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# ICSE CLASS 10

# SAMPLE PAPER

## SOLUTIONS

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# EXAM18 SOLUTIONS
# COMPUTER APPLICATIONS

***SECTION A***

**Answer 1**

1. main () function is special or important in java because, when we execute a program, the main () method is the first function to be executed. It is the entry point of us in java. We can call other methods from the main () function for execution. In standard app, there is only one main () function.

2. Unary operators work on a single operand eg. ++a, a++, --a, a— while binary operators work on two operands e.g. a+b, x*y, a-b etc.

3. "Out of bound subscript" or "index Out of bound: is a java exception error handling code. A variable representing the "index" or position of the element in an array is called subscript. When the subscript (index) exceeds the limit (beyond the lowest index or largest index) then, this error code is displayed.

4. "Not (!)" is a logical operator used for expressing negation (falsicity) of an expression. This is used mainly to indicate inequality of arithmetic expression in conditional statement like "if-else" or looping statement.
   Example**:** if (a! = b), if((n%2)!=0) , if((a !> b)) , while(n!=0), …

5. When object of a class created then, first the constructor method is called.

**Answer 2**

1. i) Mathematical function log () is used to find the natural logarithm (that is base 'e') of a number. It takes the double argument and returns also double value. It is one of the java Math library function.
   **Syntax:** double log Value= Math.log (double value);
   **How to get Log Value of base 10 i.e. $\log_{10}$ ():**
   **Syntax:** int logten= (int) Math.log10 (10);

   ii) exp (): Java exp () function also one of the java Math library function. It returns 'E' ('e') raised to the power double value **($e^x$). 'e'** is known as "Euler's number" and its approximate value is 2.71828
   **Syntax:** double expVal= Mat.exp (Double value);
   **Example:** double expval= Math.exp (1.0);

2. Delay loop: is a loop or loops often used in a program to delay the execution of the program for certain period. These loops have no other function than kill time. The delay

loop is used to pause the output for some time so that the viewer (user) can see the output in clear and better manner.

**Example:** Let us take the example of viewing the records or details of 1000 students. When the program is run the records scrolls very fast on the screen because all 1000 records can't come or fit at a time on screen due to smaller screen (usually 20 lines). Therefore, if we use delay loop (say for 5sec or 10sec) after a set of output (here say after 15-20 records) we can view the records properly.

**We can create delay loop**

i) by making thread sleep for milliseconds→ (thread, sleep(milliseconds))

ii) creating empty loop. → for (int i=1; i<=10000; ++i). Here, loop will only increase value of 'i' by 1 till it becomes 10000.

3. **Example:** Use Of Static And Dynamic Initialization:

```
class Initialization
{
static double pie= 3.14; //static variable 'pie' is initialized 3.14
static     //static block initialization
{
double   r=7.0;   // 'r' is initialized 7.0;
double area_circle =pie*r*r;
System.out.println ("Area= "+ area_circle);
}
public void vol () //method to calculate volume
{
double   R=2.5; //local variable
double Volume = pie*Math.pow(R,3); //dynamic initialization
System.out.println("Volume = "+Volume);
    }
public static void main (String args[])
{
staticVariable obj =new staticVariable();
obj.vol();  //function is called
System.out.println("Value of pie "+ pie); //static variable is
//called without the reference of the object
} //end of main method
} //end of class
```

**Output →**

Area= 153.86 → static block got invoked

Volume = 25.12 → output through function 'volume' Invoked through object 'obj'

Value of pie 3.14 → static variable invoked by itself without the reference through the object of the class

4. In java 'throws' keyword is used to declare an exception and to handle the exception. Using 'throws' keyword multiple exceptions can be declared. Keyword 'throws' should follow the method signature followed by expected exception c ode to handle the exception, in case found.
   **Example:**
   public void InputData () throws IOException
   public void Compute () throws Arithmetic Exception
   public void ArrayInput () throws ArrayIndexOutOfBoundsException

5. When no access specifier is specified for a class, method or data members, then they have the default access modifier by default. The default access modifier for a class, method or data members is public and is available only within the same package.

**Answer 3**

1. Immutable class is a class which once created; its content cannot be changed. That is, once an object created, we cannot change its content. In java all wrapper classes: byte, short, boolean, etc. and String class

2. Scope of a variable defines the section of code in which the variable is accessible. When a variable is defined within a class, its scope determines whether, it can be used within the class, within the method only or outside the class also. Instance variable is used within the class, local variables within the method and static variable within the class and outside the also class.

3. Yes, a program having class declaration can run without a constructor being used in the program because java provides default constructor. When, no constructor is used in the program, java compiler calls the default constructor and initializes the data members.

