Federal Board HSSC-II Examination
Computer Science Model Question Paper
(Curriculum 2009)

SOLUTION OF SECTION – A

Q.1 **Choose the correct answer i.e. A / B / C / D by filling the relevant bubble for each question on the OMR Answer Sheet according to the instructions given there.**

Each part carries one mark.

(Answers are underlined)

1. Which one of the following states transitions is valid?

A. Ready to Blocked	◯	B. Blocked to Running	◯
C. Running to Ready	◯	D. Terminated to Running	◯

2. Which one of the following types of processing has grouped transactions, executed in a sequence?

A. Real-time	◯	**B. Batch**	◯
C. Time-sharing	◯	D. Distributed	◯

3. Which one of the following DOS commands is used to display content of the directory?

A. DIR	◯	B. CD	◯
C. MD	◯	D. VIEW	◯

4. Identify the type of system conversion in which the old system is directly replaced by the new system:

A. Pilot	◯	B. Parallel	◯
C. Direct	◯	D. Phased	◯

5. If a = 10; b = a++; what will be the value stored in b?

A. 1	◯	B. 9	◯
C. 10	◯	D. 11	◯

6. Which one of the following statements transfers the control to the start of loop body?

A. Switch	◯	**B. Continue**	◯
C. Break	◯	D. Exit	◯

7. If x = 5, which one of the following accesses the seventh element stored in an array A?

A. A[x++] ◯ **B. A[++x]** ◯

C. A[7] ◯ D. A[x] ◯

8. The phenomenon of having two or more functions in a program with the same name but different numbers and types of parameters is called:

A. Inline function ◯ B. Nested function ◯

C. Function overloading ◯ D. Recursive function ◯

9. The dereference operator is denoted by:

A. * ◯ B. & ◯

C. ** ◯ D. && ◯

10. Which one of the following indicates the address of a variable "temp" of type float?

A. float temp& ◯ **B. &temp** ◯

C. &float temp ◯ D. temp& ◯

11. Which one of the following is the default access specifier of C++ class?

A. Private ◯ B. Public ◯

C. Protected ◯ D. Default ◯

12. The ability of a class to hide the information from outside interference and misuse is called:

A. Encapsulation ◯ B. Polymorphism ◯

C. Inheritance ◯ D. Abstraction ◯

13. Which one of the following classes inherits the base class capabilities?

A. Abstract ◯ B. Parent ◯

C. Super ◯ **D. Child** ◯

14. Identify the header file needed to read, write, and manipulate the file:

A. Ifstream ◯ B. Ofstream ◯

C. Istream ◯ **D. Fstream** ◯

15. Which one of the following functions is used to write a single character to a file?

A. get( ) ◯ B. gets( ) ◯

C. put( ) ◯ D. write( ) ◯

SOLUTION OF SECTION - B

Q. 2. Attempt any TWELVE parts from the following. All parts carry equal marks. (12*3=36)

i. Briefly write down three functions of an Operating System. (3)

ANSWER

Functions of Operating System

a. Providing Security to the users.
b. Detecting and handling errors during the execution of jobs.
c. Managing memory.
d. Managing the devices attached with the processor
e. Providing user interface

ii. Differentiate between process and thread along with one example of each. (2+1)

ANSWER

Difference between Process and Thread. (any 03)

Definition	A process is a program under execution i.e an active program.	A thread is a lightweight process that can be managed independently by a scheduler.
Context switching time	Processes require more time for context switching as they are heavy then thread.	Threads require less time for context switching as they are lighter.
Memory Sharing	Processes are totally independent and don't share memory.	A thread may share some memory with its peer threads.
Communication	Communication between processes requires more time than between threads.	Communication between threads requires less time than between processes .
Blocked	If a process gets blocked, remaining processes can continue execution.	If a user level thread gets blocked, all of its peer threads also get blocked.

iii. Write down the reasons of the following invalid variable names: (3)

i. 3a ii. S$ iii. float

ANSWER

Reasons of invalid variables

3a	Variable name is started with a digit which is invalid.
s$	No special character like $ is allowed except underscore
float	It is a reserved words which is not allowed as variable name.

iv. What will be the output of the following program segment? (1+1+1)

```
int x = 3, y = 17;
cout << x / y << y / x << (y / x) + (x % y);
```

