

CICT PART II SECTION 4

OBJECT ORIENTED PROGRAMMING

THURSDAY: 29 November 2018.

Time Allowed: 3 hours.

Answer ALL questions. Marks allocated to each question are shown at the end of the question. Show ALL your workings.

ALL programs written should be in Java object oriented programming language.

QUESTION ONE

- (a) Outline four limitations of adopting object oriented approach in software development. (4 marks)
- (b) Describe each of the following types of Java programs:
- (i) Applets. (2 marks)
  - (ii) Applications. (2 marks)
- (c) Citing an example in each case, explain each of the following terms as used in object oriented programming:
- (i) Impure function. (3 marks)
  - (ii) Infinite loop. (3 marks)
- (d) Study the Java code snippet given below:

```
Class academic
{
    int x, y;
    Void access ( );
    {
        int a, b;
        academic student = new academic ( );
        system.out.println ("Object Created");
    }
}
```

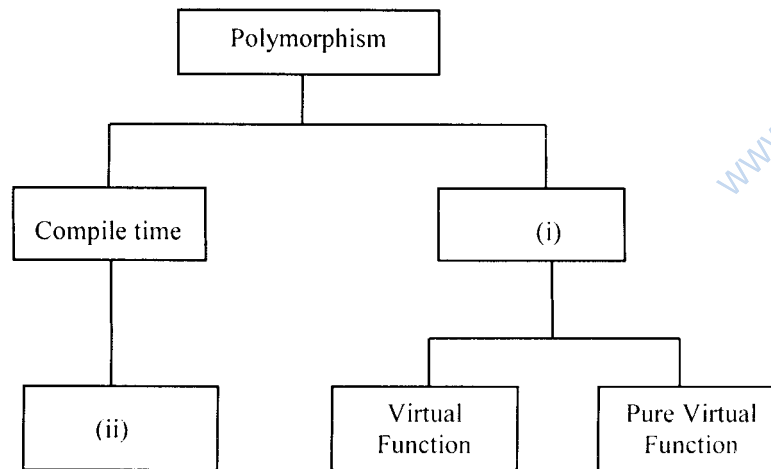
Required:

- (i) Identify the object name of class academic. (1 mark)
- (ii) Name the class variables used in the program. (1 mark)
- (iii) Write the local variables used in the program. (2 marks)
- (iv) State the type of the function used in the program and its name. (2 marks)

(Total: 20 marks)

## QUESTION TWO

(a) The diagram below shows the types of polymorphism in Java programming language:



### Required:

(i) Identify the parts labelled (i) and (ii) above. (2 marks)

(ii) Explain the function of the parts identified in (a) (i) above. (2 marks)

(b) XYZ Company Ltd. experiences frequent cyber attacks. The manager has recommended that employees should use a password with a combination of various character composition but in vain. You have been requested to develop a program that will check whether a given password string is valid. A valid password should meet the following conditions:

- Must have at least 10 characters.
- Should consist of a combination of letters and digits.
- It must contain at least 2 digits.

### Required:

Write a Java program to implement the above project. (8 marks)

(c) The following Java program contains lines numbered 1, 2, 3 and 4.

```
Public static void main (string args [ ])
{
1. System.out.println ('a' + 'b');
2. System.out.println ("H" + 'a' + 'b');
3. System.out.println ('a' + 'b' + "H" );
4. System.out.println ('a' + 'b' + "H" + 'a' + 'b' );
}
```

Use the ASCII values; 97 and 98 for characters a and b respectively.

### Required:

Citing the function of each numbered statement, write down the results to be printed by each line after the program is executed. (8 marks)

**(Total: 20 marks)**

## QUESTION THREE

(a) Explain object initialisation using constructors. (2 marks)

(b) In relation to object oriented programming, distinguish between the following terms:

(i) Primitive and reference types. (2 marks)

(ii) Instantiation and encapsulation. (2 marks)

(c) (i) Citing four reasons, justify why programmers are encouraged to use Java system packages. (4 marks)

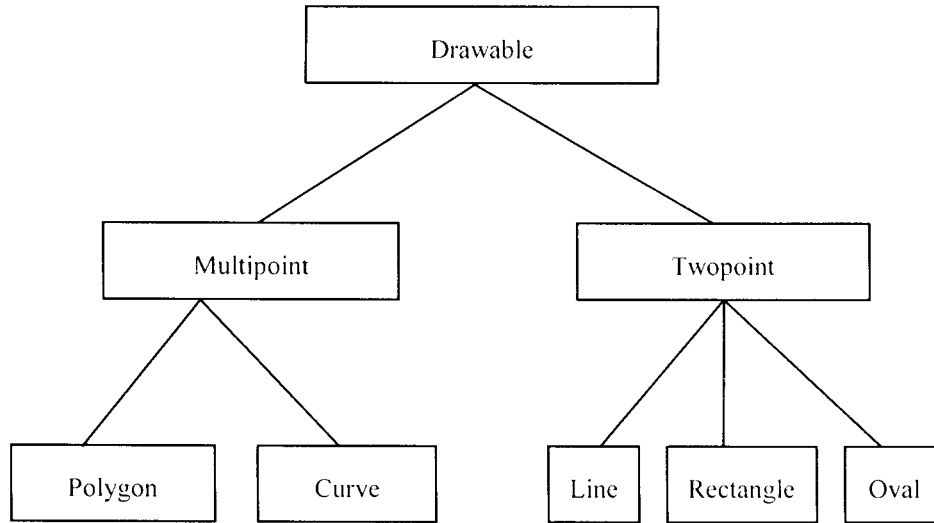
(ii) Describe the function of two of Java's system packages. (4 marks)

- (d) Create a class named arrayclass. In the arrayclass create methods: input, sort and output such that method input prompts the user to input array marks that holds ten elements, sort sorts the array elements using inbuilt methods while output prints the members of the array marks on the screen. (6 marks)

**(Total: 20 marks)**

**QUESTION FOUR**

- (a) Before a scanner object is input, you must insert statements in the import and declaration sections of the program syntax. Write down the statements. (2 marks)
- (b) Consider the diagram below:



Interpret the above diagram based on the concepts of classes, subclasses, inheritance and relationships as used in object oriented programming. (6 marks)

- (c) Using Java programming code, write a simple program that will get the size of a file residing on a server. (6 marks)
- (d) Write a Java program that accepts two integers and throws an exception message when you divide the first number with the second number. (6 marks)

**(Total: 20 marks)**

**QUESTION FIVE**

- (a) Describe an “interface” in the context of Java programming language. (2 marks)
- (b) Showing how they are implemented in a Java class, highlight four common file operations for binary file input/output (I/O). (8 marks)
- (c) Write code snippets that perform the following:
- (i) Sets up file and stream file named “Mydatafile.data”. (2 marks)
  - (ii) Saves and writes the data array {10, 20, 30, 40, 50, 60, 70, 80} in the filestream created in (c) (i) above. (2 marks)
- (d) Write a Java class named “TestDataOutputstream” program that demonstrates how to write the following primitive data types into an output file named “Sample.txt”.

Long = 11111111  
 Float = 22222222  
 Double = 33333333  
 Char = A  
 Boolean = true

(6 marks)  
**(Total: 20 marks)**