4. Java API packages: Java Language (java. lang), Java Input Output(java.io), Java utility (java. util), Java Interface, java.net, java, awt, java applet …
   **[Note: You may write any four]**

5. PrintWriter obj = new PrintWriter ();

6. i) **OUTPUT:**

   2
   4
   9
   6

**Explanation:** array elements: a[0]=2, a[1]=5, a[2]=8, a[3]=5, a[4]=3

Expression: a[i]+ = (a[i+1] ++) -(--a[i-1]); value of i=2

→ a[i]=a[i]+ (a[i+1] ++) -(--a[i-1]);

→ a [2] =a [2] + (a [3] ++) -(--a [1])

→ a [2] = 8+(5++) -(--5); [a [3] will become 6 post incrementer]

→ a [2] = 8 +5-4= 9, [a [1] =4 pre incrementer]

→ a [2] =9

New values of: a [0] =2 remain unchanged), a [1] = 4, a [2] =9, a [3] =6, a [4]= 3

In for loop since, value of 'i' ranges from 0 to 3 hence, only elements a [0], a [1], a [2] and a[3] will be printed. Therefore,

final output:

2
4
9
6 **[ANS]**

ii) **OUTPUT:**

i) rower ['**replace'** method will replace occurrence of 'p' with 'r']

ii) demy ['substring' method will return the part of string "academy" from index 3(counting from 0) all characters. Which is "demy?"

iii) **OUTPUT: E61**

**Explanation:** Given: a=5, b=2; c = 'c';

'if' condition checks whether a>b or a! =b Here a>b true hence, Next statement c=(char) (62+ (++a + --b)) will be executed

Evaluating the expression: c= (char) (62+6+1) = (char) 69 = E

Value of a= 6 [(5+1=6) prefix incrementer]

Value of b=1 [(2-1=1) prefix decrementer]

Print statement will first print char value of c which is E, then value of 'a' (6) followed by value of 'b' (1)

Hence, final output: **E61 [ANS]**

iv) **OUTPUT:** 11

**Solution:** Elements of array y: y[0]=5, y[1]=7, y[2]=8, y[3]=6

q = y. length =4 [length of the array 'y'], p = 0

for loop runs for, i=0 to i< q that is for, i=0 to i< 4, when,

| **Expression** | i=0 | i=1 | i=2 | i=3 |
|---|---|---|---|---|
| p= y[i]+y[3-i] | y[0] +y[3] | y[1] +y[2] | y [2] +y[1] | y[3] +y[0] |
| p= | 5+ 6 =11 | 7+8 =15 | 8+7= 15 | 6 + 5 = 11 |

Hence, p=11 ←**[ANS]**

exam 8

# Answer Paper Review

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v) **OUTPUT: Value of z=8.0**

**Solution:** Given: x = 1000, y = 9, z = 5

Execution of do loop:

**1st run:**

x=1000, y=9

x=x/y =1000/9=111(x and y are integer therefore x/y will be integer)

z= z++ +1 = 6 [now current value will be 7]

Condition while loop y<=x is true (9<111) therefore loop will

**2nd run:**

x=111, y=9

x=x/y =111/9=12 (x and y are integer therefore x/y will be integer)

z= z++ +1 =7

Condition while loop y<=x is true (9< 12) therefore loop will continue

**3rd run:**

x=12, y=9

x=x/y =12/9=1 (x and y are integer therefore x/y will be integer)

z= z++ +1 = 7 +1= 8

Condition while loop y<=x is false (9! <1) therefore execution stops

Hence, value of z = 8 **[ANS]**

***SECTION B***

**Answer 4**

```
import java.io.*;
class Q4_BishopEducation
{
      public static void main(String args[]) throws IOException
      {
      Int  UrbnPopulation[ ]= {25,10,34,29,93,21,10,27,42,44};
      String stateName[]={"Jammu Kashmir","Himachal Pradesh", "Punjab",
      "Haryana", "Delhi","Uttar Pradesh","Bihar","Madhya Pradesh",
      "Maharashtra","Tamil nadu"};
      String TempName="";
      int i, j, pos, min;
      InputStreamReader reader= new InputStreamReader(System.in);
      BufferedReader input= new BufferedReader(reader);
      // Sorting begins
      for (i=0;i<9;++i)
      {
      max=UrbnPopulation[i];   //storing element at i in 'max'
      pos=i;        //storing the initial position in 'pos'
      for (j=i+1;j<10;++j)  //comparing ith element with remaining elements
      {  // to find largest number
      if (min>UrbnPopulation[j])  //if  min > UrbnPopulation[j] then
      {       // smaller of the two is stored in 'min'
```

```
min=UrbnPopulation[j];    //store UrbnPopulation[j] in min
pos =j;   //store the position of larger number in 'pos'
}
}   //end of j-loop
// following codes swaps UrbnPopulation [pos] & UrbnPopulation[i] //
UrbnPopulation [pos] =UrbnPopulation[i];
//storing i-the element at // position 'pos'
UrbnPopulation[i]=min;  //storing largest integer in i-the  position
TempName=stateName [pos]; // stateName at [pos] is stored in
// TempName, stateName at [i]  is stored in
stateName[pos]= stateName[i];    // stateName at [pos] and
stateName[i]= TempName;  //TempName  stored at stateName at i
}  //end of 'i' loop
System.out.println ("List in Ascending order");
System.out.println ("State "+"\t\t" + "Percentage of Population");
for(i=0;i<10;++i)
{
System.out.println (stateName[i] +" \t\t"+UrbnPopulation[i]);
}
} //end of main method
}   //end of class
```