ANSWER

058

v. Write down the output of the following statements: (1+1+1)

i. **(x > 0) && (y < 10) where x = 5, y = 5**

ii. **13 + 21 % 4 – 2**

iii. **int m = 2, n = 4; m *= 2; n += m;**

ANSWER

i. true/1 ii. 12 iii. m = 4 n = 8

vi. Write a C++ program that prints sum of squares of integers from 1 to 10. (3)

ANSWER

```
#include<iostream>
void main()
{
   int i, sum=0,s;
   for(i=1;i<=10;i++)
    {
        s=i*i;
        sum+=s;
    }
cout<<"\n Sum of square of integers = "<<sum;
}
```

vii. Rewrite the following program segment using conditional operator. (3)

```
if (a > b) large = a;  else
        large = b;
```

ANSWER

```
large = (a > b) ? a : b;
```

viii. Compare strcpy( ) and strcat( ) functions with examples. (1+2)

ANSWER

strcpy()

is the string copy function. It copies one string into another string.

Syntax:

strcpy(string1, string2);

The two parameters to the function, string1 and string2, are strings. The function will copy the string string2 into the string 1.

strcat()

is the string concatenate function. It concatenates strings.

Syntax:

strcat(string1, string2);

The two parameters to the function, string1 and string2 are the strings to be concatenated. The above function will concatenate the string string2 to the end of the string string1.

ix. Rewrite the program segment after removing errors: (3)

```
int a{10}, i;   cout >> " enter ten numbers ;
for (i = 1; i < 10: i++)
        cin << a{i};
```

ANSWER

After removing the errors the programs is given:

```
int a[10], i;       cout << " enter
ten numbers ";
    for (i =0; i < 10; i++)
cin >> a[i];
```

x. List three advantages of using function overloading in a program. (3)

ANSWER

- Easier to use with single name for different tasks.
- Provides more readability and consistency.
- Speeding up the program execution.

xi. Write down the syntax of function prototype for the following functions: (1+1+1)

a. **A function named table with one integer parameter by value.**

b. **A function named area with no parameters and returns a float.**

c. **A function named large with two floating point numbers by reference.**

ANSWER

a. void table(int);
b. float area();
c. void large(float &, float &);

xii. If ptr is a pointer variable, what will be the output of the following statements? (1.5+1.5)

```
int n = 245, *ptr = &n;
 cout  <<  ptr ;
cout  <<  *ptr ;
```

ANSWER

cout << ptr ; it will print the address of variable n.

cout << *ptr ; this pointer variable will print the value of variable n.

xiii. Define public and private access specifier.

ANSWER

Public and private are called **access specifiers** which define the accessibility or visibility level of class members. By default the class members are private.

If the class members are public, it can be accessed from outside the class. But private class members are not accessible from outside.

xiv. Define a class Student that contains private and public data members including function get( ). (3)

ANSWER

```
class Student
{   private:
            int age = 0; float height = 0.0;
    public:
           get(int age, float height);
};
```

xv. Write down the use of bof() and eof() functions. (1.5+1.5)

ANSWER

C++ provides a special function, eof( ), that returns nonzero (meaning TRUE) when there are no more data to be read from an input file stream, and zero (meaning FALSE) otherwise.

The BOF property is automatically set to true when the record pointer is before the first record in the record set. The BOF property is also true if the record set is empty.

xvi. Write down the purpose of any three modes of file opening. (3)

ANSWER

a. **ios::app**

Append mode. All output to that file to be appended to the end.

b. **ios::ate**

Open a file for output and move the read/write control to the end of the file. c. **ios::in**

Open a file for reading.

d. **ios::out**

Open a file for writing.

SOLUTION OF SECTION – C

Note: Attempt any THREE questions. All questions carry equal marks. (3 * 8 = 24)

Q 3. What are the objectives of System Development Life Cycle? Explain the following phases of SDLC:
i. Feasibility Study ii. Requirement Engineering ANSWER

The Software Development Life Cycle, or SDLC for short, has cemented itself as the de-facto process to help build information systems, systems engineering and software engineering from the ground up by encompassing key phases that can be grouped in planning, implementation, and maintenance of the system solution. An SDLC has three primary business objectives: - ○ Ensure the delivery of high quality systems ○ Provide strong management controls ○ Maximize productivity.

i. A **feasibility study** is part of the initial design stage of any project/plan. It is conducted in order to objectively uncover the strengths and weaknesses SWOT Analysis. A SWOT analysis is used to study the internal and external environments of a company and is part of a company's strategic planning process. In addition, a of a proposed project or an existing business. It can help to identify and assess the opportunities and threats present in the natural environment, the resources required for the project, and the prospects for success. It is conducted in order to find answers to the following questions:

Does the company possess the required resources and technology?
Will the company receive a sufficiently high return on its investment?

