Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.Sc.(H) BT/MOLBIO / MICROBIO/GENETICS/

SEM-2/CA-201/2012

2012

INTRODUCTION TO *C*-PROGRAMMING & DIGITAL LOGIC

Time Allotted : 3 Hours *Full Marks* : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following : $10 \times 1 = 10$

i) x % y is equal to

a) $(x-(x/y))$ b) $(x-(x/y)*y)$

c) $(y-(x/y))$ d) $(y-(x/y)*y)$

ii) What would be the output of

```
{
  int x = 36, y = 5, z;
  float p;
  z = x/y;
  p = float(x) / float(y);
  printf ("z=%d and p=%f", z,p);
}
```

a) $z = 7$ and $p = 7$ b) $z = 7{\cdot}2$ and $p = 7$

c) $z = 7$ and $p = 7{\cdot}2$ d) $z = 7{\cdot}2$ and $p = 7{\cdot}2$.

iii) Hexadecimal number *E* is equal to binary number

a) 1110 b) 1101

c) 1001 d) 1111.

iv) Which of the following statements is true after execution of the program ?

```
{
 int A[10], i, *p;
 A[0] =1;
 A[1] =2;
 p = A;
 (*p)++;
}
```

a) *A* [0] = 2 b) *A* [1] = 3

c) *A* [1] = 2 d) All of these.

v) Which one is correct of the following program fragments ?

```
{
 int a, b, c;
 b = 2;
 a = 2*(b++);
 c = 2*(++b);
 }
```

a) $a = 4, c = 6$ b) $a = 3, c = 8$

c) $b = 3, c = 6$ d) $a = 4, c = 8$.

vi) Which are universal logic gates ?

a) NAND & NOR b) OR & NAND

c) NAND & XOR d) XNOR & NAND.

vii) What will be the output of the following program ?

```
int main ( )
{
    int b[]={10,20,30,40};
    int i;
    for (i=0;i<=3;i++)
        printf("\t%d",*(b+i);
}
```

a) That will not make any sense

b) 10 20 30 40

c) Compilation error

d) Addresses of cells of the array.

viii) The library function calloc( ) is declared in

a) dos.h b) stdio.h

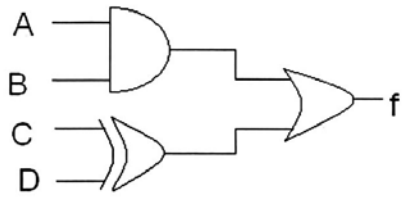
c) alloc.h d) none of these.

ix) $\overline{A + \overline{C}D}$ equals

a) $A.(C + \overline{D})$ b) $\overline{A}.(C + \overline{D})$

c) $A.(C + D)$ d) $\overline{A}.(\overline{C} + D)$.

x)



f equals

a) $(A \oplus B) + (CD)$ b) $(A + B)(C + D)$

c) $AB + (C \oplus D)$ d) $(A + B)(CD)$

xi)
```
#include<stdio.h>
#include<conio.h>
void main ( )
{
    clrscr( );
    int x = 36, y = 5, z;
    float p;
    z = x/y;
    p = float (x)/float (y);
    printf ("z=%d & p = %f", z, p);
    getch( );
}
```

The output will be

a) $z = 7$ & $p = 7$ b) $z = 7{\cdot}2$ & $p = 7$

c) $z = 7{\cdot}2$ & $p = 7{\cdot}2$ d) $z = 7$ & $p = 7{\cdot}2$.

xii) A character constant is written within

a) double quotes b) single quotes

c) both (a) and (b) d) none of these.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. State & prove the De Morgan's Theorem.
3. Draw the circuit symbol, switch equivalent circuit and truth table for a NAND gate.
4. Develop an algorithm and draw a flow chart to find G.C.D. (or H.C.F) of two integers *x* and *y*.
5. Write a *C* program to swap the contents of two integer variables.
6. What is the difference between 'while' & 'do-while' loop ?

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7. a) Write a *C* program to check whether an integer is palindrome or not.
   b) Write a *C* program to calculate the factorial of a number using function.
   c) Write a *C* program to find the transpose of a matrix.

   3×5

8. a) Differentiate between positional and non-positional number system.
   b) What are the main considerations to value each digit in positional number system ?
   c) Carry out the following conversions :
      i) $ABC_{16} = ?_8$
      ii) $125_6 = ?_4$
      iii) $765_8 = ?_{16}$
   d) Draw the circuit diagram, switch equivalent circuit and truth table of AND gate. $2 + 3 + (2 + 3 + 2) + 3$

9. a) Write a C program to evaluate the series

sum = $x + x^2 + x^3 + x... + x^{10}$

b)
```
#include<stdio.h>
#include<conio.h>
void main ( )
{
    clrscr ( );
    float  x = 4·0, y = 12·0, z = 3·5;
    x+ = 3·0;
    y* = y;
    x/=y+z;
    printf ("%f,%f,%f", x, y,z);
    getch ( );
}
```

Write down the outputs of the program.

c)
```
#include<stdio.h>
#include<conio.h>
  void main (  )
  {
   clrscr ( );
   int x, a=8, b=6, c=3, d=8;
   x=!(a>b/3)||(c!=d/3);
   printf("%d",x);
   getch ( );
   }
```

What will be the output ? 5 + 5 + 5

10. a) Find the value of *i*, *j* & *k* at the end of the program.

```
#include<stdio.h>
#include<conio.h>
void main ( )
{
   clrscr ( );
   int k = 3, i = 4, j = 6;
   k* = k++ * j– i– –;
   printf("%d,%d,%d", i, j, k);
   getch ( );
}
```

What will be the value of *i*, *j* & *k* at the output ?

b) Write a *C* program to find the sum of digit of an integer.

c) Write a *C* program to find the length of a string.

5 + 5 + 5

11. a) Create a structure to specify data on students given below :

Roll_no, Name, Dept., Course, Year of Joining

Assume that there are not more than 500 students in the college. Write a *C* function to print names of all students who joined in a particular year.

b) Explain call by value & call by reference with suitable examples.

c) Write a *C* program to find the maximum among 3 integers. 5 + 5 + 5

12. a) Write a *C* program to find the roots of a quadratic equation.

b) Write a *C* program to check whether an integer is prime or not. 10 + 5

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