# Analysis of Pupil Performance

Year 2018 Examination

COMPUTER APPLICATIONS

ICSE
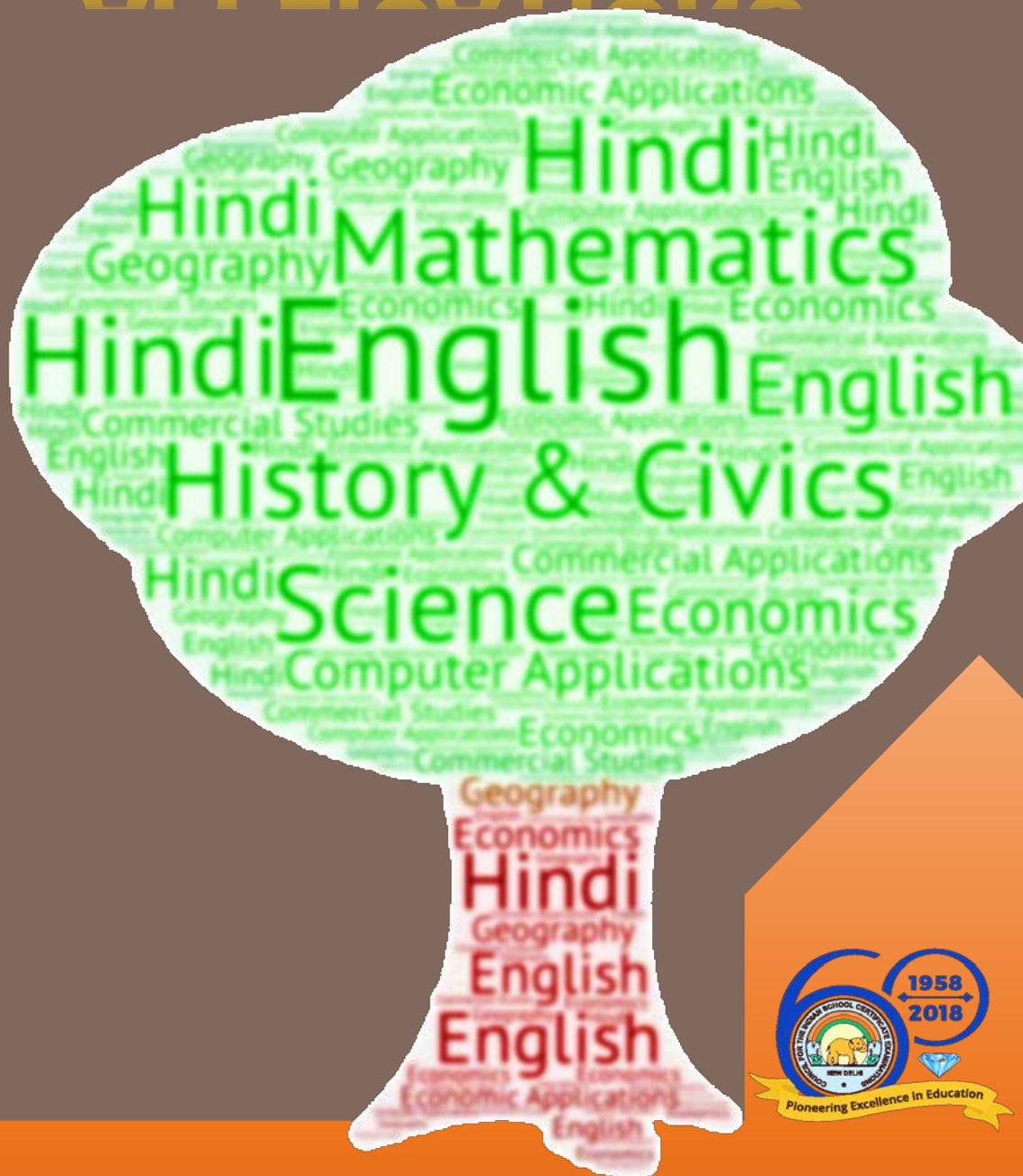
Research Development and Consultancy Division

Council for the Indian School Certificate Examinations

New Delhi

Year 2018

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This document of the Analysis of Pupils' Performance at the ISC Year 12 and ICSE Year 10 Examination is one of its kind. It has grown and evolved over the years to provide feedback to schools in terms of the strengths and weaknesses of the candidates in handling the examinations.

We commend the work of Mrs. Shilpi Gupta (Deputy Head) of the Research Development and Consultancy Division (RDCD) of the Council and her team, who have painstakingly prepared this analysis. We are grateful to the examiners who have contributed through their comments on the performance of the candidates under examination as well as for their suggestions to teachers and students for the effective transaction of the syllabus.

We hope the schools will find this document useful. We invite comments from schools on its utility and quality.

Gerry Arathoon
October 2018   **Chief Executive & Secretary**

The Council has been involved in the preparation of the ICSE and ISC Analysis of Pupil Performance documents since the year 1994. Over these years, these documents have facilitated the teaching-learning process by providing subject/ paper wise feedback to teachers regarding performance of students at the ICSE and ISC Examinations. With the aim of ensuring wider accessibility to all stakeholders, from the year 2014, the ICSE and the ISC documents have been made available on the Council's website www.cisce.org.

The documents include a detailed qualitative analysis of the performance of students in different subjects which comprises of examiners' comments on common errors made by candidates, topics found difficult or confusing, marking scheme for each answer and suggestions for teachers/ candidates.

In addition to a detailed qualitative analysis, the Analysis of Pupil Performance documents for the Examination Year 2018 have a component of a detailed quantitative analysis. For each subject dealt with in the document, both at the ICSE and the ISC levels, a detailed statistical analysis has been done, which has been presented in a simple user-friendly manner.

