COMPUTER APPLICATIONS

STATISTICS AT A GLANCE

Total Number of students who took the examination	94,250
Highest Marks Obtained	100
Lowest Marks Obtained	8
Mean Marks Obtained	83.97

Percentage of Candidates according to marks obtained

Details	Mark Range				
	0-20	21-40	41-60	61-80	81-100
Number of Candidates	3	54	7,469	27,146	59,578
Percentage of Candidates	0.00	0.06	7.92	28.80	63.21
Cumulative Number	3	57	7,526	34,672	94,250
Cumulative Percentage	0.00	0.06	7.99	36.79	100.00

Range of Marks Obtained
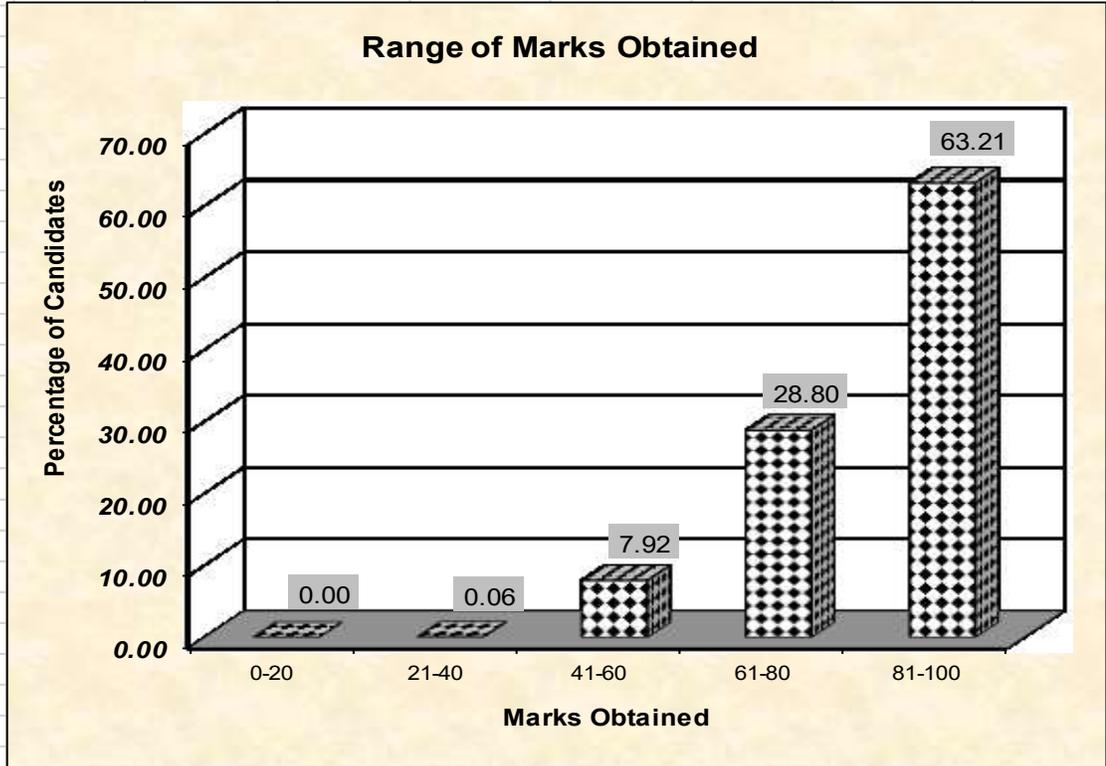
COMPUTER APPLICATIONS

ANALYSIS OF PERFORMANCE

Question 1

(a) What are the default values of primitive data type *int* and **float?** [2]

(b) Name any two OOP's principles. [2]

(c) What are identifiers? [2]

(d) Identify the literals listed below:
(i) 0.5 (ii) 'A' (iii) false (iv) "a". [2]

(e) Name the wrapper classes of **char** type and **boolean** type. [2]

Examiners' Comments

(a) Most candidates answered correctly. However a few were not clear about the default value of *float*.

(b) Most candidates answered correctly. However some candidates got confused with the principles of OOP's.

(c) Most candidates answered correctly. A few candidates however wrote the rules for declaring an identifier.

(d) Though most candidates answered correctly, there were some who misunderstood the question and wrote vague and incorrect answers.

(e) Most candidates wrote the first character of wrapper classes in lower case letters instead of uppercase character.

Suggestions for teachers
– Primitive data types should be taught with its default values.
– Principles and features of OOP's should be explained clearly.
– Correct definitions of terms used frequently should be explained thoroughly.
– Explain the different types of literals with examples.
– Teach all the wrapper classes with the correct syntax.

