ICSE Paper 2016

Computer Applications

(Two Hours)
Answers to this Paper must be written on the paper provided separately.
You will not be allowed to write during the first 15 minutes.
This time is to be spent in reading the question paper.
The time given at the head of this Paper is the time allowed for writing the answers.
This paper is divided into two Sections.
Attempt *all* questions from *Section A* and *any four* questions from *Section B*.
The intended marks for questions or parts of questions are given in brackets [ ].

Section 'A' (40 Marks)

(Attempt all questions)

Question 1:
(a) Define Encapsulation. **[2]**
(b) What are keywords ? Give an example. **[2]**
(c) Name any two library packages. **[2]**

(d) Name the type of error (syntax, runtime or logical error) in each case given below: **[2]**
(i) Math.sqrt (36 − 45)
(ii) int a;b;c;

(e) If int x [ ] = { 4, 3,7, 8, 9,10}; what are the values of p and q ? **[2]**
(i) p = x.length
(ii) q = x[2] + x[5] * x[1]

Answer:
(a) Encapsulation: It is process of wrapping code and data together into a single unit (called class).

(b) Keywords: Keywords are reserved words in Java, which have a special meaning in the language.
Example: if, void, int etc.

(c) (i) java.io
(ii) java.util

(d) (i) logical error
(ii) syntax error

(e) (i) Value of P will be 6.
(ii) q = x[2] + x[5] * x[1]
= 7 + 10 * 3
= 7 + 30 = 37
value of q is 37.

Question 2:
(a) State the difference between == operator and equals ( ) method. **[2]**
(b) What are the types of casting shown by the following examples: **[2]**
(i) char c = (char) 120;
(ii) int x = 't';
(c) Differentiate between formal parameter and actual parameter. **[2]**
(d) Write a function prototype of the following: **[2]**
A function **PosChar** which takes a string argument and a character argument and
returns an integer value.
(e) Name any two types of access specifiers. **[2]**

Answer:
(a)

= = operator	equals ( ) method
It is a relational operator.	It is a method of string class.
It checks for equality of primitive type of values.	It checks for equality of two string type of values.

(b) (i) Explicit type conversion,
(ii) Implicit type conversion.

(c)

Formal parameter	Actual parameter
They are variables define in function signature.	They are values given to the function at the time of function call.

They receive value from actual parameter.	They give values to formal parameter.

(d) int PosChar (String str, char ch)

(e) Two types of access specifiers:
1. public
2. . private

Question 3:
(a) Give the output of the following string functions: **[2]**
(i) "MISSISSIPPI".indexOf('S') + "MISSISSIPPF".lastIndexOf('I')
(ii) "CABLE".compareTo("CADET")

(b) Give the output of the following Math functions: **[2]**
(i) Math.ceil(4.2)
(ii) Math.abs(-4)

(c) What is a parameterized constructor ? **[2]**

(d) Write down java expression for: **[2]**
$$T = \sqrt{A^2 + B^2 + C^2}$$

(e) Rewrite the following using ternary operator: **[2]**
if (x%2 == o)
System.out.print("EVEN");
else
System.out.print("ODD");

(f) Convert the following while loop to the corresponding for loop: **[2]**
int m = 5, n = 10;
while (n>=1)
{
System.out.println(m*n);
n-;
}

(g) Write one difference between primitive data types and composite data types. **[2]**

(h) Analyze the given program segment and answer the following questions: **[2]**
(i) Write the output of the program segment.
(ii) How many times does the body of the loop gets executed ?

```
for (int m=5; m<=20; m+=5)
{      if(m%3==0)
            break;
       else
       if(m%5==0)
       System.out.println(m);
            continue;
}
```

(i) Give the output of the following expression: **[2]**
a+= a++ + ++a + − − a + a − − ; when a = 7

(j) Write the return type of the following library functions: **[2]**
(i) is Letter Or Digit(char)
(ii) replace(char, char)

Answer:
(a) (i) 2 + 10 = 12
(ii) -3

(b) (i) 5.0
(ii) 4

(c) Parameterized Constructor: It is a constructor which accepts parameters. When an object is declared using parameterized constructor, the initial values have to be passed as arguments to the constructor.