**Answer 5**

```
import java.io.*;
class taxpayer
 {
     public  int   pan;
     public  String   name;
     public  float   tax income;
     public  float   tax;
     taxpayer ()    //constructor to initialization
  {
      Pan=0;
      name="";
      taxincome=0;
      tax=0;
  }
      public void input() throws IOException // function to input data
  {
      InputStreamReader input = new InputStreamReader (System.in);
      BufferedReader br= new BufferedReader (input);
      System.out.println ("Enter Pan number :");
      pan=Integer.parseInt(br.readLine());
      System.out.println ("Enter Name :");
      name=br.readLine();
      System.out.println("Enter Taxable income : ");
      taxincome=Float.parseFloat(br.readLine());
```

```
}    // end of function input
public void computetax()    //function to compute tax
{
if (taxincome<= 60000) //if taxable income <= 60000
{
tax=0;   // tax= 0
}
else if(taxincome<=150000) //if taxable income between 60000-150000
{
tax=(float) (0.05*taxincome); //tax=5 % of income //
}
else if(taxincome<=500000)//if taxable income between 150000-500000
{
tax= (float) (0.10*taxincome);   //tax= 10% of income
}
else   //if taxable income greater than 500000
{
tax=(float) (0.15*taxincome);  //tax= 15% of income
}
}   // end of the function computetax()
public void displaydata()    //function to display the output
{
System.out.println("Pan Number"+"\t"+"Name"+"\t"+"Taxable Income" +"\t"+"Tax");
System.out.println(pan+"\t"+name+"\t"+taxincome+"\t"+tax);
}      // end of the function display()
public static void main (String args[ ]) throws IOException
{
taxpayer fn = new taxpayer();
fn.input ();  //calling function input () for input data
fn.computetax (); //calling function computetax () to calculate tax
fn.displaydata (); //calling function displaydata () to display the output
} // end of main method
}  // end of class
```

**Answer 6**

```
import java.io.*;
class Q6_BishopEducation
{
        public void compute () throws IOException //function to compute sum of series
        {                       // 1+2^2+3^2+4^2+....+n^2
        int n, sum=0,i;
        InputStreamReader input = new InputStreamReader (System.in);
        BufferedReader br= new BufferedReader (inp);
        System.out.println ("Enter number of terms :");
        n=Integer.parseInt (br.readLine ());
        for (i=1;i<=n;i++)
        {
```

```
sum= sum+(i*i);  //(i)2, when i=1→ i*i=12,  i=2→i*i=22 …
}
System.out.println ("sum of the series = "+sum);
}   //end of the function compute ()
public void compute (int   n)   //function to compute sum of series:
{       // 1! + 2! + 3! + 4! + ...  + n!
int    term=n, sumSeries2=0;
int    i, fact=1;
for (i=1;i<=term;i++)
{
fact =fact*i; //factorial of n= n *(factorial of (n-1),  n!=n*(n-1)!
sumSeries2 = sumSeries2+fact;
}
System.out.println ("sum of hr series = "+sumSeries2);
} //end of function compute()
public static void main(String args[])  throws  IOException
{
Q6_BishopEducation   obj = new Q6_BishopEducation (); //creating object
int  i=0, temp,sum=0, choice;
InputStreamReader inp = new InputStreamReader(System.in);
BufferedReader br= new BufferedReader(inp);
System.out.println(" Menu");
System.out.println("1. Sum Of Series : 1^2 + 2^2 + 3^2 +… + n^2 ");
System.out.println("2. Sum Of Series :  1!+ 2!+ 3!+ …. + n! ");
System.out.println("Enter your Choice(1/2) :");
choice=Integer.parseInt(br.readLine());
switch(choice)  //
{
case 1 :   //computing sum of series -1
          obj.compute();  //calling function compute() for the task
          break;   //end of method
          case 2:   // To find  sum of the series – 2
          int   NoOfTerm;
          System.out.println("Enter number of terms :");
          NoOfTerm=Integer.parseInt(br.readLine());
          obj.compute(NoOfTerm);  // calling function compute() for the task
          break;
          default:   //default option, when no option is matching
          System.out.println("Wrong Choice");
          break;
          }  // end of  switch
          } //end of main method
          } //end of class
```

**Answer 7**

```
import java.io.*;
class Q7_BishopEducation
```

```
{
    public static void main(String  args[]) throws IOException
    {
    String    str,newStr="" ; //'str' to store input string, and 'newStr' to
    // store output string
    char  chr1,chr2; //'chr1'& 'chr2' to store characters from the string
    int   length, i , val; //'length' to store length of the string,
    //'i' loop variable & 'val' to store integer value of the character
    int  encoding=2;  //number of character to move head
    InputStreamReader inpt = new InputStreamReader(System.in);
    BufferedReader br= new BufferedReader(inpt);
    System.out.println("Enter Any String in upper case: ");
    str=br.readLine();
    length=str.length();  // finding length of the string //
    for(i=0;i<length;i++) //Loop is run from last character
    {
    chr1 =str.charAt(i);  //character at 'i' is stored in 'chr1'
    val= (int)(chr1);  //integer value (ASCII value) of character is
    // stored in 'val'
    val= val+encoding; //shifting 2 positions head
    // here, given encoding=2)
    if(val>90)    // if position exceeds the last alphabet(Z) then,
    {        // wrapping around to starting alphabet by
    val=val-26;  //subtracting 26 from val }
    chr2=(char)(val);  //converting integer value 'val' back to
    // character and stored in 'chr2'
    newStr=newStr+chr2; //adding new shift character to new string
    // 'newStr'
    }
    System.out.println("New String : "+newStr);
    }  //end of main method
    }  //end of class
```

**Note:** In the above program only upper case character is taken into consideration because in sample input, only the uppercase characters are considered.

