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(Morning)

This question paper contains 10 printed pages.

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Unique Paper Code : 32341201

Name of the Paper : Programming in Java

Name of the Course : B.Sc. (Hons.) Computer Science

Semester : II

Duration : 3 hours

Maximum Marks : 75

(Write your Roll No. on the top immediately
on receipt of this question paper.)

Section A is compulsory.

Attempt any four questions from Section B.

Section A

1 (a) Give one word answer for the following: (1 x 5)

- (i) A feature to handle runtime errors
- (ii) Superclass of all the classes defined in Java
- (iii) Multiple inheritance can be implemented using them
- (iv) The toolkit to provide graphical user interface
- (v) Which feature of Java makes it secure and platform independent?

2) On compiling the file having the following two classes, how many files will be created and what will be the name(s) of those file(s)? (2)

```
class A {  
    int x = 10;  
}
```

```
class B {  
    public static void main(String args[])  
{
```

P. T. O.

```

        A    a = new A();
        System.out.println(a.x);
    }
}

```

- (c) Differentiate between the following: (3 x 2)

- (i) init() and start() methods of the Applet class
- (ii) checked and unchecked exceptions
- (iii) java application and applet

- (d) Out of the following two if statements, which one will throw an exception if value of n is 10 and of d is 0; and why? (2)

```

if (d != 0 && n / d <= 1)
    System.out.println("n/d <= 1");
if (d != 0 & n / d <= 1)
    System.out.println("n/d <= 1");

```

- (e) Write the mathematical expression in Java for:

$$X = \frac{-b + \sqrt{b^2 - 4ac}}{2a} \quad (2)$$

- (f) What will be the output of the following statements? (1 x 5)

- (i) System.out.println("Try this " + 1 + 4);
- (ii) System.out.println(3 & 8 - 2);
- (iii) System.out.println(0B11010);
- (iv) System.out.println(-1 >> 6);
- (v) System.out.println("Hello World!!!".substring(3, 7));

- (g) What is the KeyEvent class and what are the three events associated with it? Give one example of a key when pressed results in:

- (i) all the three events
- (ii) two events only.

(2 + 1)

For each of the following statements mention whether it is correct or not. Justify your answers. (6)

- (i) `i = a;`
- (ii) `a = i;`
- (iii) `i.set(1.23f);`
- (iv) `i.display();`
- (v) `a.set(1.23f);`
- (vi) `a.display();`

7. What will be the output of the following code segments?

```
(a) enum Mango {
    Alphonso(100), Langra(80), Dasehri(90);
    private int price;
    Mango(int x) { price = x; }
    int getPrice() { return price; }
}
```

```
class enumDemo {
    public static void main(String args[]) {
        for (Mango x : Mango.values()) {
            System.out.print(x.getPrice());
            System.out.println
                (" " + x.ordinal())
        }
    }
}
```

(2)

```
(b) String a = "abc", b = new String(a);
    System.out.println("a == b: " + (a == b));
    System.out.println("a.equals(b):
        "+ a.equals(b)); (2)
```

(h) Consider the following code segment:

```
class A{
    void fn(int ...v) {
        for (int x:v)
            System.out.println(x);
    }

    void fn(boolean ...v) {
        for (boolean x:v)
            System.out.println(x);
    }

    void test() {
        A a = new A();
        a.fn(1, 2, 3); // line 1
        a.fn(true, false); // line 2
        a.fn(); // line 3
    }
}
```

Out of line1, line2 and line3, which one(s) will give an error and why? (2)

(i) For the following code segment, how many times does autoboxing and autounboxing take place in line1 and line2? Explain. (2)

```
int i;
Integer I = 12; // line 1
i = I / 3; // line 2
```

(j) What is the function of run() method of the Thread class? (2)

(k) Write the statement(s) in Java to create a two dimensional array that has 3 rows. Row 1 has 3 columns, row 2 has 1 column and row 3 has 2 columns. Also write for-each statements to print this array. (2 + 2)

Section B

2. (a) Define a class Person having name as its private data member. Create a subclass Student from Person that has a data member marks. Create another subclass Employee from Person that has additional data member salary. Add the relevant methods in the classes to read into the values of the data members. Use dynamic method dispatch concept to display the contents of the subclasses.

