

2020

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 (i), (ii), (iii) and (iv) of which exactly one is correct. Choose the correct answer with proper justification/explanation (wherever applicable) for your choice : 2×10

(a) In a class, encapsulating an object of another class is called

- | | |
|-------------------|---------------------|
| (i) Abstraction | (ii) Composition |
| (iii) Inheritance | (iv) Encapsulation. |

(b) A phone is made up of many components like display, camera, sensors, processor etc. If the processor performs all the operations, display shows the display only, the camera is for picture, and the phone is represented as a whole. Then which among the following have highest level of abstraction?

- | | |
|-------------|-----------------|
| (i) Display | (ii) Camera |
| (iii) Phone | (iv) Processor. |

(c) Which is Abstract Data Type in C++?

- | | |
|-------------|-------------|
| (i) int | (ii) float |
| (iii) class | (iv) array. |

(d) Suppose you have created a class like this :

```
class A {  
    ≡  
};
```

Then the statement

```
A obj;
```

will call automatically _____.

- | | |
|------------------------|---------------------------|
| (i) Destructor | (ii) Constructor |
| (iii) Copy constructor | (iv) Assignment operator. |

Please Turn Over

- (d) Explain the different types of operators in C++. 5
- (e) (i) Explain enumeration data type with an example.
(ii) Write a statement that declares an enumeration called speeds with the enumerators obsolete, single and album. Give these three names the integer values 78, 45 and 33. 3+2
- (f) Write a C++ program to reverse a string. 5
- (g) What are the differences between pointers to constants and constant pointers? Give examples. 5

Unit - II

3. Answer **any four** questions :

- (a) Write a C++ program to exchange values between two classes using the concept of friend function. 5
- (b) What is operator overloading? Write a C++ program to subtract two given 4×4 matrices using concept of operator overloading. 1+4
- (c) Write a function that takes two distinct values as arguments and returns the larger one. Include a main() program that accepts two distinct values from the user, compares them, and displays the larger. 2+3
- (d) Define a class of triangles. Write member functions to get base and height of a triangle. Write a global function which creates an instance of the class triangle and computes area of the triangle. 1+2+2
- (e) Explain the concept of exception handling. Write a C++ program containing a possible exception. Use a try block to throw it and catch block to handle it properly. 1+4
- (f) How does polymorphism promote extensibility? Explain the various types of polymorphism with example. 5
- (g) What do you mean by constructor and destructor? Explain constructor with an example. 2+3

Unit - III

4. Answer **any four** questions :

- (a) Write a program in C++ to find the sum of $\frac{1}{1} + \frac{1}{3} + \frac{1}{5} + \frac{1}{7} + \frac{1}{9} + \dots + \frac{1}{2N+1}$ where N is a positive integer. 5
- (b) (i) Identify the error (if any) in the following program :

```
# include <iostream.h>
class student
{int marks;
public: student(){}
student (int x)
{
marks = x
}
};
```

Please Turn Over

```
void main()
{
    student s1(100);
    student s2();
    student s3 = 100;
}
```

(ii) Write down the output of the following program :

```
#include <iostream.h>
int a=10;
void main()
{
    int a=15;
    cout<<::a<<"\n";
    cout<<a<<"\n";
}
```

2+3

- (c) Write a C++ program to find GCD of two positive integers. 5
- (d) What is the use of copy constructor? Explain the concept of copy constructor with the help of a suitable example. 1+4
- (e) Write a program to find cube of a data using template. The data may be an integer, float or double number. 5
- (f) What is an 'exception'? Explain the best way of exception handling with a suitable example. 2+3
- (g) Write a C++ program to compute the determinant of a given 4×4 matrix. 5