**Answer 8**

```
import java.io.*;
class  Q8_BishopEducation
{
    public static void main(String args[])  throws  IOException
    {
    int   number,temp,i;
    char  ch;  //'ch' to store character extracted from the string
    String   str; //'str' stores the given string
    int   length,chk=0; //'chk' to check number contains digit 0 in it
    InputStreamReader inp = new InputStreamReader(System.in);
    BufferedReader br= new BufferedReader(inp);
```

```
System.out.println("Enter A Number(n) :");
number = Integer.parseInt(br.readLine());
temp=number;  //storing number in another variable 'temp'
str= String.valueOf(temp); //converting number into string form
length=str.length(); //finding length/no. of digit
ch= str.charAt(0); //character at position 0 or the first digit
if(ch=='0')  //checking if character is 0 or the first digit is 0
{              // if not 0 then,
System.out.println(" Not A Duck Number");
}
else   //if  not then, proceed with checking other numbers
{
for(i=1;i<length;++i) //checking from 1st digit to last digit
{
ch=str.charAt(i); //extracting the character which is the digit
if(ch=='0') //if character extracted(digit) is 0 then,
{
chk=1;  //'chk' is made = to 1
break;  //exit from loop
}
}  //end of for loop
if(chk==0)  //checking if any character or digit is 0
{     // if yes then it is a Duck number
System.out.println(" Not A Duck Number");
}
else   // if none of character  or digit is 0 then,
{     // not a duck number
System.out.println(number+" is A Duck Number");
}
} //end of process
} //end of main method
} //end of class
```

**Answer 9**

```
import java.io.*;
class Q9_BishopEducation
        {
        public static void main(String  args[]) throws IOException
        {
        String    str ; //'str' to store input string
        char chr1,chr2; //'chr1' & 'chr2' to store characters from the string
        int   length, i, val1,val2,j; //'length' to store length of the string
        // 'i' loop variable, 'val1' & 'val2' to store integer values of
        // characters
        InputStreamReader inpt = new InputStreamReader(System.in);
        BufferedReader br= new BufferedReader(inpt);
        System.out.println("Enter Any String in upper case: ");
```

```
str=br.readLine();
length=str.length();  // finding length of the string //
for(i=0;i<length-1;i++) //Loop is run from 1st character to one before
{    //last character because each character is compared with
next character and if 'i' goes up to last(length-1) character
then there is no character at (i+1) hence 'i' ranges up to
length-2 or one before last character.
chr1 =str.charAt(i);  //character at 'i' is stored in 'chr1'
val1= (int) (chr1);  // integer value (ASCII value) of the character
// is stored in val1
chr2= str.charAt(i+1); //character at (i+1) is stored in 'chr2'
val2= (int) (chr2); // integer value (ASCII value) of the character is
// stored in val2
if((val2-val1)==1)  //if two characters consecutive then their
{                    //  integer value will differ by 1
System.out.println(chr1+","+chr2);
}
} //end for-loop
} //end of main method
}  //end of class
```

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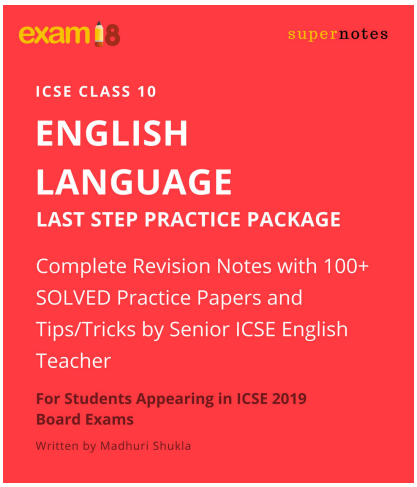


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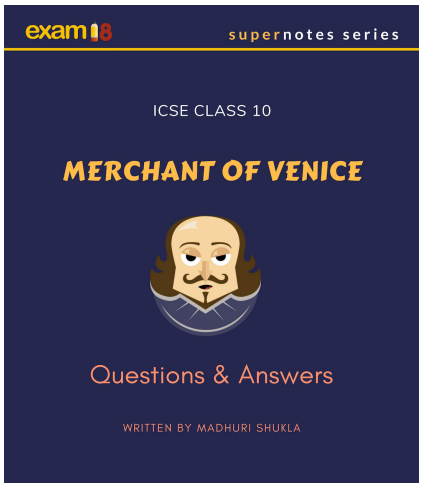


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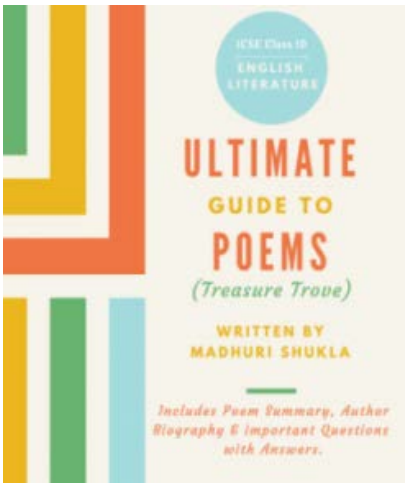


