2920/203
OBJECT ORIENTED PROGRAMMING
July 2018
Time: 3 hours

1. (a) State **three** merits of using a strongly typed language in applications development. (3 marks)

(b) Distinguish between *reference* variable and *global* variable as used in Object Oriented Programming. (2 marks)

(c) Describe Tokens as used in C++ programming language citing **three** categories. (5 marks)

(d) (i) Outline **two** differences between a *class* and an *Object* as used in Object Oriented Programming. (4 marks)

(ii) Write a C++ program that prompts the user to enter integer values from 5 to 9 then calculates the average. (6 marks)

2. (a) Table 1 shows C++ programming language escape sequences. Outline the purpose of each of them. (4 marks)

	Escape sequence
(i)	\r
(ii)	\t
(iii)	\v
(iv)	\a

Table 1

(b) Explain each of the following, citing an example in each case:

(i) type conversation ;

(ii) type casting. (6 marks)

(c) (i) Rearrange the following operators in order of precedence from the highest priority to the lowest.

Sizeof, – (cast),! (unary), ++. (2 marks)

(ii) Outline the difference between *call by value* and *call by reference* in a user defined function in C++. (4 marks)

(d) Table 2 shows a C++ program code segment representing functions I, II, III and IV with functions calls 1, 2, 3 and 4. Identify the function that is called for each case. (4 marks)

```
...
long total (int x); //..... I
char choose( char a, char b); //.....II
char choose (char a); //.....III
float total (int x, float y); //.....IV
void main()
{
...
total(n); // .....1
choose('c'); // ..... 2
choose('c','d'); // .....3 -
total(n,n1); // .....4
}
```

Table 2

3. (a) Outline **three** rules followed when writing the floating point data types in scientific notation. (3 marks)

(b) Explain the uses of each of the following with respect to C++ pointers:
(i) free ();
(ii) realloc ().
(4 marks)

(c) Table 3 shows the C++ control structure syntax. Use it to answer the questions that follow.

```
if (condition)
statement1;
statement2;
/*****************/
```

Table 3.

(i) Identify the error in the syntax;
(ii) Rewrite the syntax correctly.
(4 marks)

(d) Write a C++ program code for a class candidate with following description:

Private Members

- A data member RNo (Registration Number) of type long
- A data member Name of type string
- A data member Score of type float
- A data member Remark of type string
- A member function AssignRem( ) to assign Remarks as per the Score obtained by a candidate. Score range and the respective Remarks are shown as follows:

Score	**Remarks**
>=50	Selected
less than 50	Not selected

Public members

- A function ENTER ( ) to allow user to enter values for RNo, Name, Score & call function AssignRem() to assign the remarks.
- A function DISPLAY ( ) to allow user to view the content of all the data members.

4. (a) State **four** restrictions when overloading operators in C++. (9 marks)

(b) A C++ program segment has the following variable declaration statements: (4 marks)

```
int a=5, b=20, c=10,d=5,e=7;
int result=0;
```

Determine the output of each of the following:
(i) result= (a * b) + c – d % e;
(ii) result= a * (b + c) – d % e.
(4 marks)

(c) Write a C++ program function to delete an element at a desired point in array A. (6 marks)

(d) Each element in an array DATA [20][50] requires 4 bytes of storage. Base address of data is 2000, determine the location of DATA [10][10] when the array is stored as:

(i) row major;

(ii) column major. (6 marks)

5. (a) Distinguish between *Multiple Inheritance* and *Hierarchical Inheritance* as used in

6. (a) (i) Outline **four** characteristics of a destructor. (4 marks)

(ii) Explain the effect of *Object Slicing* during class inheritance. (2 marks)

(b) Describe the functions of each of the following in C++:

(i) assignment expression;

(ii) copy constructor. (4 marks)

(c) Distinguish between *static memory allocation* and *Dynamic memory allocation* with respect to C++ pointers. (4 marks)

(d) Sheba has defined a C++ program segment with the following code:

```
class Exam
{
     int Marks;
     char Subject[20];
public:
     Exam () //Function 1
      {
          Marks = 0;
          strcpy (Subject,"Computer");
     }
     Exam(char,int) //Function 2
          {
               Marks = 0;
               strcpy(Subject,S);
          }
     Exam(int M) //Function 3
               {
               Marks = M;
               strcpy(Subject,"Computer");
               }
          }
```

Write statements in C++ to carry out the following:

(i) execute Function 2 and Function 3 of class Exam;

(ii) implement a copy constructor for the class. (6 marks)

7. (a) Explain **two** ways of eliminating *Ambiguity* in a Mult-path class inheritance. (4 marks)

(b) Outline **four** properties of an abstract class. (4 marks)

(c) Distinguish between a *virtual table* and a *virtual pointer* as used in polymorphism. (4 marks)

(d) Declare a class max, which has 3 integer data type members x, y and z, a function read to input the values of the data members and a function display to display, the greatest number between them. The program should prompt the user to enter the values from the keyboard. (8 marks)

8. (a) Table 4 shows I/O Console functions. State the purpose of each. (2 marks)

	I/O Function
(i)	putchar()
(ii)	gets()

Table 4

(b) State the meaning of each of the following file mode parameters.

(i) ios::beg;

(ii) ios::cur;

(iii) ios::end. (3 marks)

(c) (i) State **two** types of exceptions in C ++ programs. (2 marks)

(ii) With the aid of a block diagram, explain the exception handling mechanism in C++ Programming language. (5 marks)

(d) (i) State the meaning of each of the following C++ program statements:

(I) `char a[]="string";`

(II) `char *p="string";` (2 marks)

(ii) Write a function in C++ to count and display the number of lines starting with alphabet 'A' contained in a text file "STORY.TXT". (6 marks)

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