MARKING SCHEME
Question – 1

(a) The default value of **int** is 0 and that of **float** is 0.0f

(b) Data Abstraction/Abstraction, Inheritance, Polymorphism, Message passing, Data encapsulation/Encapsulation

(c) An identifier is a sequence of characters used to name variables , methods, classes, packages and interfaces   OR
They represent names of different components of a Java program.

(d) (i)   floating point literal
(ii)   character literal..
(iii) boolean literal.
(iv)   String literal

(e)   Character and Boolean

Question 2

(a) Evaluate the value of **n** if value of p=5,q=19
   int n = (q-p)>(p-q)?(q-p) : (p-q);   [2]

(b) Arrange the following primitive data types in an ascending order of their size: [2]
   (i) char (ii) byte (iii) double (iv) int

(c) What is the value stored in variable **res** given below :   [2]
   double res = Math.pow("345".indexOf('5'),3);

(d) Name the two types of constructors.   [2]

(e) What are the values of **a** and **b** after the following function is executed , if the values
   passed are 30 and 50:
   void paws(int a ,int b)
      {   a=a+b;
            b=a-b;
            a=a-b;
            System .out.println(a+","+b);   }   [2]

Examiners' Comments:
(a) Most candidates answered correctly, however some candidates wrote the expression (q-p) instead of its final value.
(b) Candidates got confused between the size of **int** and **char.** Some candidates wrote the answer in descending order instead of an ascending order.
(c) Most candidates wrote the answer as 8 instead 8.0. A few candidates were unable to find the index of the given argument.
(d) Most candidates answered correctly. A few candidates were not clear about the types of constructor.
(e) Most candidates answered correctly. Some however were unable to interchange the value correctly.

Suggestions for teachers
 – Practice exercise on ternary operator.
 – Order of all data types with its size should be taught thoroughly.
 – Stress on using important keywords.
 – Practice exercises on evaluation of the multiple and single mathematical functions on the computer.
 – Constructor should be taught in detail along with its types.
 – Explain the difference between transfer of value and interchange of value.

Question 3

(a) State the data type and value of **y** after the following is executed :

    char x='7';
    y= Character.isLetter(x);   [2]

(b) What is the function of **catch** block in exception handling ? Where does it appear in
      a program?   [2]

(c) State the output when the following program segment is executed :

    String a="Smartphone", b="Graphic Art";
    String h=a.substring(2,5);
    String k= b.substring(8).toUpperCase();
    System.out.println(h);
    System.out.println(k.equalsIgnoreCase(h)) ;   [2]

(d) The access specifier that gives the most accessibility is_____ and the
      least accessibility is _____.   [2]

(e) (i) Name the mathematical function which is used to find **sine** of an angle given
        in radians.
      (ii) Name a string function which removes the blank spaces provided in the prefix
        and suffix of a string .   [2]

(f)   (i) What will this code print ?
        int arr[] =new int[5];
        System.out.println(arr);
        (i)   0 (ii) value stored in arr[0] (iii) 0000 (iv) garbage value
       (ii) Name the keyword which is used to resolve the conflict between method parameter
        and instance variables/fields.   [2]

(g) State the package that contains the class :
      (i) BufferedReader
      (ii) Scanner   [2]

(h) Write the output of the following program code :

```
char ch;
int x=97;
    do
    {
       ch=(char)x;
       System.out.print(ch+" ");
       if(x%10==0)
       break;
       ++x;
    } while(x<=100);
```
[2]

(i) Write the Java expression for:

$$\frac{a^2 + b^2}{2ab}$$
[2]

(j) If int y=10 then find int z=(++y*(y++ +5));
[2]

Examiners' Comments

(a) Many candidates did not write the data type with only the value being written. Some candidates were unfamiliar with Character functions.
(b) Most candidates showed a lack of knowledge of this topic. However a few candidates wrote the answer correctly.
(c) Many candidates answered this question correctly. However some candidates incorrectly wrote (Art) instead of art.
(d) Most candidates answered correctly. However, there were few candidates who interchanged the answer. Some candidates wrote protected, friendly and default as the answer instead of private.
(e) Most candidates answered this question correctly. A few however committed errors in the syntax and wrote the answer as sine () instead of sin ().
(f) Most candidates were unable to understand both parts of the question and wrote incorrect answers.
(g) Many candidates answered this question correctly. A few candidates were not familiar with the package that contains Scanner and Buffered class.
(h) A number of candidates wrote the answer correctly, but a few candidates failed to take the last iteration. Some candidates wrote the integer value instead of character value.