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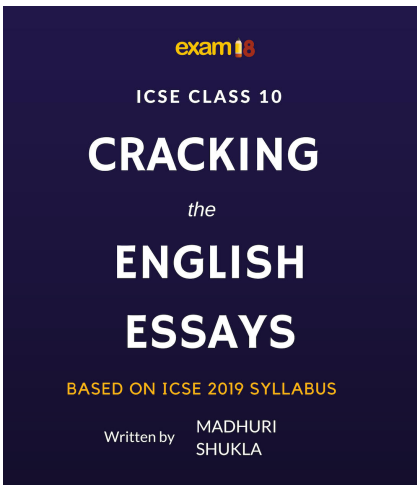


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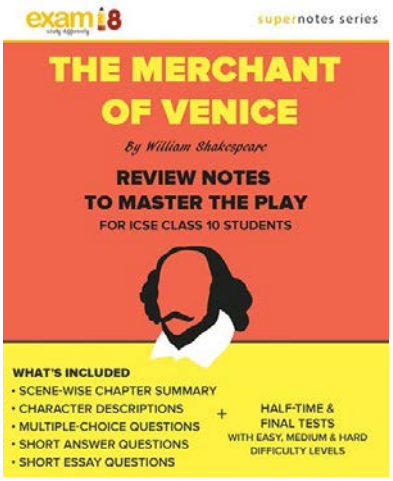


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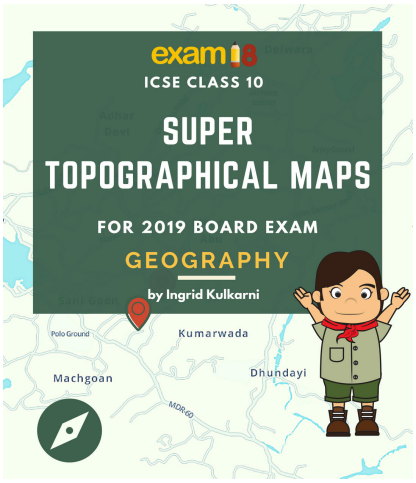


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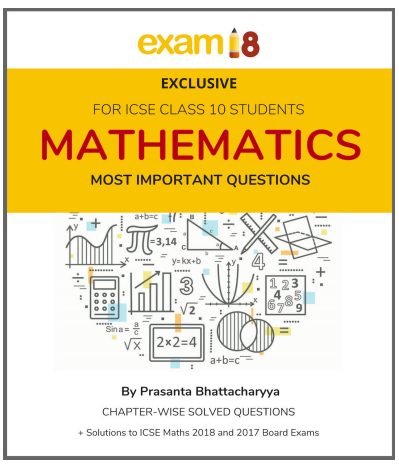


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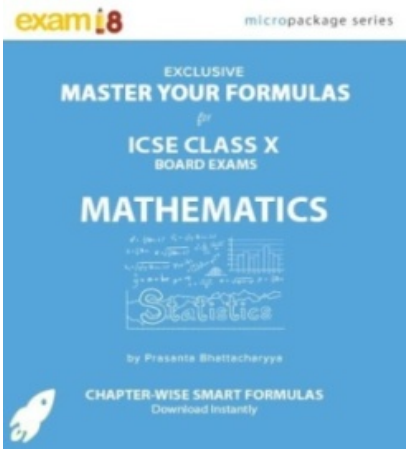


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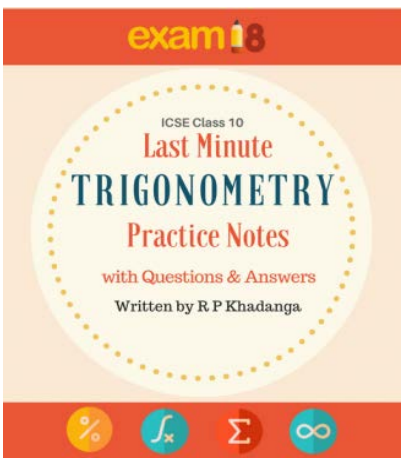


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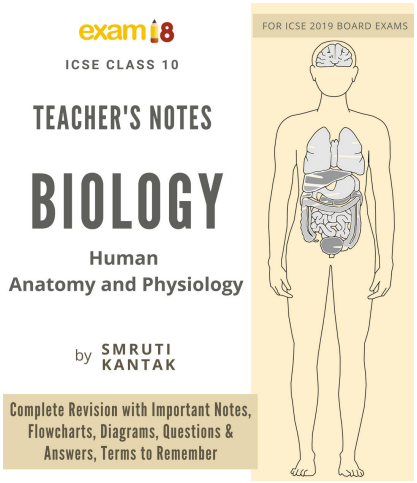


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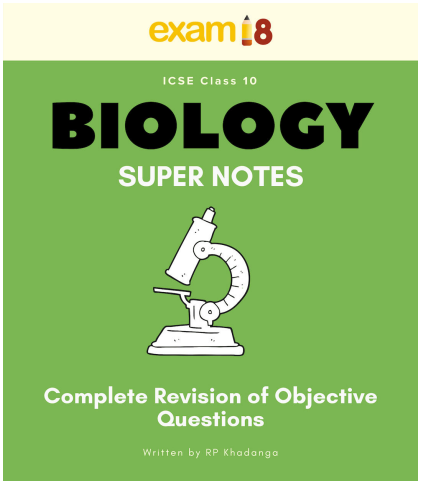