(d) T = Math.sqrt (A*A + B*B + C*C);

(e) String k;
k = x%2 == 0 ? "EVEN" : "ODD";
System.out.print(k);

(f) for (int m=5, n=10; n>=1; n − −)
{

```
System.out.println (m*n);
}
```

(g)

Primitive data types	Composite data types
They are predefined/inbuilt data types.	These data types are defined by user and made-up of primitive data type values.
Examples : int, byte, long, short, char, float, double, boolean.	Examples : Array, class, interface.

(h) (i) Output:
5
10
(ii) 3 times

(i) a = a+ a++ + ++a + − − a + a − − ;
= 7 + 7 + 9 + 8 + 8 = 39

(j) (i) boolean (ii) String

Section B (60 Marks)

Attempt any four questions from this Section.
The answers in this Section should consist of the Programs in either Blue J,
environment or any program environment with Java as the base.
Each program should be written using Variable descriptions I Mnemonic Codes so that
the logic of the program is clearly depicted.
Flow-Charts and Algorithms are not required.

Question 4:
Define a class named Book Fair with the following description: **[15]**
Instance variables/Data members :

String B name — stores the name of the book
double price — stores the price of the book Member methods :

(i) Book Fair() — Default constructor to initialize data members
(ii) void Input() — To input and store the name and the price of the book.

(iii) void calculate() – To calculate the price after discount. Discount is calculated based on the following criteria.

Price	Discount
Less than or equal to Rs. 1000	2% of price
More than Rs. 1000 and less than or equal to Rs. 3000	10% of price
More than % 3000	15% of price

(iv) Void display () – To display the name and price of the book after discount. Write a main method to create an object of the class and call the above member methods.

Answer:

```
import java.util.Scanner;
class BookFair
{
    String Bname
    double price;
    BookFair( )
    {
        Bname = " ";
        Price = 0;
    }
    void input( )
    {
        Scanner S = new Scanner (System.in);
        System.out.println ("Enter Book name");
        Bname = S.nextLine( );
        System.out.println ("Enter Price");
        price = S.nextDouble( );
    }
    void calculate ( )
```

```
{
        double d;
        if (price < = 1000)
            d = 2.0/100 * price;
        else if (price < = 3000)
            d = 10.0/100 * price;
        else
            d = 15.0/100 * price;
        price = price – d;
    }
    void display ( )
    {
        System.out.println ("Book Name" + Bname);
        System.out.println ("Price" + price);
    }
public static void main ( )
    {
        BookFair b = new BookFair ( );
    b. input ( );
    b.calculate ( );
    b.display ( );
    }
    }
```

Question 5:
Using the switch statement, write a menu driven program for the following: **[15]**
(i) To print the Floyd's triangle [Given below]

1

2   3

4   5   6

7   8   9   10

11 12 13   14   15

(ii) To display the following pattern:

I

I C

I C   S

I C   S   E

For an incorrect option, an appropriate error message should be displayed.

Answer:

```
(i)     import  java.util.Scanner;
        class    pattern
        {
        public static void main ( )
        {
        Scanner sc = new Scanner (System. in);
        System.out.println ("1. Pattern 1 \n 2. pattern 2");
        System.out.println ("Enter choice");
        int c = sc.nextInt ( );
        switch (c)
```

```
          {
                    case 1 :
                    int a, b, c = 1;
                    for (a = 1; a < = 5; a++)
          {
                    for (b = 1; b < = a; b++)
                    {
                          System.out.print (c);
                          C++;
                    }
                    System.out.println ( );
          }
          break;
(ii)          String s = "ICSE"; int l = s.length( );
          for (int i = 0; i < l; i++)
          {
                    for (int j = 0; j < = i; j++)
                    {
                          System.out.print (s.charAt(j)),
                    }
                    System.out.println ( );
          }
          break ;
          default :
          System.out.println ("Invalid choice");
          }
      }
  }
```

Question 6:
Special words are those words which starts and ends with the same letter. **[15]**

Examples:
EXISTENCE
COMIC
WINDOW
Palindrome words are those words which read the same from left to right and vice versa

Examples:

MALAYALAM
MADAM
LEVEL
ROTATOR
CIVIC

All palindromes are special words, but all special words are not palindromes. Write a program to accept a word check and print whether the word is a palindrome or only special word.