(5)

- (b) Identify the errors in the code segments given below:

(1 x 5)

- (i) `++(i + j);`
- (ii) `interface I {
 char c;
 void display();
}`
- (iii) `final class A {
 float f;
}
class B extends A {
 char c;
}`
- (iv) `String s = "ace";
s[0] = 'i';`
- (v) `class try {
 void fn(int x) {
 System.out.println(x);
 }
 void fn(int x, int y) {
 System.out.println(x + " " + z);
 }
}`

7.

```
x = x;  
System.out.print(x + " ");  
}  
public static void main(String  
                                args[]) {  
    X a = new X(10);  
    System.out.print(a.x + " ");  
}
```

6. (a) Write a program to create a child thread. The parent thread should read an integer n from the user and the child thread should then print all the odd numbers till n. The parent thread should wait for the child to complete the work.

(4)

- (b) Consider the following code segment:

```
interface I {  
    int x = 10;  
    void display();  
}  
class A implements I {  
    float f;  
    void set(float F) { f = F; }  
    public void display() {  
        System.out.println(x + " " + f);  
    }  
}  
class Demo {  
    public static void main(String args[]) {  
        A a = new A();  
        I i;  
    }  
}
```

3.

- (a) Design a class named *Book* having title, authorName and yearOfPublication as its private members. Here, authorName is an object of the class Name that has firstName, middleInitial and lastName as its private members. Assume appropriate data types for the instance members of the classes. Define methods to read the data for objects of *Book* class and override *toString()* method to print the details of a book. (*main()* method not required) (5)

- (b) Consider the following three files:

File: A.java

```
package X;
public class A {
    int i;
}
```

File: A.java

```
package Y;
public class A {
    float f;
}
```

File: B.java

```
package Z;
import X.*;
import Y.*;
class B {
    public static void main(String
                                args[]) {
        A a = new A();
    }
}
```

- (i) What problem will come on compiling file B.java? How can that problem be solved?

(ii) What should be the names of the folders/directories to store these three files? Assume that the name of the parent folder is home.

(iii) What command will be used to run the program assuming that the error has been removed and file has been successfully compiled? (2 + 2 + 1)

4.

(a) Write a method `int myIndexOf(String str, char ch, int startIndex)` that returns the position of the first occurrence of `char ch` in the string `str` and `startIndex` is the index from where the search begins. The function should return -1 if not found or if the `startIndex` is greater than the size of the string. Don't use the library routine `IndexOf()`. (4)

(b) Explain the Delegation Event Model for event handling. (3)

(c) What are the two ways a thread can be created? Which one should be preferred and why? (3)

5.

(a) Create an applet named `mouseDemo` to show "Mouse Pressed" in the status bar of the applet window when the mouse is pressed. Also write the applet tag required to run this applet. (4)

(b) Write a program to display the contents of the file whose name is passed as a command line argument to the program. (4)

(c) What is the output of the following code segment? Justify your answer. (2)

```
class X {
    int x = 20;
    X(int x) {
```

(3)

```
(d) class Demo {  
    static void test(int a) {  
        try {  
            if (a > 10)  
                throw new ArithmeticException  
                    ("Demo");  
            System.out.println("Normal exit");  
        }  
        catch (ArithmeticException e) {  
            System.out.println(e);  
            throw e;  
        }  
        finally {  
            System.out.println("In test method  
                                for a = " + a);
```


10.

```
    }  
    }  
  
    public static void main(String args[]) {  
        try {  
            test(10);  
            test(20);  
        }  
        catch (Exception e) {  
            System.out.println("Caught");  
        }  
    }  
}
```

(3)