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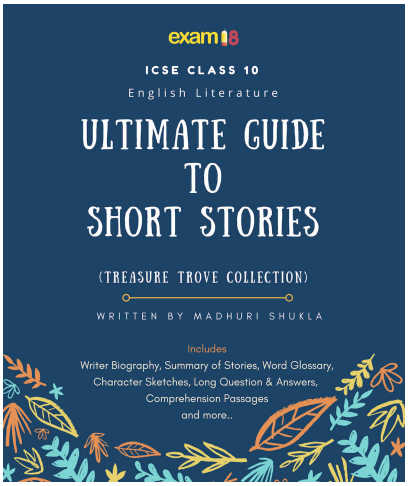


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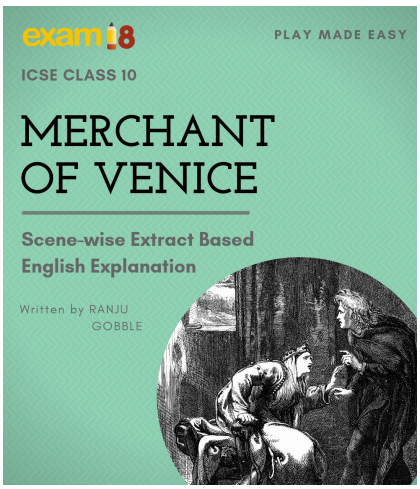
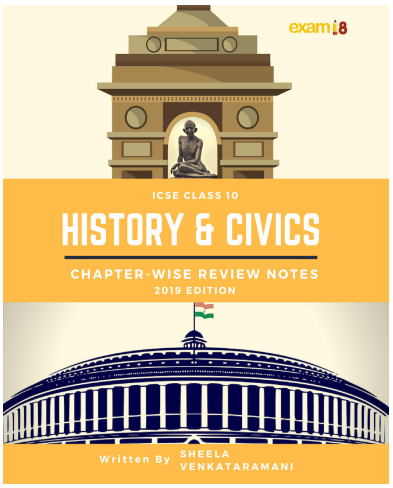
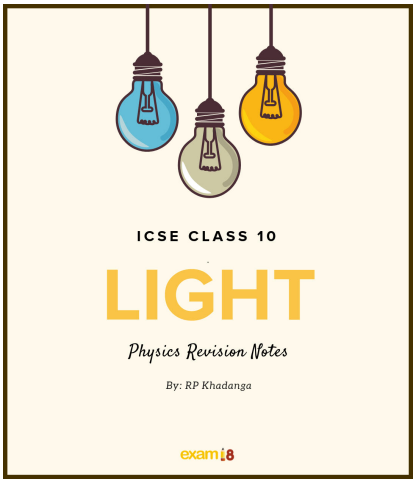