It is hoped that this document will not only enable teachers to understand how their students have performed with respect to other students who appeared for the ICSE/ISC Year 2018 Examinations, but also provide information on how they have performed within the Region or State, their performance as compared to other Regions or States, etc. It will also help develop a better understanding of the assessment/ evaluation process. This will help teachers in guiding their students more effectively and comprehensively so that students prepare for the ICSE/ ISC Examinations, with a better understanding of what is required from them.

The Analysis of Pupil Performance document for ICSE for the Examination Year 2018 covers the following subjects: English (English Language, Literature in English), Hindi, History, Civics and Geography (History and Civics, Geography), Mathematics, Science (Physics, Chemistry, Biology), Commercial Studies, Economics, Computer Applications, Economic Applications, Commercial Applications.

Subjects covered in the ISC Analysis of Pupil Performance document for the Year 2018 include English (English Language and Literature in English), Hindi, Elective English, Physics (Theory), Chemistry (Theory), Biology (Theory), Mathematics, Computer Science, History, Political Science, Geography, Sociology, Psychology, Economics, Commerce, Accounts and Business Studies.

I would like to acknowledge the contribution of all the ICSE and the ISC examiners who have been an integral part of this exercise, whose valuable inputs have helped put this document together.

I would also like to thank the RDCD team of, Dr. M.K. Gandhi, Dr. Manika Sharma, Mrs. Roshni George and Mrs. Mansi Guleria who have done a commendable job in preparing this document.

Shilpi Gupta
October 2018   *Deputy Head - RDCD*

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INTRODUCTION

This document aims to provide a comprehensive picture of the performance of candidates in the subject. It comprises of two sections, which provide Quantitative and Qualitative analysis results in terms of performance of candidates in the subject for the ICSE Year 2018 Examination. The details of the Quantitative and the Qualitative analysis are given below.

Quantitative Analysis

This section provides a detailed statistical analysis of the following:

- Overall Performance of candidates in the subject (Statistics at a Glance)
- State wise Performance of Candidates
- Gender wise comparison of Overall Performance
- Region wise comparison of Performance
- Comparison of Region wise performance on the basis of Gender
- Comparison of performance in different Mark Ranges and comparison on the basis of Gender for the top and bottom ranges
- Comparison of performance in different Grade categories and comparison on the basis of Gender for the top and bottom grades

The data has been presented in the form of means, frequencies and bar graphs.

Understanding the tables

Each of the comparison tables shows N (Number of candidates), Mean Marks obtained, Standard Errors and t-values with the level of significance. For t-test, mean values compared with their standard errors indicate whether an observed difference is likely to be a true difference or whether it has occurred by chance. The t-test has been applied using a confidence level of 95%, which means that if a difference is marked as 'statistically significant' (with * mark, refer to t-value column of the table), the probability of the difference occurring by chance is less than 5%. In other words, we are 95% confident that the difference between the two values is true.

t-test has been used to observe significant differences in the performance of boys and girls, gender wise differences within regions (North, East, South and West), gender wise differences within marks ranges (Top and bottom ranges) and gender wise differences within grades awarded (Grade 1 and Grade 9) at the ICSE Year 2018 Examination.

The analysed data has been depicted in a simple and user-friendly manner.

Given below is an example showing the comparison tables used in this section and the manner in which they should be interpreted.

Comparison on the basis of Gender

Gender	N	Mean	SE	t-value
Girls	2,538	66.1	0.29	
Boys	1,051	60.1	0.42	

*Significant at 0.05 level

11.91*

Girls performed significantly better than boys.
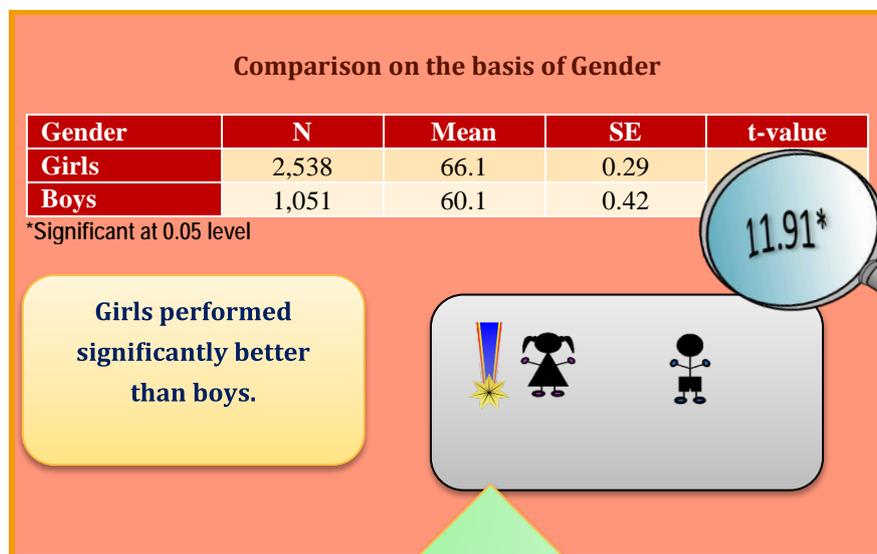
The table shows comparison between the performances of boys and girls in a particular subject. The t-value of 11.91 is significant at 0.05 level (mentioned below the table) with a mean of girls as 66.1 and that of boys as 60.1. It means that there is significant difference between the performance of boys and girls in the subject. The probability of this difference occurring by chance is less than 5%. The mean value of girls is higher than that of boys. It can be interpreted that girls are performing significantly better than boys.