Suggestions for teachers
–   All the character functions given in the Syllabus should be taught comprehensively.
–   Teach all the String functions mentioned in the syllabus thoroughly.
–   Access specifiers should be taught with examples.
–   Emphasize on all mathematical and String Functions.
–   Attach more importance to the fundamentals of array.
–   Introduce the concept of packages and the classes contained in them.
–   Practice output questions involving loops and stress on doing dry run and writing the steps of calculation.
–   Explain the hierarchy of operators and also how to evaluate the Java expressions.
–   Prefix and postfix of increment and decrement operator is a common topic and sufficient practice must be done in class.

(i) Most candidates answered correctly. A few however lost marks due to missing asterisk(multiplication) symbols and wrong division signs.

(j) Some candidates were not familiar in solving expressions involving pre increment and post increment operators within a multiple parenthesis.

MARKING SCHEME
Question - 3

(a) Data type is boolean and y=false

(b) A Catch block is a group of Java statements that are used to handle a raised exception. The catch block should be placed after try block.

(c) art
true

(d) (i) public   (ii) private.

(e) (i)sin() (ii) trim()

(f) (i) garbage value
(ii) this keyword.

(g) io and util package

(h) a b c d

(i) (Math.pow(a,2)+Math.pow(b,2))/(2*a*b)   [OR]
        (a*a+b*b)/(2*a*b)

(j) int z=(++y*(y++ +5));
      (11*(11+5));
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Question 4

Define a class called **Parking Lot** with the following description :
Instance variables/data members :
int vno   - To store the vehicle number
int hours   - To store the number of hours the vehicle is parked in the parking lot
double bill   - To store the bill amount

Member methods :
void input()   - To input and store the vno and hours.
void calculate() -   To compute the parking charge at the rate of ∎ 3 for the first hour or part thereof, and ∎1.50 for each additional hour or part thereof.
void display()   -   To display the detail

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

[15]

(i) Function names and variables names written by most candidates were different from what was asked in the question.
(ii) The entire program was done using only one method.
(iii) The value for parking charge, which is to be calculated was accepted from the user.
(iv) There were mistakes in calculations of parking charge.
(v) Variables were declared inside the input() method .
(vi) Object creation was not done.
(vii) Variable description /mnemonic codes were not found in most answers.

Suggestions for teachers
– Instruct students to use the class name, variable name and method name as given in the question.
– Teach the concept of classes/object/Data members with the help of real Life examples.
– Teach writing programs in which multiple methods are involved.
– Explain that the parking charge/bill that needs to be calculated should not be accepted from the user.

MARKING SCHEME

Question - 4

```
import java.util.*;
class ParkingLot
{
    int vno;
    int hours;
    double bill;
    Scanner sc=new Scanner(System.in);
    void input()
    {
        System.out.println("Enter the vehicle number and number of hours");
        vno=sc.nextInt();
        hours=sc.nextInt();
    }
    void calculate()
    {
        if(hours<=1)
        bill= 3;
        else
        bill=3+(hours-1)*1.50;
    }
    void display()
    {
        System.out.println("Vechicle Number:"+vno);
        System.out.println("Hours:"+hours);
        System.out.println("Bill:"+bill);
    }
    public static void main(String args[])
    {
        ParkingLot pl=new ParkingLot();
```

```
        pl.input();
        pl.calculate();
        pl.display();
     }
  }

  Description of variables/ comments/mnemonics
```

Question 5

Write two separate programs to generate the following patterns using iteration(loop) statements:
```
*                        (b) 54321
*#                           5432
*#*                          543
*#*#                         54
*#*#*                        5                                    15]
```

Examiners' Comments:
(i)   Some candidates wrote the program for only one type of triangle instead of both.
(ii) A few candidates were confused with the pattern using two characters.
(iii) In part (b) reverse loop was not formed correctly
(iv) A few candidates answered this question by writing 5 print statements.
(v)   Improper output, println() statement instead of print() statement for printing each character.
(vi) Blank println() statement was missing.