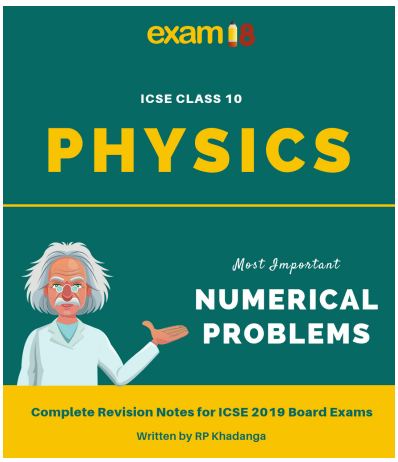

**Merchant of Venics: Explanation Notes**



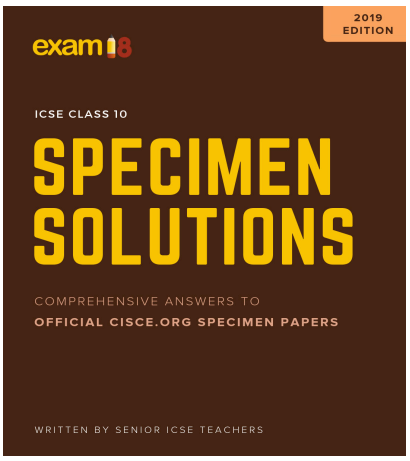

**History & Civics Super Notes**



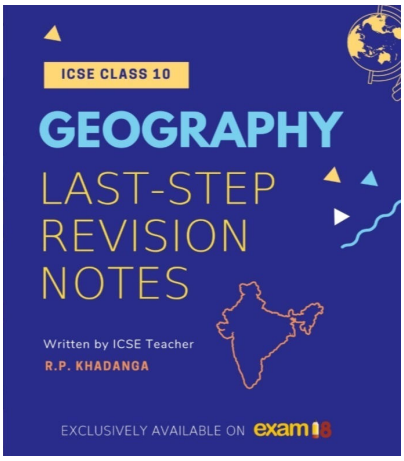

**Physics: Light Revision Notes**




**ICSE Physics Numerical Problems**




**ICSE Class 10: Specimen Solutions**




**Geography: Last Step Revision Notes**

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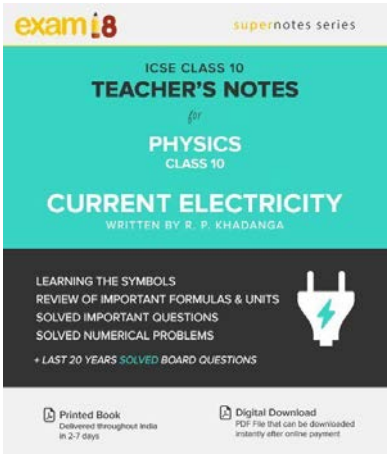
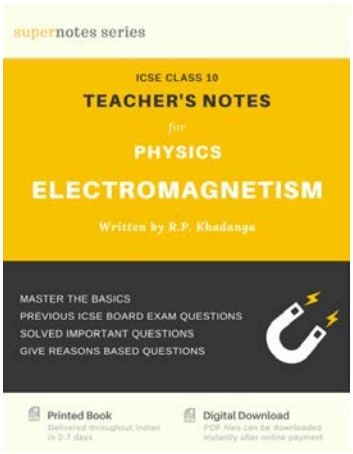
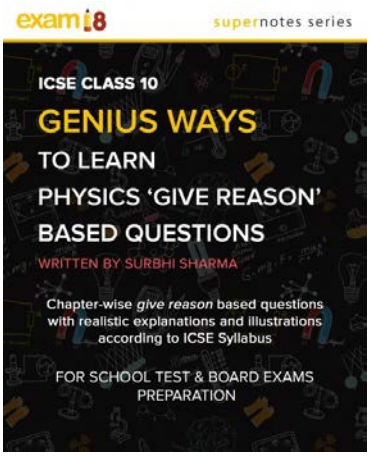



**Physics Teacher's Notes: Current Electricity**


**Physics Teacher's Notes: Sound**




**Physics Teacher's Notes: Electromagnetism**

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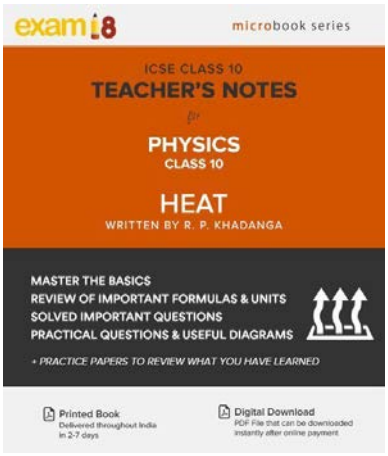
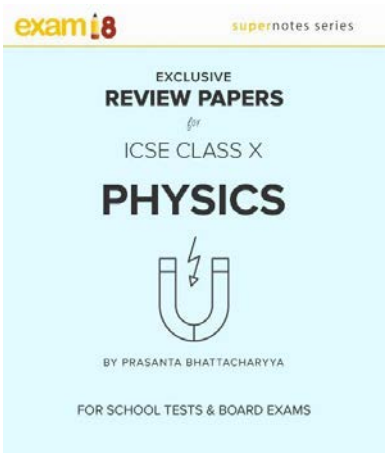



**Physics Teacher's Notes: Heat**

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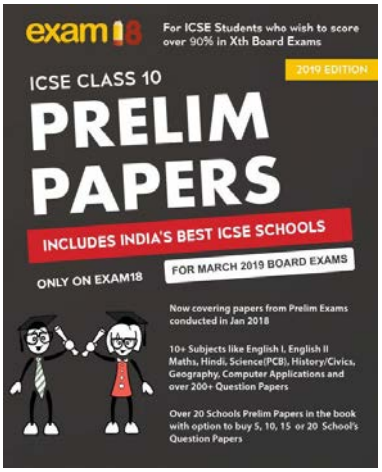


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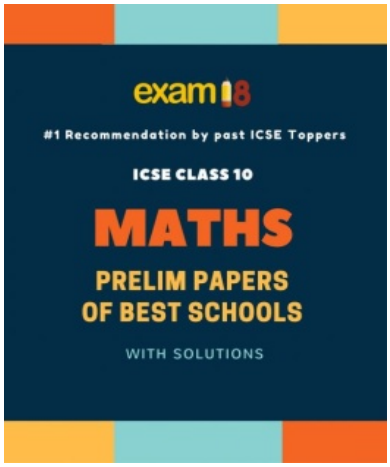


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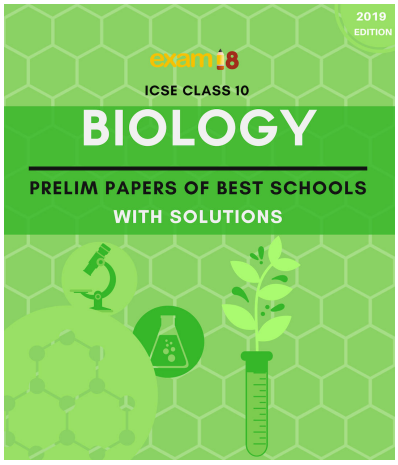


