attempt *five* questions in all.

1. Answer any *five* questions out of the following : 5×3=15

(a) A microcomputer has 64 k memory. How many bytes does this represent ? If 0000H stands for the first memory location, what is the hexadecimal notation for the last memory location ? Explain your answer.

(b) What are registers ? Give the full form and use of : A, PC and SP in 8085 microprocessor.

(c) Explain the following instructions using suitable examples :

(i) LDAX B

(ii) LHLD 2050 H

P.T.O.

(d) Compare the following instructions :

(i) MVI A,25H

(ii) LDA 2050H

(e) Explain the following instructions : RAR and RRC.

(f) Determine the values of the following C/C++ expressions :

(i)  $(10 \geq 6) \ \&\& \ (10 < 5)$

(ii)  $(4 == 4) \ || \ (5 == 8)$

(g) Write the corresponding C/C++ expressions for the following mathematical expressions :

(i)  $p + q/(r + s)^4$

(ii)  $(\cos x / \tan^{-1} x) + x$

(h) What are the values of the following C/C++ expressions ?

(i)  $(3*12)\%(5*5)$

(ii)  $!(3 > 5 \ \&\& \ 4 < 6)$

(i) Explain the meaning of the following in C/C++

```
struct student
```

```
{
```

```
    short rollno;
```

```
    short class;
```

```
    float marks;
```

```
    char grade;
```

```
};
```

```
student student1, student2;
```

## Section A

(Answer any two)

2. (a) Draw the labelled pin out diagram of the 8085 microprocessor and explain in brief the function of each pin. 10
- (b) Show that bit position of various flags in the flag register of 8085 microprocessor. Mention the purpose of the flag register. 5
3. (a) Explain each step of the following assembly language program. Identify the contents of the accumulator after the execution of the last instruction :
- LXI H,2040H
- MVI M,59H
- INR M
- INX H
- MVI M,90H
- DCR M
- MOV A,M 10
- (b) Write an assembly language program to multiply two 8-bit numbers (10H and 03H) using repeated addition. 5
4. (a) How is SIM instruction used to set interrupts ? Illustrate with an example. 5
- (b) Illustrate the steps and the timing of data flow when the instruction MVI B,35H is executed. Instruction is stored at the memory location shown below :

Memory Address	Mnemonic	Hex Code
2000H	MVI B,35H	06H
2001H	?	35H

10  
P.T.O.

## Section B

(Answer any two)

5. (a) Write a C/C++ program to determine the roots of a quadratic equation for real, imaginary and equal roots.
- (b) Explain C++ data types with appropriate examples.
6. (a) Explain the difference between the following control structures in C/C++ giving examples of each :
- (i) if-else
  - (ii) switch
- (b) What is significance of "break" in the "switch" statement in C/C++ ?
- (c) Write a C/C++ program to print the first 50 natural numbers and their sum.
7. (a) Explain the difference between a structure and an array with the help of suitable examples.
- (b) Write a C/C++ program to multiply two  $3 \times 3$  matrices.