The results have also been depicted pictographically. In this case, the girls performed significantly better than the boys. This is depicted by the girl with a medal.

Qualitative Analysis

The purpose of the qualitative analysis is to provide insights into how candidates have performed in individual questions set in the question paper. This section is based on inputs provided by examiners from examination centres across the country. It comprises of question wise feedback on the performance of candidates in the form of *Comments of Examiners* on the common errors made by candidates along with *Suggestions for Teachers* to rectify/ reduce these errors. The *Marking Scheme* for each question has also been provided to help teachers understand the criteria used for marking. Topics in the question paper that were generally found to be difficult or confusing by candidates, have also been listed down, along with general suggestions for candidates on how to prepare for the examination/ perform better in the examination.

QUANTITATIVE ANALYSIS

STATISTICS AT A GLANCE

Total Number of Candidates: 1,09,005

Mean Marks: 83.5

Highest Marks: 100

Lowest Marks: 03
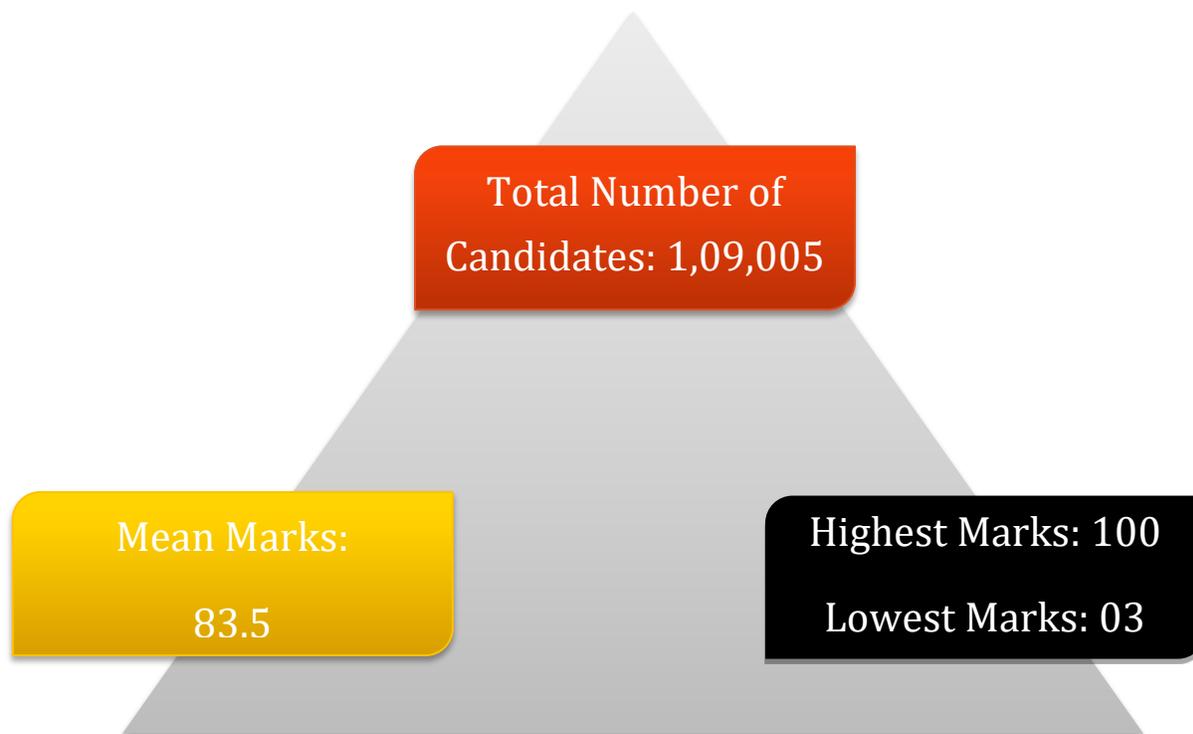
PERFORMANCE (STATE-WISE & FOREIGN)

State/UT	Mean Marks
West Bengal	82.7
Uttarakhand	83.9
Uttar Pradesh	81.7
Tripura	83.1
Telangana	82.9
Tamil Nadu	87.0
Sikkim	75.5
Rajasthan	82.7
Punjab	82.5
Puducherry	74.3
Odisha	82.9
New Delhi	93.4
Meghalaya	83.9
Maharashtra	88.7
Madhya Pradesh	79.1
Kerala	87.8
Karnataka	86.8
Jharkhand	82.2
Himachal Pradesh	82.1
Haryana	87.0
Gujarat	81.6
Goa	91.8
Chhattisgarh	76.4
Chandigarh	91.8
Bihar	85.1
Assam	84.7
Andhra Pradesh	80.8
Foreign	89.3

The States/UTs of New Delhi, Goa and Chandigarh secured highest mean marks. Mean marks secured by candidates studying in schools abroad were 89.3.
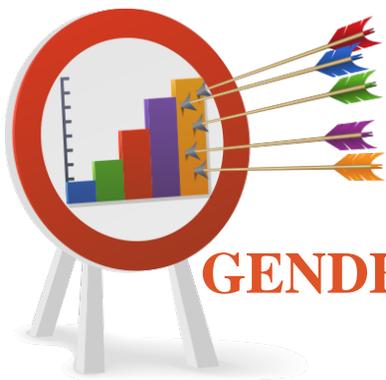
GENDER-WISE COMPARISON

GIRLS

Mean Marks: 83.9

Number of
Candidates: 46,840

BOYS

Mean Marks: 83.1

Number of
Candidates: 62,165

Comparison on the basis of Gender

Gender	N	Mean	SE	t-value
Girls	46,840	83.9	0.06	9.03*
Boys	62,165	83.1	0.06	

*Significant at 0.05 level

Girls performed significantly better than boys.

