2018

COMPUTER APPLICATIONS

(THEORY)

(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 abstraction.* **[2]**

(b) *Differentiate between searching and sorting.* **[2]**

(c) *Write a difference between the functions isUpperCase( ) and toUpperCase( ).* **[2]**

(d) *How are private members of a class different from public members ?* **[2]**

(e) *Classify the following as primitive or non-primitive datatypes :* **[2]**

(i) char
(ii) arrays
(iii) int
(iv) classes

Answer 1.

(a) It is the act of representing essential features without including the background details.

(b)

Searching	Sorting
It is the process of checking whether the element is present in the array or not.	It is the process of arranging the data in the array.
Types of searching techniques are linear and binary search.	Types of sorting techniques are exchange selection and bubble sort.

(c)

isUpperCase()	toUpperCase()
This function is used to check whether a character is in upper case or not.	This function is used to convert a character in upper case.
Return type is boolean.	Return type is char.

(d)

Private Members	Public Members
It is the most restricted access specifier.	It is the least restricted access specifier.
Members declared under this section are only accessible in their own class.	Members declared under this section are accessible in all parts of a java program.

(e) primitive : (i) char, (iii) int
non-primitive : (ii) arrays, (iv) classes

Question 2.

(a) *(i) int res = 'A';*
*What is the value of **res** ?*
(ii) Name the package that contains wrapper classes. **[2]**

(b) *State the difference between **while** and **do while** loop.* **[2]**

(c) *System.out.print("BEST");*
System.out.println ("OF LUCK");
Choose the correct option for the output of the above statements **[2]**

(i) BEST OF LUCK
(ii) BEST
OF LUCK

(d) *Write the prototype of a function* ***check*** *which takes an integer as an argument and returns a character.* **[2]**

(e) *Write the return data type of the following function.* **[2]**

(i) endsWith( )

(ii) log( )

Answer 2.

(a) (i) res=65 (ii) java.lang

(b)

while	do while
It is not guaranteed that how many times loop body will get executed.	It is guaranteed that loop body will get executed atleast once.
It is a pre-tested loop.	It is a post tested loop.

(c) (i) BEST OF LUCK is the correct option.

(d) char check(int n)

(e) (i) boolean (ii) double

Question 3.

(a) *Write a Java expression for the following :* $\frac{\sqrt{3x + x^2}}{a + b}$ **[2]**

(b) *What is the value of y after evaluating the expression given below ?* **[2]**

y+= ++y + y-- + --y; when int y=8

(c) *Give the output of the following :* **[2]**

(i) Math.floor (–4.7)

(ii) Math.ceil(3.4) + Math.pow(2,3)

(d) *Write two characteristics of a constructor.* **[2]**

(e) *Write the output for the following :* **[2]**

```
System.out.println("Incredible"+
"\n"+"world");
```

(f) *Convert the following* ***if else if*** *construct into* ***switch case*** **[2]**

```
if (var==1)
    System.out.println("good");
else if(var==2)
    System.out.println("better");
elseif(var==3)
    System.out.println("best");
else
    System.out.println("invalid");
```

(g) *Give the output of the following string functions :* **[2]**

(i) *"ACHIEVEMENT".replace ('E','A')*

(ii) *"DEDICATE".compareTo ("DEVOTE")*

(h) *Consider the following String array and give the output* **[2]**

```
String arr[]= {"DELHI",
"CHENNAI", "MUMBAI",
"LUCKNOW", "JAIPUR"};
System.out.println(arr[0].length()
                    >arr[3].length());
System.out.print(arr[4].substring
                    (0, 3));
```

(i) *Rewrite the following using ternary operator :* **[2]**

```
if(bill > 1000)
discount = bill * 10.0/100;
else
discount=bill * 5.0/100;
```

(j) *Give the output of the following program segment and also mention how many times the loop is executed :* **[2]**

```
int i;
for (i = 5; i > 10; i ++)
System.out.println(i);
System.out.println ( i * 4 );
```

Answer 3.

(a) Math.sqrt((3 * x) + (x * x))/(a + b);

(b) 33

(c) (i) – 5.0 (ii) 12.0

(d) (i) Constructors have the same name as that of the class.

(ii) They do not have any return type not even void.

(e)
```
Incredible
world
```

(f)
```
switch(var)
{
  case 1: System.out.println("good");
          break;
  case 2 : System.out.println
                    ("better");
          break;
  case 3 : System.out.println
                    ("best");
          break;
  default : System.out.println
                    ("invalid");
}
```

(g) (i) ACHIAVAMANT
(ii) – 18

(h) false
JAI

(i) discount = bill > 10000 ? (bill * 10.0 / 100) : (bill * 5.0 / 100) ;

(j) Loop will be executed 0 times since the test condition is initially false.
Output will be : 20.