Answer:

```java
import java.util.Scanner;
class test
{
        public static void main ( )
        {
                Scanner s = new Scanner (System.in);
                System.out.println ("Enter a word");
                String w = s.next ( );
                int l = w.length ( );
                string w1 = ""; char ch1, ch2;
        for (int k = 0; k < 1; k++)
        {
                ch1 = w.charAt (k);
                w1 = chl + w1;
        }
                if (w1. equals (w) = = true)
                System.out.println ("It is palindrome word");
                else if (w.charAt (0) = = w.charAt (l – 1))
                System.out.println ("It is only a special word");
        else
                System.out.println ("It is not a special word");
                }
        }
```

Question 7:
Design n class to overload a function SumSeriesO as follows: **[15]**

(i) void SumSeries(int n, double x) – with one integer argument and one double argument to find and display the sum of the series given below:

$$s = \frac{x}{1} - \frac{x}{2} + \frac{x}{3} - \frac{x}{4} + \frac{x}{5} \ldots. \ldots. \ldots. \text{ to n terms}$$

(ii) void SumSeries() – To find and display the sum of the following series:
s = 1 + (1 x 2) + (1 x 2 x 3) + ….. + (1 x 2 x 3 x 4 x 20)

Answer:

```
class Overload
{
      void  SumSeries (int n, double x)
      {
            double sum = 0;
            for (int k=1; k<=n; k++)
            {
                  t = x / k;
                  if (k% 2 = = 1)
                      sum = sum + t;
                  else
                      sum = sum – t;
            }
      System.out.println ("sum is" + sum);
}
void SumSeries ( )
{
      long f, s = 0;
      for (int a = 1; a<=20; a++)
      {
            f = 1;
            for (int b = 1; b <=a; b++)
                }
                      f = f * b;
            }
            S = S + f;
      }
      System.out.println ("Sum" + S);
                }
      }
```

Question 8:
Write a program to accept a number and check and display whether it is a Niven number or not. **[15]**

(Niven number is that number which is divisible by its sum of digits).

Example:
Consider the number 126.
Sum of its digits is 1+2+6 = 9 and 126 is divisible by 9.

Answer:

```
class test
{
    public static void main (int n )
    {
        int s = 0, R;
        int c = n;
        while (n! = 0)
    {

        R = n%10;
        s=s+R;
        n=n/10;
    }

        if (c%s = = 0)
        System.out.println ("it is Niven number");
    else
        System.out.println {"It is Not a Niven No.");
    }
    }
```

Question 9:
Write a program to initialize the seven Wonders of the World along with their locations in two different arrays. Search for a name of the country input by the user. If found, display the name of the country along with its Wonder, otherwise display "Sorry Not Found!". **[15]**

Seven wonders – CHICHEN ITZA, CHRIST THE REDEEMER, TAJMAHAL, GREAT WALL OF CHINA, MACHU PICCHU, PETRA, COLOSSEUM
Locations – MEXICO, BRAZIL, INDIA, CHINA, PERU, JORDAN, ITALY
Example – Country Name: INDIA   Output: INDIA-TAJMAHAL
Country Name: USA   Output: Sorry Not Found!

Answer:

```java
import java.util.Scanner;
class test
{
    public static void main( )
    {
        String w[ ] = {"Chichen Itza", "Christ The Redeemer", "Taj Mahal",
                    "Great wall of China","Machu Picchu", "Petra Colosseum" };
        String L [ ] = {"Mexico, "Brazil", "India", "China", "Peru", Jordan",
                    "Italy"};
        Scanner sc = new Scanner (System.in);
        System.out.println ("Enter country Name");
        String c=sc.next();
        boolean found = false;
        for (int i=0; i<w.length( ); i++)
        {
            if (L [i].equalsIgnoreCase(c))
            {
                found = true;
                System.out.println (L[i] + "–" + w[i]);
                break;
            }
        }
            if (found = = false)
            System.out.println ("Sorry Not found");
        }
    }
```