REGION-WISE COMPARISON

East

Mean Marks: 82.8

Number of Candidates: 36,258

Highest Marks: 100
Lowest Marks: 28

North

Mean Marks: 81.9

Number of Candidates: 41,475

Highest Marks: 100
Lowest Marks: 03

REGION

Mean Marks: 85.8

Number of Candidates: 22,173

Highest Marks: 100
Lowest Marks: 40

West

Mean Marks: 87.3

Number of Candidates: 8,838

Highest Marks: 100
Lowest Marks: 31

South

Mean Marks: 89.3

Number of Candidates: 261

Highest Marks: 100
Lowest Marks: 44

Foreign

Mean Marks obtained by Boys and Girls-Region wise
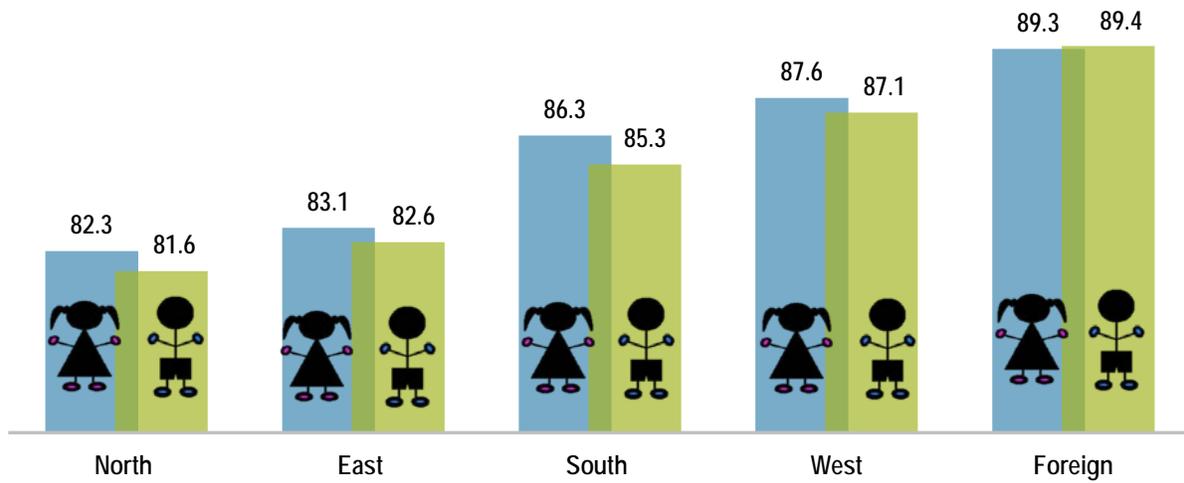
Region	Gender	N	Mean	SE	t-value
Comparison on the basis of Gender within Region					
Region	Gender	N	Mean	SE	t-value
North (N)	Girls	17,367	82.3	0.10	4.99*
	Boys	24,108	81.6	0.09	
East (E)	Girls	15,002	83.1	0.11	2.90*
	Boys	21,256	82.6	0.10	
South (S)	Girls	10,916	86.3	0.10	6.01*
	Boys	11,257	85.3	0.12	
West (W)	Girls	3,437	87.6	0.21	1.81
	Boys	5,401	87.1	0.18	
Foreign (F)	Girls	118	89.3	1.12	-0.07
	Boys	143	89.4	1.12	

*Significant at 0.05 level

The performance of girls was significantly better than that of boys in northern, eastern and southern region.

REGION (N, E, S)

MARK RANGES :
COMPARISON GENDER-WISE

Comparison on the basis of gender in top and bottom mark ranges

Marks Range	Gender	N	Mean	SE	t-value
Top Range (81-100)	Girls	30,274	92.0	0.03	-15.22*
	Boys	39,012	92.7	0.03	
Bottom Range (0-20)	Girls	0	0	0	-
	Boys	2	5	2	

*Significant at 0.05 level

Marks Range (81-100)

Performance of boys was significantly better than the performance of girls.

Marks Range (81-100)

Legend: ■ Boys ■ Girls ■ All Candidates

Marks Range	Boys	Girls	All Candidates
81 - 100	92.7	92.0	92.4
61 - 80	71.2	71.8	71.5
41 - 60	54.8	55.4	55.0
21 - 40	36.8	36.8	36.8
0 - 20	5.0		5.0
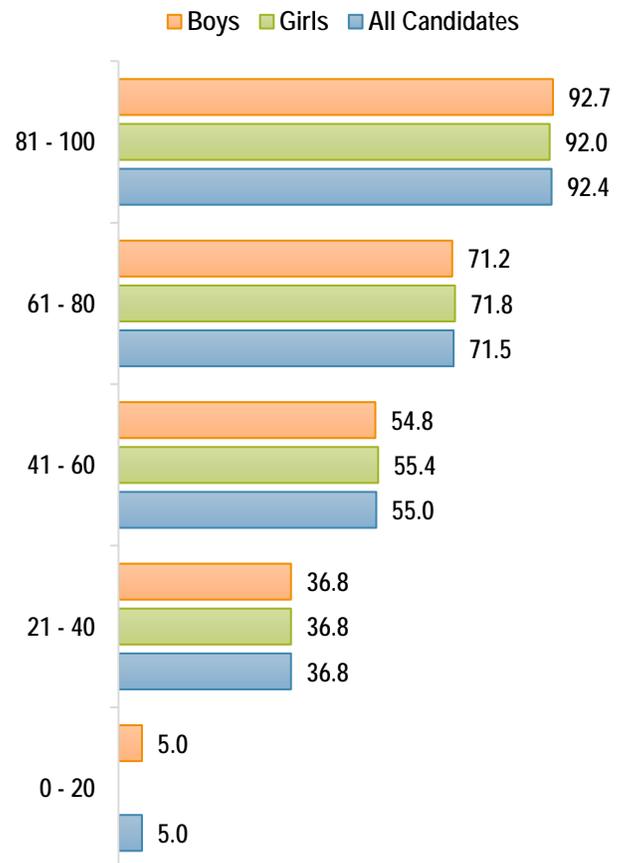
GRADES AWARDED : COMPARISON GENDER-WISE