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/Mnemonic Codes** so that the logic of the program is clearly depicted.*

*Flow-Charts and Algorithms **are not required.***

Question 4.

*Design a class **RailwayTicket** with following description :* **[15]**

Instance variables/data members :

String name : To store the name of the customer

String coach : To store the type of coach customer wants to travel

long mobno : To store customer's mobile number

int amt : To store basic amount of ticket

int totalamt : To store the amount to be paid after updating the original amount

Member methods :

void accept () – To take input for name, coach, mobile number and amount.

void update () – To update the amount as per the coach selected (extra amount to be added in the amount as follows)

Type of Coaches	*Amount*
First_AC	*700*
Second_AC	*500*
Third_AC	*250*
Sleeper	*None*

void display() – To display all details of a customer such as name, coach, total amount and moible number.

Write a main method to create an object of the class and call the above member methods.

Answer 4.

```
import java.util.*;//importing package
class RailwayTicket
{
  String name, coach;
   long mobno;
   int amt, totalamt;
   void accept()
   {
      Scanner sc=new
              Scanner(System.in);
      System.out.println("Enter
                          Details");
      name=sc.nextLine();
      coach=sc.nextLine();
      mobno=sc.nextLong();
      amt=sc.nextInt();
   }
   void update()
   {
      if(coach.equalsIgnoreCase
                          ("First_AC"))
```

```
    {
     totalamt=amt + 700;
    }
     else if(coach.equalsIgnoreCase
                        ("Second_AC"))
    {
     totalamt=amt + 500;
    }
    else  if(coach.equalsIgnoreCase
                        ("Third_AC"))
    {
     totalamt=amt + 250;
    }
    else if(coach.equalsIgnoreCase
                        ("sleeper"))
    {
     totalamt=amt;
    }
  }
  void  display()
  {
     System.out.println("Name : " +
                                name);
     System.out.println("Coach : " +
                                coach);
     System.out.println("Mobile
                        no. : " + mobno);
     System.out.println("Amt : " +
                                amt);
    System.out.println("Total Amt :
                        " + totalamt);
  }
  public static void main
                        (String args[])
  {
    RailwayTicket ob =new
                        RailwayTicket();
    ob.accept();//function call
    ob.update();
    ob.display();
  }
}
```

Question 5.

Write a program to input a number and check and print whether it is a ***Pronic*** *number or not. (Pronic number is the number which is the product of two consecutive integers)* **[15]**

Example : $12 = 3 \times 4$
$20 = 4 \times 5$
$42 = 6 \times 7$

Answer 5.

```
import java.util.*;//importing package
class Pronic
{
  int n, i = 1 , p = 0;
  void display()
  {
    Scanner sc=new
                Scanner(System.in);
    System.out.println("Enter a
                        number");
    n=sc.nextInt();
    while(p<=n)
    {
      p=i*(i+1);
      if(p==n)
      {
        System.out.println
                ("Pronic Number");
        break;
      }//while loop ending
      else if(p>n)
      {
        System.out.println
          ("Not a Pronic Number");
        break;
      }
      else
      {
        i++;
      }
    }
  }
}
```

Question 6.

Write a program in Java to accept a string in lower case and change the first letter of every word to upper case. Display the new string.

Sample input : we are in cyber world.
Sample output : We Are In Cyber World. **[15]**

Answer 6.

```
import java.util.*;//importing package
class Demo
{
  String s,w;
  char ch;
  int i, l;
  void display()
  {
    Scanner sc=new
                  Scanner(System.in);
    System.out.println("Enter a
                              Sentence");
    s=sc.nextLine();
    s= s + " ";
    l=s.length();
    for(i=0; i< l; i++)
    {
      w="";
      while(s.charAt(i)!=' ')
      {
        w=w+s.charAt(i);
        i++;
      }//while loop ending
      ch=w.charAt(0);
      ch-=32;
      w=ch + w.substring(1);
      System.out.print(w + " " );
    }
  }
}
```

Question 7.

Design a class to overload a function volume () as follows : **[15]**

(i) double volume (double R) –with radius (R) as an argument, returns the volume of sphere using the formula.
$V = 4/3 \times 22/7 \times R^3$.

(ii) double volume (double H, double R)–with height(H) and radius(R) as the arguments, returns the volume of a cylinder using the formula.
$V = 22/7 \times R^2 \times H$

(iii) double volume (double L, double B, double H)–with length(L), breadth(B) and Height(H) as the arguments, returns the volume of a cuboid using the formula.
$V = L \times B \times H$

Answer 7.

```
class Overload
{// class beginning
  double V;
  double volume(double R)
  {
    V=(4.0/3)*(22/7)*R*R*R);
    return (V);
  }
  double volume(double H, double R)
  {
    V=(22/7)*(R*R)*H;
    return (V);
  }
  double volume
       (double L, double B, double H)
  {
    V=L*B*H;
    return (V);//returning the value of
     V
  }
}
```

Question 8.

