Your Roll No. ....

5716   **B**

B.Sc. (Hons.) PHYSICS/III Sem.

Paper—PHHT–308

MICROPROCESSOR AND COMPUTER PROGRAMMING

Time : 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 from each Section A and B.

Attempt *Five* questions in all.

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

(*a*)   If the clock frequency of a Microprocessor is 2 MHz, calculate the time required to execute the following two instructions MOV C, B and MVI B, 5B H.

(*b*)   The memory address of the last location of 1 k bytes of memory chip is given as FF00 H. Specify the starting address.

(*c*)   Compare the following instructions :

(*i*)   MOV A, M and LDAX D

(*ii*)   CMP B and SUB B.

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(d) Explain the functions of the following pins in a 8085 microprocessor :

   (i) ALE

   (ii) HOLD

   (iii) READY

(e) The accumulator of an 8085 microprocessor contains C5H and carry is set. What will the accumulator and carry contain following each of the instruction given below ?

   (i) XRA A

   (ii) ADI 91H

   (iii) RRC

(f) Write the following expression in C/C++ :

$$3.5 \log_e x + \cos \theta - |x^2 + y^2| + \sqrt{2xy} + e^{-k}$$

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

(*h*)   What is the output of the program?

#include <iostream.h>

int main()

{ for (int i=0; i<8; i++)

if (i%2 == 0) cout << i + 1 << "\t";

else if (i%3 == 0) cout << i * i << "\t";

else if (i%5 == 0) cout << 2 * i-1 << "\t";

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

}

(*i*)   Variables i=3 and j=5. What will be the output of the following ?

(*i*)   cout << i << i++;

(*ii*) cout << j << ++

Section A

(Answer any *two*)

1.   (*a*)   Illustrate the data flow and list of events using a neat timing diagram when the instruction MOV C, A (Hex code 4F H) is fetched by the 8085A Microprocessor from memory location 2005H. 10

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(b) Write a program in assembly language to add two 16-bit numbers 6B89H and 7FC0H.　　5

2. (a) Draw the logic pin out diagram of 8085 microprocessor wherein all the different signals are depicted and classified in different groups.　　6

(b) Explain the instructions stepwise when the following program is executed :

　　　　MVI A, *data*

　　　　ADI 72 H

　　　　JC Display

　　　　STA 2500 H

　　　　HLT

　　Display : XRA A

　　　　STA 2500 H

　　　　HLT

What will be the contents of memory location 2500 H if *data* is (i) 8F H and (ii) 0F H?　　4

(c) Write an assembly language program to subtract two 8-bit numbers (FCH and BDH) stored in memory locations 2005H and 2006H respectively using direct addressing mode. The difference is to be stored in memory location 2007H and Borrow (if any?) in 2008H.　　5

3.   (a)   Give the memory map for the following figure if
             (i) O_0 is connected to $\overline{CE}$ of the EPROM, (ii) O_3
             is connected to the $\overline{CE}$ of EPROM, and (iii) O_5
             is connected to $\overline{CE}$ of EPROM and A_{15} is left
             as don't care (not used in the circuit).   9
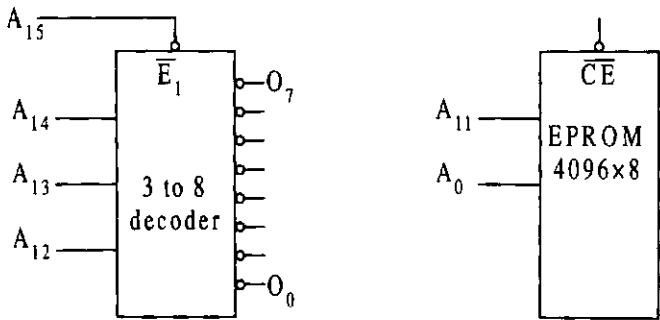
      (b)   Write an assembly language program to calculate
             Z by the following equation :

                   Z = X OR {Y AND (X OR Y)},

             where X and Y are two 8-bit numbers stored in
             two different memory locations 2000H and 2001H
             respectively.   6

Section B

(Answer any *two*)

1.   (a)   What are the different types of data supported by
             C/C++?   5

(b) What is function prototype?   2

(c) Write a C/C++ program to solve a Quadratic equation of the form $ax^2 + bx + c = 0$ for real, imaginary and equal roots.   8

2. (a) Bring out the difference between 'while' and 'do-while' loops with the help of appropriate flow-charts.   7

(b) 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.   8

3. (a) How is a structure different from an array? Explain with an example.   4

(b) Write a C/C++ program to find largest of a given list of ten numbers using array.   6

(c) What is recursion? Write a recursive function to find factorial of a number.   5