Comparison on the basis of gender in Grade 1 and Grade 9

Grades	Gender	N	Mean	SE	t-value
Grade 1	Girls	19,945	95.5	0.02	-10.31*
	Boys	27,429	95.8	0.02	
Grade 9	Girls	0	0	0	-
	Boys	2	5.0	2.00	

*Significant at 0.05 level

Grade 1

Performance of boys was significantly better than the performance of girls.

Grade 1

Boys **Girls** **All Candidates**

Grade	Boys	Girls	All Candidates
1	95.8	95.5	95.7
2	84.8	84.8	84.8
3	75.6	75.7	75.7
4	66.7	66.9	66.8
5	57.3	57.5	57.4
6	48.5	48.5	48.5
7	41.1	40.7	41.0
8	30.0	31.0	30.1
9	5.0		5.0
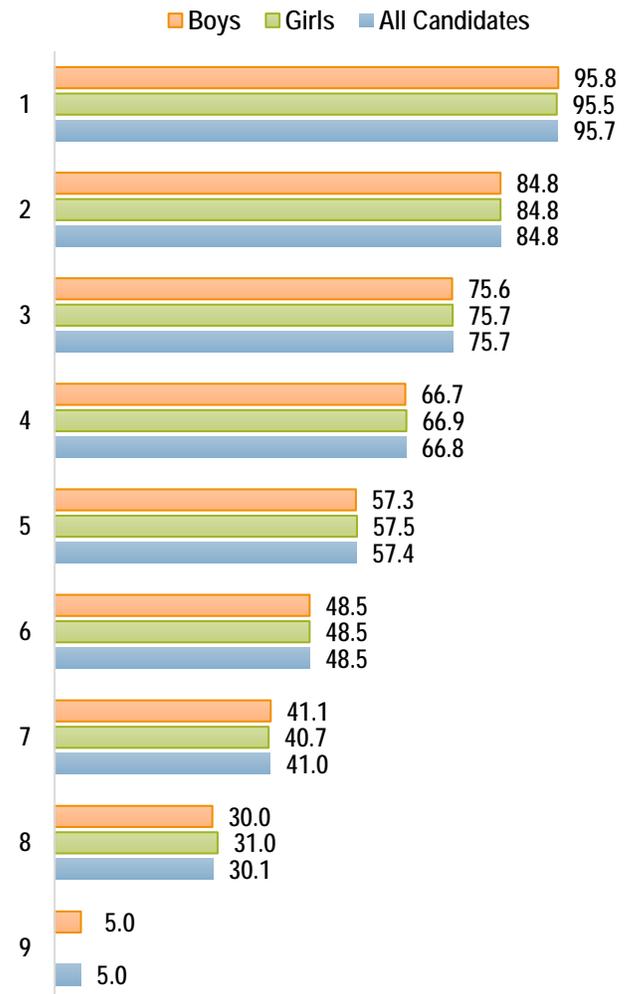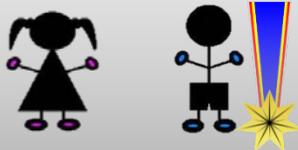
SECTION A (40 Marks)
Attempt all questions

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

Comments of Examiners

(a) Many candidates, instead of writing the definition of abstraction, wrote the definition of encapsulation Some candidates did not write important keywords like hiding the background details or showing the essential details.

(b) Some candidates wrote the types of searching and sorting instead of their differences based on Java programming. A few candidates used the same words as given in the question i.e. searching means to search something and sorting means sorting data.

(c) Majority of the candidates were not clear about the difference between Character class functions and String functions. Most of the candidates were not aware that isUpperCase() happens to be a Character class function.

(d) Majority of the candidates wrote very general answers like- can be seen by everyone or shown to or used by everyone or public premises or cannot be seen by everyone or only user can see or use, or everything is not shown or private premises.

(e) Most of the candidates were able to answer this question. However, a few candidates got confused between primitive and non-primitive data types.

Question 1

(a)	abstraction: the act of representing essential features and hide unnecessary or background details is called abstraction.		

(b)		**Searching**	**Sorting**	
		To find an element in an array is called searching.	To arrange the elements in an order is called sorting.	

(c)		**isUpperCase**	**toUpperCase**	
		CHECKS whether a given character is an uppercase letter or not	CONVERTS the character to its upper case	
		Output of this function is boolean	Output of this function is character.	

(d)	public members can be accessed from any other class.
	private members can only be accessed within the declared class.

(e)	char – primitive array – non-primitive int – primitive class – non primitive

Question 2

(a)   (i)   int res = 'A';   [2]

What is the value of **res**?

(ii)   Name the package that contains wrapper classes.

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

(c)   System.out.print("BEST ");   [2]

System.out.println("OF LUCK");

Choose the correct option for the output of the above statements

(i)   BEST OF LUCK

(ii)   BEST

OF LUCK

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

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

　　　(i)　　endsWith()

　　　(ii)　　log()

Comments of Examiners

(a) (i)　Majority of the candidates wrote the answer as 'A' or "A" or A. Candidates were unable to understand the implicit conversion.

