SLIATE

SRI LANKA INSTITUTE OF ADVANCED TECHNOLOGICAL EDUCATION
(Established in the Ministry of Higher Education, vide in Act No. 29 of 1995)

Higher National Diploma in Information Technology
First Year, First Semester Examination – 2017
HNDIT 1103 - Structured Programming

Instructions for Candidates:

Answer five (05) questions only

No. of questions : 06

No. of pages : 04

Time : 03 Hours

Question 01

I. Define the terms flow chart and pseudo code. (2 marks)

II. Draw symbols used in flow chart to indicate the followings. (3 marks)
   a) Input
   b) Process
   c) Decision

III. Evaluate the following expressions. (4 marks)
   a) int x=4+2*3;
   b) int x=(4+2)*5;
   c) int x=4/3*2;
   d) int x=5%3;

IV. Write down whether the following statements are True or False. (5 marks)
   a) The iostream header file is useful when your program needs to receive key input and print text on the screen.
   b) Each C++ program may have many main functions.
   c) The cin>> input statement is used to receive data from keyboard
   d) A comment in C++ language starts with */ and ends with /*.
   e) C++ is case sensitive.

V. Draw a flow chart to input average marks and find the grade according to the grade system given below (6 marks)

   75 - 100   "A"
   65 - 74   "B"
   55 - 64   "C"
   45 - 54   "S"
   0 - 44   "F"

Question 02

I. Why main function is special in C++? (2 marks)

II. Put a tick mark (✓) against the identifiers which can be used for naming variables, constants or functions in a C++ program: (3 marks)
   a) repeat
   b) for
   c) Number 2
   d) 2ndName

e) Amount2

f) COUNTER_2

III. What type of error (syntax, runtime or logical) can be occurred in the following statements? (4 marks)

a) cin<<a;

b) remainder = a/b;

c) a=n/0;

d) Int i = 5;

IV. Declare a variable and assign the following data values for each. (5 marks)

a) 87.988

b) 'A'

c) 67

d) 6.897865

e) "SLIATE"

V. Write a C++ program to output the volume and area of a sphere for the input radius of the sphere. Clearly declare constants and variables in your program. (6 marks)

(Hint: Volume of a sphere=4/3 πr^3, Area of a sphere= $4\pi r^2$ where r is radius, here π=22/7)

Question 03

I. Write the syntaxes for "if-else" statement and "switch" statement. (2 marks)

II. Is "switch case" faster than "else-if"? Explain your answer. (3 marks)

III. Rewrite the following C++ code segment after removing the syntax errors (if any). Underline each correction and write reasons as comments. (4 marks)

```
char ch;
cout<<"Enter a Character\n"
cin<<ch
Switch(chr)
{
case "O": cout<< "Opened"; break;
case 'C': cout<< "Closed"; break;
default: cout<< "Incorrect Input";
}
```

IV. Write the output of the following code segments. (5 marks)

a)
```
int i = 0, j = 1;
if ((++i >= 1) && (++j >= 0))
cout << j++;
else
cout <<i++;
```

b)
```
int a=3;
switch(a)
{
case 1:
case 2: cout<< "a is 1 or 2 \n"; break;
case 3:
case 4: cout<< "a is 3 or 4 \n"; break;
default: cout<< "Incorrect Number\n";
}
```

V. Assume that x, y and t are integer variables. Initial value of x is 1. User inputs value to y. The value of x is incremented based on the following conditions.

-If 0<=y<=35, then x increments by one.

-If 36<=y<=55, then x increments by two.

-If 56<=y<=75, then x increments by three.

-If $76<=y<=100$, then x increments by four.
-If all above conditions are not true, then the value of x is same as the initial value.
Write a C++ program using **nested if-else** to output t where $t=2x^2+ y$.　　　　(6 marks)

Question 04
I.　What is the difference between "Pre Test Loop" and "Post Test Loop"?　　(2 marks)
II.　Write the syntaxes of three (03) loop structures supported by C++.　　(3 marks)
III.　What is infinite loop?
　　Give examples for Infinite Loops in for loop, while loop and do-while loop.　　(4 marks)
IV.　What is nested loop?
　　What are the outputs of the following C++ code segments?　　(5 marks)
　　a)　int i=1;
　　　　do
　　　　{
　　　　Cout<<"HNDIT\n";
　　　　i++;
　　　　}while(i<=3);
　　b)　for(int a=1; a<=1;a++)
　　　　{
　　　　for(int b=0; b<=a; b++)
　　　　{
　　　　cout<<a*b;
　　　　}
　　　　}
V.　Write a C++ codes that will print the followings using loops.　　(6 marks)
　　a)　1
　　　　12
　　　　123
　　　　1234
　　b)　***1
　　　　**22
　　　　*333
　　　　4444
　　c)　Factorial of 1 is 1
　　　　Factorial of 2 is 2
　　　　Factorial of 3 is 6
　　　　Factorial of 4 is 24
　　　　Factorial of 5 is 120　(Hint: Factorial of N is 1 X 2 X 3 X .... X N)

Question 05
I.　Compare and contrast the followings (use simple diagrams).　　(2 marks)
　　a)　Ordinary Variables and Pointer Variables
　　b)　Arrays and Structures
II.　Write down whether the following statements are true or false.　　(3 marks)
　　a)　The operator * is used to get value stored at an address that is pointed by a pointer.
　　b)　An array can have structure type elements.
　　c)　A structure can have an array type field.
III.　Write a _single statement_ in C++ to do the following tasks.　　(4 marks)
　　a)　Declare an integer variable p with the initial value 10.
　　b)　Declare an integer pointer q having the address of p,
　　c)　Declare a 2D array numMatrix with the values shown below.

3	5	7	9	11
2	4	6	8	10

d) Declare a variable e of structure type Employee having the fields name, age and salary.

IV. What would be printed from the following C++ program? (5 marks)

a) ```
void main(){
    int arr[5]={1,3,5,7};
    int i;
    for(i=3;i>0;i--)
        cout<<arr[i]<<"\t";}
```

b) ```
void main () {
    int var = 20;
    int *ip;
    ip = &var;
    cout << &var << endl;
    cout << var << endl;
    cout << ip << endl;
    cout << *ip << endl;}
```
(Assume that the Address stored in var variable is 0x7fff4bd38704)

V. Write a C++ program to output the *address* of the biggest element of an array having five integer elements randomly entered by the user. (6 marks)

Question 06

I. Give two benefits of using functions in C++ program? (2 marks)

II. Write down whether the following statements are True or False. (3 marks)
a) A function can return more than one value.
b) A local variable declared in a function is not usable outside the function.
c) A function can have more than one parameter.

III. Briefly explain the following terms in a user defined function in C++. (4 marks)
a) Formal parameter
b) Actual parameter
c) Pass by reference
d) Pass by value

IV. Identify the above terms in the following C++ programme and guess the output of the programme? (5 marks)
```
#include <iostream.h>
void swap(int first, int& second)
{
    int temp;
    temp=first;
    first=second;
    second=temp;
}
void main()
{
    int x=5;
    int y=10;
    swap(x,y);
    cout<<"x = "<<x<<"  y = "<<y;
}
```

V. Write a program which includes a function named "cal_floats" that takes two floating point arguments as pass-by-value method and output the total and average. The function should return no value. The program has to prompt the user to input values for the function parameters. (6 marks)