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No of MCQs	20
No. of SAQs	03
No. of Pages	09

GENERAL SIR JOHN KOTELAWALA DEFENCE UNIVERSITY
BACHELOR OF SCIENCE HONORS IN ENGINEERING

INTAKE 39 – 2ND SEMESTER EXAMINATION 2022

OBJECT ORIENTED PROGRAMMING
(IT 2022)

Instructions:

Duration: 02 Hours

The paper contains **Part A** and **B**.

Answer **both** Part A and B

The Part A contains **20 MCQs** and in each of the questions **1 to 20**, pick one of the alternatives from **i, ii, iii, iv** which is **correct** and **mark your response in the provided answer sheet with a cross (x)**.

Answer **Part B** in the provided answer book.

Calculators are **Not Allowed**.

If you have any doubts about the interpretation of the wording of a question, make your own decision, but clearly state it on the answer script.

Part A

1. A computer language that is closer to human languages is known as
 i. High-level language
 ii. Programming language
 iii. Assembly language
 iv. Machine language

2. Which of the following is a fifth-generation programming language?
 i. Mercury
 ii. Java ~
 iii. BASIC - High level - 3rd
 iv. C++ -

3. Which of the following is not a characteristic of procedure-oriented programming (POP)?
 i. Emphasis on algorithm
 ii. Provides a modular structure for programs
 iii. Large programs are divided into multiple functions
 iv. Functions share global data

4. Which of the following statement is FALSE with machine language?
- i. Machine language instruction can be directly executed by the CPU
 - ii. A language that is much closer to human languages
 - iii. Also known as object code
 - iv. Extremely tough to comprehend
5. Which of the following statement(s) is/are correct about objects?
- A. Class is an instance of an object
 - B. Classes allow the data and functions to be hidden
 - C. Classes are user-defined types
- i. A and B only
 - ii. B and C only
 - iii. A and C only
 - iv. All A, B, and C
6. Consider the C++ code given below and identify the class name, object, and variable(s) which are mentioned using X, Y, and Z respectively.

```
class Hall {  
public:  
double length, height, breadth;  
  
double area() {  
return length * breadth;  
}  
};  
  
int main  
Hall hall;  
hall.length = 30;  
hall.height = 40;  
hall.breadth = 30;  
return 0;  
}
```

- i. X = Hall, Y = Hall, Z = length, height, breadth
- ii. X = Hall, Y = Hall, Z = Length, Height, Breadth
- iii. X = Hall, Y = hall, Z = Length, Height, Breadth
- iv. X = Hall, Y = hall, Z = length, height, breadth

7. Which access specifier allows the programmer to make private members that can be inherited?
 - i. Private
 - ii. Public
 - iii. Protected
 - iv. Protected and public
8. If the same message is passed to objects of several different classes and all of those can respond in a different way, what is this feature called?
 - i. Inheritance
 - ii. Overloading
 - iii. Polymorphism
 - iv. Overriding
9. Consider the following scenario and select the most suitable answer.

A phone is made up of many components such as a motherboard, camera, sensors and etc. If the processor represents all the functioning of the phone, the display shows the display only, and the phone is represented as a whole. Which among the following has the highest level of abstraction?

- i. Motherboard
- ii. Display
- iii. Camera
- iv. Phone

10. Consider the C++ code given below and choose the most suitable answer.

```
class MyClass {  
public:  
void Method1();  
};  
  
void MyClass :: Method1() {  
cout << "Hello World!";  
}
```

- i. Code shows inside class definition
- ii. Code shows outside class definition
- iii. Code shows both inside and outside class definition
- iv. None of the above

11. Consider the below statements and choose the most appropriate answer which is matched with the statements.

- A. Doesn't have a return type.
- B. Automatically invoked when the objects are created
- C. They cannot be virtual

- i. this pointer
- ii. Constructor
- iii. Destructor
- iv. Array

12. Which among the following is correct for a hierarchical inheritance?

- i. Two base classes can be used to be derived into one single class
- ii. Two or more classes can be derived into one class
- iii. One base class can be derived into other two derived classes or more
- iv. One base class can be derived into only 2 classes

13. Consider the below C++ code and select the correct constructor type.

```
class Shapes {  
public:  
    int length;  
    Shapes (int y) {  
        length = y;  
    };  
  
    int main() {  
        Shapes s1(40);  
        Shapes s2(20);  
        cout << s1.length << "\n";  
        cout << s2.length << "\n";  
        return 0;  
    }  
}
```

- i. Dynamic constructor
- ii. Copy constructor
- iii. Parameterized constructor
- iv. Default constructor

14. Which of the following statements is TRUE about "Aggregation"

- i. The part can only belong to one object x
- ii. The part can belong to more than one object at a time
- iii. The part does not know about the existence of the object x
- iv. The part has its existence managed by the object x