　　(ii)　Most of the candidates were able to answer this question. However, some candidates wrote io or util as the answer while a few candidates wrote the answer Lang or in capital letters LANG.

(b)　Most of the candidates were able to answer this question. However, some candidates interchanged the answers.

(c)　Majority of the candidates were unable to select the correct option for the output of the given statements as either they seemed to be unclear of the working of the println() method or did not read all the options carefully.

(d)　Several candidates could not write the prototype of the function given in the question.

(e) (i)　Many candidates, instead of writing Boolean, wrote return type as String.

　　(ii)　Many candidates wrote return type as float or integer. Some candidates mentioned data types with the first letter in uppercase.

MARKING SCHEME	
Question 2	
(a)	(i) 65
	(ii) lang
(b)	

while loop	**do while loop**
Entry controlled loop	Exit controlled loop
If condition is false in the beginning loop never executes,	Loop will execute at least once even if the condition is false.
minimum repetition is 0	*minimum repetition is 1*

(c)	(i) BEST OF LUCK
(d)	char check (int n)
(e)	(i) boolean
	(ii) double

Question 3

(a)   Write a Java expression for the following: [2]

$$\frac{\sqrt{3x + x^2}}{a + b}$$

(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");

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```
        else if(var==2)
        System.out.println("better");
        else if(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 >10000)
        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   [2]
   the loop is executed:
        int i;
        for (i = 5 ; i > 10; i ++)
        System.out.println(i);
        System.out.println(i * 4);

Comments of Examiners

(a) Majority of the candidates did not put the parenthesis in the denominator. Some candidates were not familiar with the syntax of sqrt function.

(b) Many candidates seemed to be unaware of the meaning of y+=. Most candidates made errors while evaluating prefix and post fix operators.

In many answer scripts, addition of the initial value of the variable to the evaluated value of the expression was incorrect. Some candidates added the decremented value to the evaluated value of the expression.

(c) (i) Several candidates did not write the negative sign in the answer. Many students did not write the answer in decimals. Some candidates, instead of writing the answer as -5·0, wrote it as - 4 or - 4·0 or 4·0.

(ii) Most of the candidates wrote 12 as the answer instead of 12·0.

(d) Majority of the candidates were able to answer this question. However, some candidates wrote that constructor is used to construct objects, or it is used to make the program easier.

(e) Several candidates simply copied the question. Majority of the candidates were not clear of the use of \n. The common errors made by the candidates were: Incredible "\n" world, "Incredible" + "\n" + "world".

(f) Many candidates wrote if with in case.

The common errors made by majority of the candidates were:

(i) Case 1: if (var==1) or var==1.

(ii) Switch var( ); or switch was missing.

(iii) Break and default statements were missing.

(g) (i) Majority of the candidates were able to answer this question. However, in a few answer scripts only the first occurrence of E was converted.

(ii) Majority of the candidates were unclear about the working of compareTo() function. Several candidates were unable to calculate ASCII difference. In a few answer scripts, the answer calculated was either 18 or -1. Some candidates wrote any random negative value as the answer.

(h) Some candidates, instead of writing false as the answer, wrote 5>6. Some candidates were unclear whether the position of second argument was included in the output or not. Some candidates extracted the character at third index also.

(i) The common errors made by majority of the candidates were:
  (i) if(bill>10000)? bill*10.0/100: bill*5.0/100.
  (ii) The assignment part of the statement was not being written.
  (iii) 'discount =' - not being written.

(j) Majority of the candidates were unable to identify the final limit of the loop. Some candidates wrote error in the condition of the loop.

- Give adequate practice in conversion of if to switch and vice-versa.
- Discuss with the students, examples of various problems with the appropriate conditional statements.
- Explain String functions with examples.
- Theoretically and through practical sessions, explain the execution of the compareTo() function, so that the students understand the difference between equals() and compareTo() functions.
- Explain the importance of ASCII values of the letters (both uppercase and lowercase) to evaluate the output value.
- Clarify to the students how relational operators works in output statement and results as true or false.
- Practically show to the students how to extract the number of characters in substring function.
- Interpret clearly the purpose and the working of the second argument in substring() function.
- Explain to the students that '?' represents if and: represents else.
- Make the students practice conversion from if- else to ternary and ternary to if- else in the class.
- Explain all the variations of for loop.
- Teach loops with different initial and final values and their output after execution.

MARKING SCHEME

Question 3

(a)	$Math.sqrt(3*x+x*x)/(a+b)$ OR Math.sqrt(3*x+Math.pow(x,2))/(a+b);
(b)	33
(c)	i. -5.0 ii. 12.*0*

(d)	(i)	Constructors have the same name as that of the class they belong to.
	(ii)	Constructors are executed when an object is created.
(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)	(i)	false
	(ii)	JAI
(i)	discount = bill>1000? bill*10.0/100: bill *5.0/100;	
(j)	Output: 20 Loop is not executed even once	

SECTION B (60 Marks)
*Attempt **any four** questions from this Section*

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

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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 mobile number.

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

Comments of Examiners

Numerous types of errors were committed in this question by many candidates, namely:
- Used a different class name other than the one given in the question.
- Variable declaration was done at many places i.e. immediately after class and also inside accept()
- Function names and variable names were different from the ones asked in the question.
- The 'totalamt' which was to be calculated was accepted from the user.
- Update() function.
- Syntax error while writing input statement e.g. nextInt() - which letter to be written in capital.
- While comparing types of coaches, words were not written within double quotes.
- Calculation of extra amount.
- Syntax errors in the object creation and function call statement.