MARKING SCHEME

Question - 5

```
(a) import java.io.*;
   class Quest_5a
  {
     void patteren1()
        {    for(int i=1;i<=5;i++)
               {
                   for(int j=1;j<=i;j++)
                      {  if(j%2!=0)
                              System.out.print("*"+" ");
                      else
                              System.out.print("#"+" ");
                      }
```

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```
                    System.out.println();
              }    }    }

   Description of variables/ comments/mnemonics
(b) import java.util.*;
     class Quest_5b
     {
      void patteren()
      {
        for(int i=1;i<=5;i++)
        {
        for(int j=5;j>=i;j--)
         {
        System.out.print(j);
         }
         System.out.println();
        }
        }
        }
   Description of variables/ comments/mnemonics
```

Question 6

Write a program to input and store roll numbers, names and marks in 3 subjects of **n**
number students in five single dimensional array and display the remark based on
average marks as given below:(the maximum marks in the subject are 100)
average marks=Total Marks
$$3$$

Average marks	Remarks
85-100	EXCELLENT
75-84	DISTINCTION
60-74	FIRST CLASS
40-59	PASS
Less than 40	POOR

[15]

Examiners' comments:

(i)   Many candidates attempted the question without using array.
(ii) Input of data was not taken inside the loop.
(iii) Value of 'n' (number of students) not accepted.
(iv) Arrays were declared without specifying the size.
(v)   Calculation average was not done inside the loop.
(vi) Accepted the average marks from the user instead of computing.
(vii) Conditions for grading were not written correctly.

> *Suggestions for teachers*
> − Array creation with different data types should be practiced.
> − Inputting and storing elements in an array should be practiced on the computer.
> − Use of relational operators should be explained clearly.

MARKING SCHEME

Question - 6

```java
import java.util.*;
class Quest_6
{
void grade()
    {
            Scanner br=new Scanner(System.in);
            System.out.println("Enter number of students");
            int n=br.nextInt();
            int roll[]=new int[n];
            String name[]=new String[n];
            double m1[]=new double[n];
            double m2[]=new double[n];
            double m3[]=new double[n];
            double avg[]=new double[n];
            for(int i=0;i<n;i++)
                {
System.out.println("Enter roll number,name,marks in 3 Subjects
                        for"+(i+1)+"student");
                roll[i]=br.nextInt();
                name[i]=br.next();
                m1[i]=br.nextDouble();
                m2[i]=br.nextDouble();
                m3[i]=br.nextDouble();
                avg[i]=(m1[i]+m2[i]+m3[i])/3;
                if(avg[i]>=85&&avg[i]<=100)
                System.out.println("EXCELLENT");
                else if(avg[i]>=75&&avg[i]<=84)
                System.out.println("DISTINCTION");
                else if(avg[i]>=60&&avg[i]<=74)
                System.out.println("FIRST CLASS");
                else if(avg[i]>=40&&avg[i]<=59)
                System.out.println("PASS");
                else
                System.out.println("POOR");
            }
            }
            }
```

Description of variables/ comments/mnemonics

Question 7

Design a class to overload a function Joystring() as follows:

(i)   void Joystring (String s, char ch1, char ch2) with one string argument and two character arguments that replaces the character argument **ch1** with the character argument **ch2** in the given string **s** and prints the new string.

Example:

Input value of s ="TECHNALAGY"

ch1='A',

ch2='O'

Output : "TECHNOLOGY"

(ii)   void Joystring (String s) with one string argument that prints the position of the first space and the last space of the given string **s.**

Example:

Input value of ="Cloud computing means Internet based computing"

Output : First index : 5

         Last index : 36

(iii)   void Joystring (String s1, String s2) with two string arguments that combines the two strings with a space between them and prints the resultant string.

Example:

Input value of s1 ="COMMON WEALTH "

Input value of s2="GAMES "

Output : COMMON WEALTH GAMES

    (use library functions)   15

Examiners' Comments

Most candidates answered correctly. A few candidates were not clear about the concepts of function overloading.

(i) A few candidates used separate programs or three functions with different names.

(ii) Some candidates used the same name for the class and the three methods.

(iii) Some candidates made all the calculations in the main function itself.

(vi) Functions were called without passing required arguments and accepted values as inputs inside the function body.

(v) In place of concat() method , + operator was used.

(vi) String functions were not used. Instead candidates complicated the program by using loops and arrays.

MARKING SCHEME

Question - 7

```java
import java.util.*;
class Quest_7
{
void joystring(String s,char ch1,char ch2)
{
  String str=s.replace(ch1,ch2);
  System.out.println(str);
}
 void joystring(String s)
 {
        int first=s.indexOf(' ');
        System.out.println("First index :"+first);
        int last=s.lastIndexOf(' ');
        System.out.println("Last index :"+last);
}
 void joystring(String s1,String s2)
{      String s3=" ";
        String str=s1.concat(s3).concat(s2);
        System.out.println(str);
}
 public static void main(String args[])
 {
        Quest_7 obj=new Quest_7();
      obj.joystring("TECHNALAGY",'A','O');
```