Write a menu driven program to display the pattern as per user's choice. **[15]**

Pattern 1	***Pattern 2***
ABCDE	*B*
ABCD	*LL*
ABC	*UUU*
AB	*EEEE*
A	

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

Answer 8.

```
import java.util.*;//importing package
class Menu
```

```
{
  int ch, l, i, j;
  String s;
  public Menu()// constructor
  {
      s= "";
  }
  void display()
  {
     Scanner sc=new
                    Scanner(System.in);
     System.out.println("Enter 1 for
                                Pattern1");
     System.out.println("Enter 2 for
                                Pattern2");
     ch=sc.nextInt();
     if(ch==1)
     {
       s="ABCDE";
       l=s.length();
       for(i=l-1; i>=0; i--)
       {
         for(j=0; j<=i; j++)
         {
         System.out.print(s.charAt(j));
         }
         System.out.println();
       }
     }
     else if(ch==2)
     {
       s="BLUE";
       l=s.length();
       for(i=0; i<l; i++)
       {
         for(j=0; j<=i; j++)
         {
         System.out.print(s.charAt(i));
         }
         System.out.println();
       }
     }
     else
     {
      System.out.println("Invalid
                                Choice");
     }
   }
}
```

Question 9.

Write a program to accept name and total marks of N number of students in two single subscript array ***name[ ]*** *and* ***totalmarks[ ].*** **[15]**

Calculate and print :

(i) The average of the total marks obtained by N number of students.
[average = (sum of total marks of all the students)/N]

(ii) *Deviation of each student's total marks with the average.*
[deviation = total marks of a student – average]

Answer 9.

```
import java.util.*;//importing package
class Student
{
   int n, i, s=0;
   double avg, d;
    void display()
    {
      Scanner sc=new
                    Scanner(System.in);
      System.out.println("Enter number
                                of students");
      n=sc.nextInt();
      String name[]=new String[n];
      int totalmarks[]=new int[n];
      for(i=0; i<n; i++)
      {
          System.out.println("Enter
                name and total marks");
          name[i]=sc.nextLine();
          totalmarks[i]=sc.nextInt();
          s=s+totalmarks[i];
      }
      avg=(double)s/n;
      System.out.println("Average = "
                                + avg);
      for(i=0; i<n; i++)
      {
          d=totalmarks[i]-avg;
          System.out.println(name[i]
                + " Deviation is " + d);
      }
    }
} // class end
```

ICSE 2023 EXAMINATION

SPECIMEN QUESTION PAPER

COMPUTER APPLICATIONS

Maximum Marks: 100

Time allowed: Two hours

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*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

*(Attempt **all** questions from this **Section**.)*

Question 1 [20]

Choose the correct answer and write the correct option.

(i) Wrapping up of data and methods together as one unit is termed as:

(a) Inheritance

(b) Polymorphism

(c) Encapsulation

(d) Abstraction

(ii) The datatype which is specified that the method does not return a value is:

(a) Void

(b) void

(c) VOID

(d) boolean

(iii) The logical operator which is an unary operator:

(a) &&

(b) ||

(c) !

(d) >>

(iv) The Scanner class is a _____ class.

(a) Primitive

(b) Derived

(c) Wrapper

(d) super class

(v) Math.pow(625, ½) + Math.sqrt(144)

(a) 17.0

(b) 13.0

(c) 37.0

(d) 13

(vi) The correct if statement for the following ternary operation statement is:

System.out.println(n%2 == 0? "true":"false");

(a)
```
if(n%2==0)
return true;
else
return false;
```

(b)
```
if(n%2==0)
return "true";
else
return "false";
```

(c)
```
if(n%2==0)
System.out.println("true");
else
System.out.println("false");
```

(d) if(n%2==0)
return false;
else
return false;

(vii) Multiple branching statement of java is:

(a) For

(b) while

(c) do… while

(d) switch

(viii) The number of bytes occupied by the constant 45 are:

(a) Four bytes

(b) two bytes

(c) Eight bytes

(d) one byte

(ix) do…..while loop is an

(a) entry controlled loop

(b) infinite loop

(c) exit controlled loop

(d) Finite loop

(x)
```
for(k=1;k<=2;k++)
{ for(m=1;m<=4;m++)
{ System.out.println(m*2);
}
}
```

How many times the inner loop is executed?

(a) 4 times

(b) 8 times

(c) 2 times

(d) 16 times

(xi) A method with the same name as of the class and with arguments and no return data type is termed as:

(a) parameterized constructor

(b) default constructor

(c) Non – parameterized constructor

(d) wrapper class method

(xii) int res='A'; What is the value of res?

