

2021

MATHEMATICS — HONOURS

Paper : SEC-A-2

(Object Oriented Programming in C++)

Full Marks : 80

The figures in the margin indicate full marks.

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

1. Each question below is followed by four possible answers of which exactly one is correct. Choose the correct answer with proper justification/explanation (whenever applicable) for your choice : 2×10
- (a) In C++ the function `main` has a default return type
- (i) float (ii) string
(iii) character (iv) integer.
- (b) What will be the output of the following program?
- ```
#include<iostream.h>
int main ()
{ char *n;
 cout<<sizeof(n) ;
 return 0;
}
```
- (i) 2                                              (ii) 1  
(iii) 4                                          (iv) 0.
- (c) Dynamic binding is done using the key-word
- (i) virtual                                      (ii) inline  
(iii) static                                      (iv) void.
- (d) Wrapping data and its related functionality into a single entity is known as
- (i) Abstraction                                 (ii) Encapsulation  
(iii) Polymorphism                             (iv) Modularity.
- (e) How to access the private member function of a class?
- (i) Using class address                        (ii) Using object of class  
(iii) Using object pointer                    (iv) Using address of member function.

**Please Turn Over**

(f) Which of the following is not a type of constructor?

- |                           |                                 |
|---------------------------|---------------------------------|
| (i) Friend constructor    | (ii) Copy constructor           |
| (iii) Default constructor | (iv) Parameterized constructor. |

(g) Which statement gets affected when  $i++$  is changed to  $++i$  ?

- |                     |                                                    |
|---------------------|----------------------------------------------------|
| (i) $i = 20; i ++;$ | (ii) <code>for (i = 0; i &lt; 20; i ++)</code> { } |
| (iii) $a = i ++;$   | (iv) <code>while (i ++ = 20) count i ;</code>      |

(h) What is the output of the code?

```
include <iostream>
using namespace std;
class cons
{
 public :
 int m;
 cons ();
} s;
cons : : cons ()
{
 m = 11; }
int main ()
{
 cout << "s.m"; }
```

- |                     |             |
|---------------------|-------------|
| (i) 0               | (ii) 11     |
| (iii) unpredictable | (iv) error. |

(i) Which of the following operator, when overloaded is not inherited by the child class?

- |          |         |
|----------|---------|
| (i) *    | (ii) =  |
| (iii) ++ | (iv) -. |

(j) A template class

- (i) is designed to be stored in different containers
- (ii) works with different data types
- (iii) generates objects which must be identical
- (iv) generates classes with different numbers of member function.

## Unit - 1

2. Answer **any four** questions :

- (a) What is object-oriented programming? Distinguish between data abstraction and data encapsulation in object-oriented programming. 1+4
- (b) Write a C++ program to calculate the variance and standard deviation of N numbers. Use the formula  $\text{Mean} = \bar{x} = \frac{1}{N} \sum_{i=1}^N x_i$  Variance =  $\frac{1}{N} \sum_{i=0}^N (x_i - \bar{x})^2$   
Standard Deviation =  $\sqrt{\frac{1}{N} \sum_{i=0}^N (x_i - \bar{x})^2}$  5
- (c) Write 5 differences between C and C++. 5
- (d) Write a C++ program swapping two numbers using pointers. 5
- (e) Define an array. Explain types of arrays with example. 2+3
- (f) What is the difference between pointers to constants and constant pointers? Give examples. 5
- (g) Explain enumeration data type with an example. 5

## Unit - 2

3. Answer **any four** questions :

- (a) Write a C++ program to set number of precision points. Display the results of  $\sqrt{7}$  in different precision settings from precision 10 to 1. 5
- (b) Write a C++ program to find the octal representation of a given positive number. 5
- (c) List out the types of Inheritance. Discuss in detail about any two Inheritance concepts with an example program. 5
- (d) What is polymorphism? Explain different types of polymorphism. 2+3
- (e) What is friend function and friend class and what are the merits and demerits? 2+3
- (f) Write a C++ program to implement binary operator overloading over '+' operator to add two complex numbers. 5
- (g) What is the output of the code? 5

```
include <iostream>
using namespace std;
class cons
{
public:
 int m;
 void init ()
 {
```

Please Turn Over

```

 m = 80; }
 cons ()
 {
 init (); }
};

int main ()
{
 cons S;
 cout << S.m; }

```

### Unit - 3

4. Answer **any four** questions :

- (a) Write a C++ program to arrange N integers in descending order. 5
- (b) What is the need of using function templates? How will you create and use the function template? 1+2+2
- (c) Write a C++ program to generate fibonacci numbers using copy constructor. 5
- (d) Write a program to create a template to find the maximum value stored in an array. 5
- (e) Explain how to handle exceptions using try, catch and throw mechanism. 5
- (f) Predict the output of the following code : 5

```

include <iostream>
using namespace std;
namespace a_name_space{
int fl(int a, int b)
{
 int c = a+b;
 cout << c << " "; }
}
name space b_name_space{
 int fl (int a, int b)
 {
 int c = a-b;
 cout << c << " "; }
 }
int main ()
{
 a_name_space :: fl (2, 2);
 b_name_space :: fl (1, 1);
}

```

- (g) Write a C++ program to find the HCF and LCM of three positive integers. 5
-