Question 4

```java
import java.util.*;
class RailwayTicket
{
  String name, coach;
  long mobno;
  int amt ,totalamt;
  void accept()
  {
     Scanner  sc  = new  Scanner(System.in);
     System.out.println("enter name , coach and mobile no and amount");
     name=sc.next();
     coach=sc.next();
     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
     totalamt=amt;
  }
  void display()                        {
     System.out.println("name  is :"+name);
     System.out.println("mobile no is :"+mobno);
     System.out.println("coach is :"+ coach);
     System.out.println("total amount is :"+totalamt);   }
  public static void main (String arg[])
  {
     RailwayTicket ob =new RailwayTicket();
     ob.accept();
     ob.update();
     ob.display();   }}
```

STEPS
class name
Variable declaration
void accept ()
Four inputs
void update()
Four conditions and calculations
void display ()
Output (totalamt compulsory)
Object creation *with one function call*
Variable description/Mnemonic codes

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)

Examples: $12 = 3 \times 4$

$20 = 4 \times 5$

$42 = 6 \times 7$

Comments of Examiners

Many candidates answered this question correctly. Some common errors observed were:
- Output in most cases was written inside the loop and the break and flag statements were not written.
- "Not a pronic number" was not printed,
- In the *if* condition, instead of (i*((i+1)==num), (i*i+1==num) was written.
- In the *if* statement, instead of the relational operator (==), assignment operator (=) was used.
- Mentioning that *else* statement inside the loop results in printing both the statements "Pronic Number" and also "Not a pronic number".

Suggestions for teachers

- Train students about the use of *for* loop.
- Give sufficient practice on problems to print an appropriate output message.
- Explain Operator precedence and importance of use of parenthesis in proper place.
- The effect of not putting parenthesis should be shown on the computer.
- Teach students the use of *break* statement to come out of the loop.
- Advice the students to read the questions carefully.

Question 5

```java
import java.util.*;
class  pronic  {
  public  static  void  main(String arg[])
  {
    Scanner  sc  = new  Scanner(System.in);
    System.out.println("enter  the  number");
    int num=sc.nextInt();
    int flag=0;
    for(int i=0;i<num;i++)
    {
      if( i*(i+1)==num)
      {
        flag=1;
        break;
      }
    }
    if(flag==1)
    System.out.println("Pronic number");
    else
    System.out.println("Not  a pronic number");
  }
}
```

STEPS
Input
flag initialisation
for loop
if condition
flag=1
Jump statement break
if else and displaying message
Variable description/Mnemonic codes

Alternate method

```java
class  Q5
{
public  void  pronic (int n)
{
int  s=(int)Math.sqrt(n);
if(s*(s+1)==n)
System.out.println(n +" is a pronic number");
else
System.out.println(n+" is not a pronic number ");
}
 }
```

Variable description

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

Comments of Examiners

Majority of the candidates were unable to answer this question correctly. Some of the commonly made mistakes were:
- Not taking care of the index of charAt() or substring() function.
- Incorrect initial and final values of the for   loop- forr(int i=1; i<=l;i++).
- Accessing first character after space was done by writing (ch+1).
- Converting the first character after space was done as:
  ch.toUpperCase() or (ch+1).toUpperCase()
- Displaying output without space between the words.
- Getting an incorrect output as only the first character was converted and displayed.

Suggestions for teachers
- Illustrate to the students that in the String, since position starts with 0, so condition should be either i< s.length() or i<=s.length()-1.
- Explain practically to the students how to access character after space.
- Give adequate number of exercises on String and Character functions to avoid confusion with the students when they use it in the program.

MARKING SCHEME
Question 6

```
 import java.util.*;
class ques6  {
public static void main(String args[])  {
Scanner obj= new Scanner(System.in);
String s="";
System.out.println(" enter a string");
String sen=obj.nextLine();
sen=' ' +sen;
int l= sen.length();
for(int x= 0; x<l; x++) {
char ch= sen.charAt(x);
if (ch==' ') {
```

```java
int i= sen.charAt(x+1);
i=i-32;
s= s+ ' '+ (char)i;
x++;  }
else s=s+ch;}
System.out.print(s);
}}
```

Alternate Method

```java
// To change the first letter of each word to uppercase
import java.util.*;
class Q6_Title_Case
{
   public static void main(String args[])
   {
     Scanner sc= new Scanner(System.in);
     String sent,x="";
     char k , p ;
     int len, i;
     System.out.print("Enter a sentence");
     sent= sc.nextLine();
     sent= sent.toLowerCase();
     sent= " " + sent;
     len = sent.length();
     for(i=0;i<len-1;i++)
        {
           k=sent.charAt(i);
           p=sent.charAt(i+1);
           if(k==' ' && p!=' ')
              p=Character.toUpperCase(p);
           x=x+p;
        }
     System.out.println("The new string is "+ x);
   }
}
```

STEPS
Input
Declaration of variable
Finding length
Logic
Output
Variable description/Mnemonic codes

Alternate Method

```java
class change
{
   void change( String s)
   {
     int l=s.length(),p,i;
     String str="";
     s=s.toLowerCase();
     s=s+" ";
     for(i=0;i<l;i++)
        {
```

```
    p=s.indexOf(" ",i);
    str=s.substring(i,p);
System.out.print(Character.toUpperCase(str.charAt(0))+str.substring(1)+" ");
    i=p;
 }}}
```

[15]

Question 7

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

(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.

$V = L \times B \times H$

Comments of Examiners

Most candidates answered correctly. However, a few general mistakes were observed in all the three functions:

- Declaration of the variable V, was missing.
- Void was used in the prototype, but return statement was used in the body of the function.
- Double was used in the prototype, but System.out.println() was used in the body of the function and 'return' statement was missing.
- Void with System.out.println() was used. Though it shows no error, the combination is not as per the requirement in the question.
- In the keyword return R was capital.
- In the formula, instead of R*R*R, R^3 was written.
- Function name was not as per the question.
- Function overloading concept was not followed.
- Three different functions with different names were used.