15. Hiding the information about the implementation is known as
- i. Encapsulation
 - ii. Polymorphism
 - iii. Data abstraction
 - iv. Control abstraction
16. Which of the following statements is correct about “Encapsulation”?
- A. Access specifiers are very important to implement encapsulation in C++
 - B. It gives flexibility and extensibility to the code
 - C. Can be used to bundle variables and functions inside a single object
- i. A and B only
 - ii. B and C only
 - iii. A and C only
 - iv. All A, B, and C
17. Which of the following statements is correct?
- A. Polymorphism can be classified as compile-time polymorphism and run-time polymorphism
 - B. Compile-time polymorphism can be achieved by operator overloading
 - C. Run-time polymorphism can be achieved by using virtual functions
- i. A and B only
 - ii. B and C only
 - iii. A and C only
 - iv. All A, B, and C
18. Which of the following statements is incorrect about “Composition”
- i. Also known as object composition
 - ii. Depicts the “has-a” relationship
 - iii. The class is easier to write, debug, understand and usable by other programmers
 - iv. It is the process of creating complex classes from simple classes
19. How can Encapsulation be achieved?
- i. Using Access Specifiers
 - ii. Using only private members
 - iii. Using inheritance
 - iv. Using Abstraction
20. Which among the following best describes Inheritance?
- i. Copying the code already written
 - ii. Using the code already written once
 - iii. Using the data and functions into the derived segment
 - iv. Using already defined functions in programming language

Part B

Answer all questions

Question 01

(a) Programming language is a system of notation for writing computer programs.

- i. Briefly describe programming language generations. - 1st Gen - Machine 2nd - Assembly, Mercury 3rd - DBs, PL/I, COBOL
- ii. Compare and contrast procedural programming and object-oriented programming.

[3 x 2 Marks]

(b) State whether the following statements are TRUE or FALSE. If it is FALSE justify your answer.

- i. Object can be introduced as an instance of a class.
- ii. Small inline functions have better efficiency.

[2 x 2 Marks]

(c) Create a class named **Cuboid** that has four data members, length (type **float**), breadth (type **float**), height (type **float**) and color (type **string**).

Your class should have:

- A constructor with default values for length = 15.5, breadth = 7.0, height = 3.5 and color = "yellow".
- A parameterized constructor that initializes the four data members.
- Provide set and get functions for each data member.
- Provide a member function named **CalculateVolume** that calculates the volume of the cuboid.

Write the class declaration only, not the method implementation.

[10 Marks]

Question 02

(a) Answer following questions

- i. List three advantages of Encapsulation.
- ii. Briefly describe below access specifiers.
 - a. Public
 - b. Private
 - c. Protected

[3 x 2 Marks]

- (b) Abstraction means displaying only essential information and hiding the details. Clearly describe the difference in between abstraction using classes and abstraction in header files by providing suitable examples.

[6 Marks]

- (c) Consider the following codes given below and write the output.

i.

```
#include <iostream>
using namespace std;
class Person {
private:
    string name;
    int age;
public:
    Person()
    {
        cout<<"Default constructor is called"<<endl;
        name = "student";
        age = 12;
    }
    void display()
    {
        cout<<"Name of current object: "<<name<<endl;
        cout<<"Age of current object: "<<age<<endl;
    }
};
int main()

{
    Person obj;
    obj.display();
    return 0;
}
```

ii.

```
#include <iostream>
using namespace std;
class Rectangle {
public:
    int length;
    int breadth;
    Rectangle(int len, int brth) : length(len), breadth(brth) {}
    int getArea() {
        return length * breadth;
    }
};
int main() {
    Rectangle rect(8, 6);

    cout << "Area = " << rect.getArea();
    return 0;
}
```

[4 x 2 Marks]

Question 03

(a) Answer the following questions. ~~Ques. 03~~ Area and Breadth

- i. Classify the types of polymorphism. ~~Ques. 04~~
- ii. Compare and contrast composition and inheritance.

[3 x 2 Marks]

(b) State whether the following statements are TRUE or FALSE. If it is FALSE justify your answer.

- i. The process of building complex classes from simple classes is called as composition. ~~Ques. 05~~
- ii. Figure 1 shows the hierarchical inheritance. ~~T~~

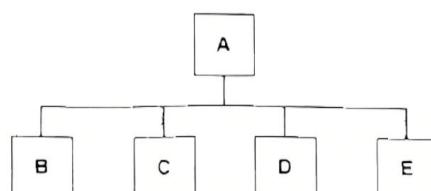


Figure 1.

[3 x 2 Marks]

(c) A school is comprised of different types of members mainly including students, administrative officers, academic staff and non-academic staff. Among them, students consist of primary school students and secondary school students while administrative staff contains principal, vice-principal and registrar.

(i) Draw a UML diagram for the Members class hierarchy.

[4 Marks]

(ii) Write class headers for each of the above classes.

#include "student.h"
#include "student.h"

[4 Marks]

end if

---- END OF THE PAPER ----