



# SLIATE

**SRI LANKA INSTITUTE OF ADVANCED TECHNOLOGICAL EDUCATION**

(Established in the Ministry of Higher Education, vide in Act No. 29 of 1995)

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

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Instructions for Candidates:  
Answer five (05) questions only

No. of questions : 06  
No. of pages : 04  
Time : 03 Hours

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**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= $\frac{4}{3} \pi r^3$ , Area of a sphere=  $4\pi r^2$  where r is radius, here  $\pi=22/7$ )

### 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  $0 \leq y \leq 35$ , then x increments by one.
  - If  $36 \leq y \leq 55$ , then x increments by two.
  - If  $56 \leq y \leq 75$ , then x increments by three.

-If  $76 \leq y \leq 100$ , 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)