(a) A

(b) 66

(c) 65

(d) 97

(xiii) The style of expressing single line comment is:

(a) /* comment*/

(b) * comment

(c) // comment

(d) /* comment

(xiv) The method to check if a character is an alphabet or not is:

(a) isLetter(char)

(b) isAlpha(char)

(c) isUppercase(char)

(d) isLowercase(char)

(xv) The output of Double.parseDouble("71.25") +0.75 is:

(a) 72

(b) 72.0

(c) 71.0

(d) 71.75

(xvi) The method to convert a string to upper case is:

(a) toUpperCase(char)

(b) toUPPERCASE(String)

(c) toUpperCase(String)

(d) touppercase(String)

(xvii) The output of the method "DETERMINATION".substring(2, 6) is:

(a) "TERM"

(b) term

(c) "Term"

(d) "TERMI"

(xviii) The array int x[10] occupies:

(a) 10 bytes

(b) 40 bytes

(c) 20 bytes

(d) 80 bytes

(xix) The element in x[4] of the array {3, 5, 7, 12, 16, 18, 20, 35, 42, 89} is:

(a) 16

(b) 12

(c) 7

(d) 18

(xx) Name the type of error that occurs for the following statement:

System.out.println(Math.sqrt(24 - 25));

(a) Syntax error

(b) run time error

(c) logical error

(d) no error

Question 2

(i) Evaluate the expression: [2]

Z += a++ + --b + ++a + --b;

where a = 10, b = 5, Z = 10

(ii) Write java expression for: $\left| x^2 + xy \right|$ [2]

(iii) Rewrite the following using ternary operators: [2]

```
if ( x > y )
c = 'A';
else
c = 'a';
```

(iv) Rewrite the following while loop using for loop: [2]

```
int x = 5;
while ( x <= 5)
{
x++;
}
System.out.println(x);
```

(v) How many times the following loop will gets executed? What is the output of the same? [2]

```
int counter=1;
do
{
System.out.println(counter);
} while ( counter ++ < 5 );
```

(vi) ."MISSISSIPPI".replace('S', 't').toLowerCase() [2]

(vii) "REDUCE".compareTo("REVOLT") + "ANTARTICA".lastIndexOf('A') [2]

(viii) Define boxing with an example. [2]

(ix) Consider the following program and answer the questions given below: [2]

```
class sample
{     int a, b;
```

```
sample(int x, int y)
{    a = x; b = y;
}
void calculate()
{    int z;
     z = a+b;
     System.out.println(z);
}
}
```

(a) Name the global variables.

(b) What are the method variables?

(x) Consider the following array and answer the questions given below: [2]

int x [ ] = {23, 45, 67, 12, 45, 89, 24, 12, 9, 7}

(a) What is the size of the array?

(b) What is the position of 89?

SECTION B

*(Answer **any four** questions from this **Section**.)*

The answers in this section should consist of the programs in either BlueJ environment or any program environment with java as the base.

Each program should be written using variable description / mnemonic codes so that the logic of the program is clearly depicted.

Flowcharts and algorithms are not required.

Question 3 [15]

Define a class with the following specifications:

Class name:	employee
Member variables:	eno – employee number
	ename – name of the employee
	age – age of the employee
	basic – basic salary

[Declare the variables using appropriate data types]

Member methods:

void accept() –	accept the details using scanner class
void calculate () –	to calculate the net salary as per the given specifications: net = basic + hra + da – pf hra = 18.5% of basic da = 17.45% of basic pf = 8.10% of basic if the age of the employee is above 50 he/she gets an additional allowance of Rs.5000.
void print() –	to print the details as per the following format eno ename age basic net
void main() –	to create an object of the class and invoke the methods

Question 4 [15]

Define a class to overload the method print as follows:

void print () – to print the format	1 2 3 4 5 6 7 8 9 10
boolean print (int n) –	to check whether the number is a Dudeney number , a number is dudeney if the cube of the sum of the digits is equal to the number itself. Eg : 512 = (5+1+2)3 = (8)3 = 512
void print (int a, char ch) –	if ch = s or S print the square of the number else if ch = c or C print the cube of the number.

Question 5 [15]

Define a class to accept 10 integers and arrange them in descending order using bubble sort. Print the original array and the sorted array.

Question 6 [15]

Define a class to accept values into a double array of size 20 and print the range of the array, range is the difference between the largest and the smallest elements of the array.

Question 7 [15]

Define a class to accept a string and print the same in reverse, also print the number of vowels in the string.

Eg : S = "BEAUTIFUL" Output – "LUFITUAEB"

No. of vowels = 5

Question 8 [15]

Define a class to accept the names of 10 students in an array and check for the existence of the given name in the array using linear search, if found print the position of the name, if not found print the appropriate message. Also print the names which begins with the word "SRI".