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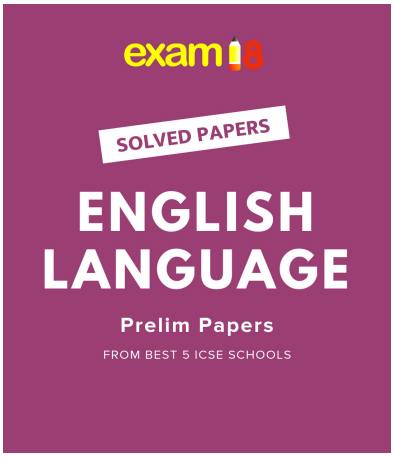


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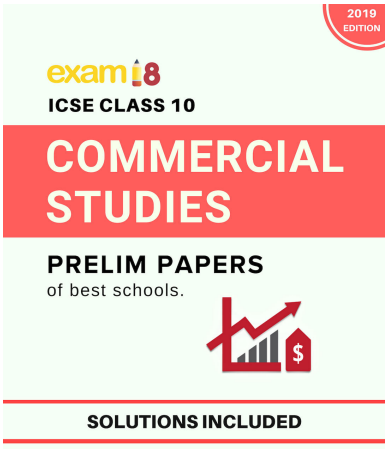


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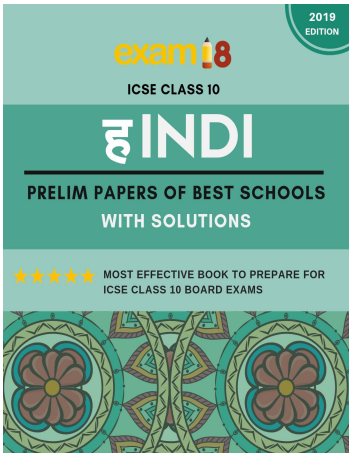


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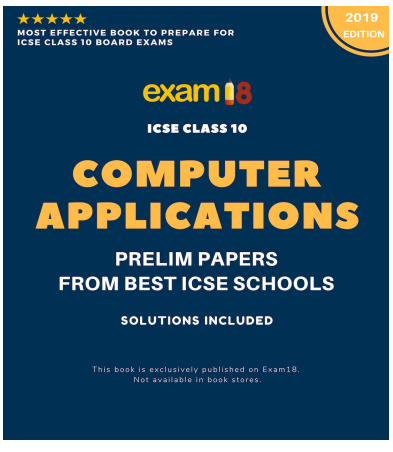


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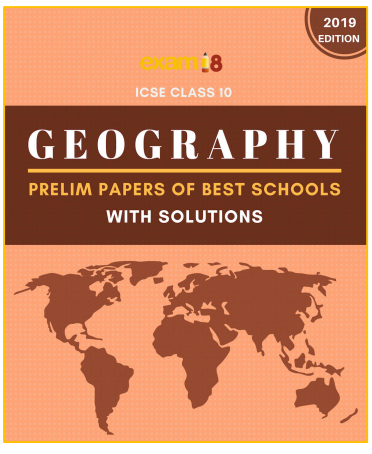


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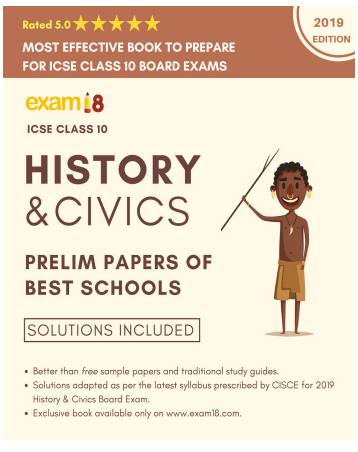


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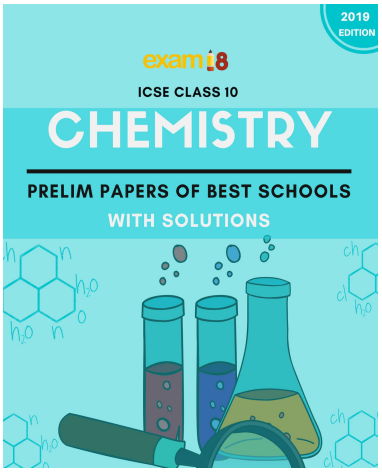


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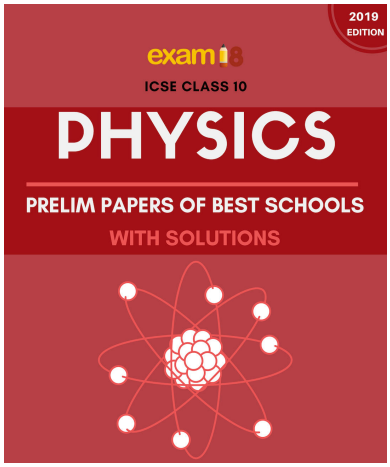


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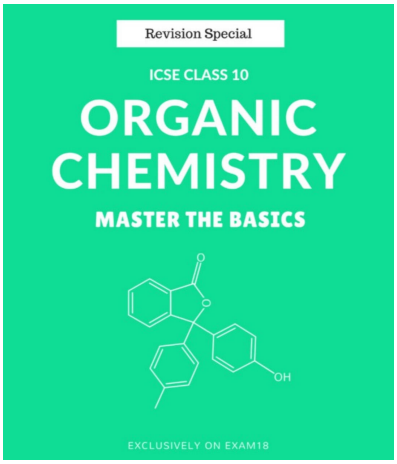


**Organic Chemistry - Master the Basics**