Question 7

```
import java .io.*;
public class mensuration
{
      double volume(double  R)
      {
      double  V= 4.0/3* 22.0/7*Math.pow(R,3);
       return(V);
       }
    double volume( double H,double R)
    {
       double V= 22.0/7 * Math.pow(R,2) *H;
       return(V);
    }
        double volume( double L, double B , double H)
    {
       double  V = L*B*H;
        return( V);
    }
}
```

STEPS
3 Functions with correct argument
Formulas in all the 3 functions
return statements in all the 3 functions
Variable description/Mnemonic codes

Question 8 [15]

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

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

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

Comments of Examiners

Majority of the candidates attempted well barring a few exceptions who showed following lapses:
- Menu was not displayed.
- Input for choice was not taken.
- Pattern printing was done using multiple print statements.
- Nested loop logic was not used,
- To start with new line,println( ) was missing,.
- ASCII value was used to print ABCDE but was not converted properly. (Loop value started with 65 and was checked for <= 69, but conversion to character was incorrect).
- Two separate classes were written instead of one.
- In the statements, switch and default. first character s and d were in capital letters.

MARKING SCHEME
Question 8

```
import java .util.*;
class  series
{
  public  static  void  main(String arg[])
  {
    Scanner  sc  = new  Scanner(System.in);
    System.out.println("1.Series1  2.series2");
    System.out.println("enter  the  choice");
    int choice=sc.nextInt();
    switch(choice)
    {
      case 1:String s="ABCDE";
          for(int i=s.length();i>0;i—)
          {
```

STEPS
Displaying menu, input choice, switch
Initialising/ input   string in case 1
for loop with length of string
Display and substring function
Initialising string in case 2/Input
Outer for loop
Inner for loop
Extraction , and display
println()
Default
Variable description/Mnemonic codes

```
                System.out.println(s.substring(0,i));
            }
            break;
        case 2 :String s1="BLUE";
            for(int i=0;i<s1.length();i++)
            {
                for(int j=0;j<=i;j++)
                { System.out.print(s1.charAt(i));  }
                System.out.println();
            }
            break;
        default :System.out.println("invalid choice");
    }   }
}
```

Question 9 [15]

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

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]

Comments of Examiners

Most of the candidates wrote the program correctly. However, a few could not attempt it correctly due to following miscues:
-   Value of N (size of the array) was taken after arrays, name and total marks were created
-   While accepting the values into the array, the index number was missing. Instead of name[i], candidates wrote name[]= sc.next().
-   All operations i.e. input, calculating an average and deviation was done in one Loop.
-   The average of the total marks obtained by N number of students was calculated inside for loop.
-   Deviation of each student's total marks with average marks was not Displayed, rather it was printed outside for loop.

Question 9

```
import java .io.*;
import java.util.*;
class ques9
{
public static void main(String aa[])
{
 Scanner obj = new Scanner(System.in);
 int n;
 System.out.println("enter number of students");
 n= obj.nextInt();
 String name[] = new String[n];
 double marks[] = new double[n];
 double ave, total=0.0;
 for(int x=0; x<n; x++)
 {
   System.out.println(" enter name and totalmarks");
   name[x]= obj.nextLine();
   marks[x]= obj.nextDouble();
   total=total+ marks[x];


 }
  ave= total/n;
  System.out.println("Name " + "        " + " Deviation");
  for(int x= 0; x<n;x++)
   System.out.println( (marks[x]–ave));
  }
}
```

STEPS
Accepting n, total=0.0
Declaring two array
Loop
Accepting value in array
total=total + marks
ave = total/n
Output headings, loop for output
Output with calculation deviation
Variable description/Mnemonic codes

GENERAL COMMENTS

Topics found difficult/ confusing by candidates

- Library functions - its appropriate use.
- Arrays used with commercial / calculation-based programs.
- Menu driven program with pattern printing.
- Identifying the return data type of the library functions-print( ) and println( )
- Confusion in the use of print() and println() functions.
- Conversion of if-else –if to switch-case
- Output questions.
- CompareTo() function and its working.
- Syntax of switch-case and array declaration and initialization.
- Pattern printing using nested loop.
- String and Character functions.
- Return a value from a user-defined function.
- Using the key terms in definitions while writing the differences.
- Output of Math.floor() of negative values.
- Post increment and shorthand assignment operator.
- How to convert first character of a word to uppercase after space.

Suggestions for candidates

- Revise and integrate the concepts studied in Class IX with the Class X syllabus.
- Avoid selective study.
- Give equal importance to all the topics mentioned in the syllabus.
- Practise each topic/sub –topic with as many examples as possible.
- Being an application-oriented subject, apply what is taught in the program and explain its outcome.
- Give sufficient practice to output-based questions.
- Understand all key terms and definitions comprehensively and learn.
- Learn correct use of all statements to eliminate syntax errors.
- Practise programs on various types of loops, their working, conversion from one loop to another and working of nested loop.
- Use proper variable names and ensure that every program has a variable description table.
- Avoid writing abbreviations like SOP, SOPLN, PSVM.
- Understand the logic of a program instead of memorising it.
- Explain programs using Mnemonic variables and comments.
- After writing the program, dry run it with different inputs.
- Write variable description /Mnemonic codes for every program.
- Practise previous years' ICSE question papers,
- Read the questions carefully and write the answers according to their requirements.
- Utilize the reading time to clearly understand the nature of the question.