A feasibility report should include the following sections: ○ Description of the Product/Service ○ Technology Considerations ○ Product/ Service Marketplace ○ Identification of the Specific Market ○ Marketing Strategy ○ Organizational Structure ○ Schedule ○ Financial Projections

ii. Requirement engineering is the process of collecting, validating and managing the requirements essential for the development of the software, specified by the clients or the end-users. This task is performed at the initial stages of software development.

Requirement engineering provides the appropriate mechanism to understand: ○ what the customer desires
- ○ analyzing the need, and assessing feasibility, ○ negotiating a reasonable solution, ○ specifying the solution clearly,
- ○ validating the specifications and managing the requirements

Thus, requirement engineering is the disciplined application of proven principles, methods, tools, and notation to describe a proposed system's intended behavior and its associated constraints.

Q.4 (a): Describe any two types of loop.

ANSWER

A loop is a control structure that repeatedly executes a sequence. Looping structure are more appropriate where repetition of statement is required. Following are the types of loops

FOR LOOP:

For loop is also called iteration loop. It is used to execute one or more statements for a specific number of times. It is more suitable for a situation where number of iteration is known. Starting and ending points are given. Loop will check the counter value with ending point. The loop will continue until counter variable meets the ending point. Its syntax is:

SYNTAX:

```
For(initialization; condition; interval )
        {   Block of statements    }
```

Example:

```
#include <iostream.h>
#include <conio.h>
void main ()
{       int k;
        for ( k=1; k<5;k++)
        {
        cout<<"I m a student";
         cout<<"I was born in 2004" ;
        }
        getche();
}
```

While Loop

It is also known as conditional loop. In this loop, condition is checked at the beginning. The body keeps on executing until the condition is true.

Syntax

```
while(condition)
{
        Block of Statements
}
```

Example:

```
#include <iostream.h>
#include <conio.h>
void main ()
{
        int k = 1;
         while(k<5)
        {
                cout<<"I m a student";
                cout<<"I was born in 2004"
                k = k + 1;
        }
       getche();
}
```

Q 4. (b) Write a C++ program that reads a number and prints whether it is prime or composite.

ANSWER

```
#include <iostream>
 void main()
{     int n, i, m=0, flag=0;
      cout << "Enter the Number to check Prime: ";
      cin >> n;
      m=n/2;
      for(i = 2; i <= m; i++)
      {
         if(n % i == 0)
               {
                  cout<<"Number is Composite"<<endl;
                  flag=1;
                  break;
               }
         }
         if(flag==0)
          cout << "Number is Prime."<<endl;
       }
```

Q **5. Determine the output of the following C++ program and fill the columns of the given table. (2+3+3)**

```
void main(void)
{  int a [6] = {12,27,36,55,72,83};
        int i, s = 0, v=0;
          for (i = 0 ; i <= 5; i++)
          {
            if(a [i]  % 3 == 0)
                  {
                        cout<<a [i] ;
                        s = s + a [i];
                        v = s * 3 – a [i] % 7;
                  }
             cout <<  s << "\t" << v;
          }
 }
```

ANSWER

i	a[i]	s	V
0	**12**	**12**	**31**
1	**27**	**39**	**111**
2	**36**	**75**	**224**
3		**75**	**224**
4	**72**	**147**	**439**
5		**147**	**439**

Q.6 Write a C++ program to calculate the factorial of a number. The program inputs a number and pass it by reference to a user-defined function factorial.

ANSWER

```
#include<iostream>
using namespace std;
void findFct(int, int *);
int main()
{
    int num, fact=1;
    cout<<"Enter the Number: ";
    cin>>num;
   findFct(num, &fact);
    cout<<"\nFactorial = "<<fact;
    cout<<endl;
   return 0;
}
void findFct(int n, int *f)
{
                int i;
                 for(i=n; i>=1; i--)
                 *f = (*f)*i;
}
```