```
        obj.joystring("Cloud computing means Internet based computing");
        obj.joystring("COMMOM WEALTH","GAMES");
    }
}
    Description of variables/ comments/mnemonics
```

Question 8

Write a program to input twenty names in an array. Arrange these names in descending order

of alphabets, using the bubble sort technique.   [15]

Examiners' comments
 (i) Array elements are assigned not accepted.
(ii) Integer array was declared instead of String array.
(iii) Declaration of temporary variable as an integer type instead of String array.
(iv) Compare To() method was not used.
(v)   Other methods of sorting were used instead of bubble sort.
(vi) Array elements were sorted in ascending order instead of sorting in a descending order.
(vi) Printing of sorted elements was not done.

Suggestions for teachers
– Revise iteration before teaching arrays.
– Explain the importance of the loop variable.
– Basic technique such as searching and sorting should be taught with different data types.
– Use of compareTo () method should be explained with help of examples.
– Train candidates to write the program using different array length.
– Difference between bubble sort and selection sort must be discussed.
– Emphasize on output requirements.

MARKING SCHEME

Question 8

```java
import java.util.*;
class Quest_8
{    void sort()
    {
            Scanner br=new Scanner (System.in);
            String names[]=new String[20];
            System.out.println("Enter 20 names");
            for(int i=0;i<20;i++)
            {
                    names[i]=br.next();
            }
            for(int j=0;j<(20-1);j++)
            {    for(int k=0;k<20-j-1;k++)
                {
                    if(names[k].compareTo(names[k+1])<0)
                    {      String temp=names[k];
```

```
                names[k]=names[k+1];
                names[k+1]=temp;
            }
        }
    }
    System.out.println("Names in descending order");
    for(int k=0;k<20;k++)
    {System.out.println(names[k]);
    } }       }
Description of variables/ comments/mnemonics
```

Question 9

Using the switch statement, write a menu driven program to:

(i)   To find and display all the **factors** of a number input by the user (including 1 and excluding number itself).

Example:

Sample Input   :   n =15

Sample Output   :   1,3, 5

(ii) To find and display the **factorial** of a number input by the user (the factorial of a non–negative integer **n,** denoted by n!, is the product of all integers less than or equal to n.

Example:

Sample Input   :   n =5

Sample Output   :   5! = 1×2×3×4×5 =120.

For an incorrect choice, an appropriate error message should be displayed.   [15]

Examiners' comments:

Many candidates lost marks because of the absence of menu and input choice, break and default statement. Some candidates did not follow the instruction and wrote two separate programs.

(a) (i) Overlooked the instruction excluding number itself .

(ii) For finding the factor '/' operator was used instead of % operator.

(b) (i) Variable for finding the factorial was initialized with value 0 . Some candidates initialized the variable with value 1 but inside the loop.

(iii) Loop to find the factorial was formed 1 to < n.

MARKING SCHEME

Question 9

```java
import java.util.*;
    class question9
    {
        public static void main(String args[])
        {
            Scanner sc=new Scanner(System.in);

            System.out.println("MENU");
            System.out.println("1.FACTORS OF A NUMBER");
            System.out.println("2.FACTORIAL OF A NUMBER");
            System.out.println("ENTER A NUMBER");
            int num=sc.nextInt();
            System.out.println("ENTER YOUR CHOICE");
            int choice=sc.nextInt();

            switch (choice)
            {
                case 1:
                System.out.print("FACTORS ARE=");
                    for(int i=1;i<=num/2;i++)
                    {
                        if(num%i==0)
                        System.out.print(i+",");
                    }
                    break;
                    case 2:
                        int f=1;
                        for(int i=1;i<=num;i++)
                        {
                            f=f*i;
                        }
                System.out.println("FACTORIAL OF "+num+"="+f);
                        break;
                        default:
                        System.out.println("Wrong choice");
                }
        }}
```

Description of variables/ comments/mnemonics

Topics /Concepts found difficult

- Default value of float.

- Working of ternary operator.

- Wrapper classes.

- Output question using different library functions.

- Default values of primitive data types.

- Evaluation of an expression containing prefix and postfix operators.

- Use of switch...case and default.

- Arranging names in descending order.

- Calculation of bill.

- Use of nested loop.

Suggestions for students

- Solve exercises based on various operators and inbuilt functions.

- Section A is compulsory and hence all question must be attempted.

- Read the question carefully before answering.

- If a proper definition does not come to mind then explain the term with suitable example.

- Do not forget to write comment lines or description of variables and use mnemonic names.

- Dry run each program before trying it on the computer.

- Try to understand the question asked by reading it carefully.

- Each concept should be understood instead of rote learning.

- If a definition does not come to mind, write an accurate example to illustrate the concept.

- Learn the correct use of all statements so that syntax errors can be eliminated.