

**SAINIK SCHOOL BALACHADI**  
**2018-19**  
**SUMMER VACATION : HOLIDAY HOMEWORK**  
**CLASS – XII**



• **ENGLISH**

1. Practice everyday handwriting. (Mention the date)
2. Make a project on the topic 'Kamala Das – A great Indian English poetess'
3. Justify the title of the lesson 'The Last Lesson' you have studied.
4. Solve the questions in the handouts provided.
  - a) Identify the sentence skills mistakes at the underlined spots in the selection that follows. From the box below, choose the letter that describes each mistake and write it in the space provided. Also correct the errors. The same mistake may appear more than once.

a. Sentence fragment	e. Mistake with quotation marks
b. Run-on	f. Mistake in pronoun point of view
c. Mistake in subject-verb agreement	g. Spelling error
d. Mistake in verb tenseh. No mistake	
  - b) One reason that I enjoy the commute to school is that the drive gives me uninterrupted time to myself. 1
  - c) The classes and socializing at college is great, and so is the time I spend with my family, but sometimes all this 2 togetherness keeps you from being able to think. In fact, I look forward to the time I have alone it gives me a 3 4 chance to plan what I'll accomplish in the days ahead. For example, one Tuesday afternoon my history professor announces that a rough outline for our semester report was due that Friday. Fortunately, I had already done some 5 6 reading, and I had checked my proposed topic with her the week before. Therefore, on the way home in the car 7 8 that evening. I planned the entire history report in my mind. Then all I had to do when I got home was quickly jot it down before I forgot it. When I handed the professor the outline at 8:30 Wednesday morning. She asked 9 me "if I had stayed up all night working on
5. Critically appreciate the lesson 'The Tiger King' by Kalki.
6. Write an essay on the topic 'The Role of parents and youth in eradicating Child Labor'.
7. Make a list of words with Synonyms and Antonyms, using each of them in sentences of your own (100 words)

• **PHYSICS**

1. To complete the assigned investigatory project along with project file.
2. Solve the following problems:
  - (a) An object is placed in front of a concave mirror of focal length 20 cm. The image formed is three times the size of the object. Calculate the possible distances of the object from the mirror.
  - (b) When an object is placed at a distance of 60 cm from a convex spherical mirror, the magnification produced is  $1/2$ . Where the object should be placed to get a magnification of  $1/3$ ?
  - (c) Find the focal length of a double convex lens bounded by spherical surfaces of radii of curvature 20 cm each and having a refractive index  $5/3$ . Surrounding medium is air.
  - (d) Two converging lenses of focal length 15 cm and 30 cm held in contact with each other. Calculate power and focal length of the combination.
  - (e) The refractive indices of crown and flint glasses for violet and red light are 1.523, 1.513, 1.773 and 1.743 respectively. Find the dispersive power of the glasses.
  - (f) A glass prism is immersed in water. If the angle of prism is  $70^\circ$ , calculate the angle of minimum deviation for a ray of light while passing through the prism in water. Given  ${}^a\mu_g = 1.62$  and  ${}^a\mu_w = 1.33$
  - (g) The minimum deviation produced by a glass of angle  $60^\circ$  is  $30^\circ$ . If the velocity of light in vacuum is  $3 \times 10^8$  m/s, calculate the velocity of light in glass.
  - (h) The radii of curvature of the surfaces of a double convex lens are 25 cm and 30 cm. What will be its focal length and power in air and water? Refractive indices for glass and water are  $3/2$  and  $4/3$  respectively.
  - (i) A ray of light is incident at an angle of  $60^\circ$  on one face of  $30^\circ$  prism. The emergent ray from the prism makes an angle of  $30^\circ$  with the incident ray. Show that the

emergent ray is normal to the surface from which it emerges. Calculate the refractive index of the material of the prism.

- Derive Prism formula as,  $\mu = \frac{\sin(A + d_m / 2)}{\sin(A / 2)}$ , where A is the angle of prism and  $d_m$  is angle of minimum deviation.  
Calculate the refractive index of the material of an equilateral prism for which the angle of minimum deviation is  $60^\circ$ .
- Draw the ray diagram using concave lens to obtain lens maker's formula. Write the expressions for three different forms of lens maker's formula.
- Mention the basic defects of vision. Explain with the help of ray diagrams.

## • CHEMISTRY

- Define the following term:
  - Ideal Solution
  - Azeotrope
  - Osmotic Pressure
  - Raoult's Law.
- A First order reaction is found to have a rate constant  $K=5.5 \times 10^{-14} \text{ s}^{-1}$ . Find the half life of the reaction.
- A reaction is second order in A and first order in B.
  - Write the differential rate equation.
  - How is the rate affected on increasing the Concentration of A three times ?
- 100mg of a protein is dissolved in just enough water to make 10.0 ml of solution. If this solution has an osmotic pressure of 13.3 mm Hg at  $25^\circ\text{C}$ , What is the molar mass of the protein ?
- Calculate the freezing point depression constant expected for 0.0711 m aqueous solution of  $\text{Na}_2\text{SO}_4$  if this solution actually freezes at  $-0.302^\circ\text{C}$ , what would be the value of van't Hoff factor ? ( $K_f$  for water is  $1.86^\circ\text{C mol}$ )
- Differentiate between molality and molarity of a solution. What is the effect of change in temperature of a solution on its molality and molarity ?
- Define molar conductivity of a substance and describe how for weak and strong electrolytes, Molar conductivity changes with concentration of solute. How is such a change explained ?
- A voltaic cell is set up at  $25^\circ\text{C}$  with the following half cell:-  
 $\text{Al}/\text{Al}^{3+}$  (0.001M) and  $\text{Ni}/\text{Ni}^{2+}$  (0.50M)  
Calculate the cell voltage  
( $E^\circ \text{Ni}^{2+}/\text{Ni} = 0.25\text{v}$   $E^\circ \text{Al}^{3+} / \text{Al} = -1.66\text{v}$ )
- State the relationship amongst cell constant of a cell, resistance of the solution in the cell and conductivity of the solution. How is molar conductivity of a solute related to Conductivity of solution.
- One day, Sakshi's Mother Notices that the water pipe line of her house was getting Rusted. She did not want excavation of the pipe. She asked her daughter that as she was a Student of Science, She Should suggest some method so that further rusting stops.  
Now, answer the following questions:-
  - What values are expressed in the above paragraph ?
  - What do you think Sakshi must have suggest to her mother and why ?
- Define Henry law and also write its two application.
  - 0.6 ml of Acetic acid ( $\text{CH}_3\text{COOH}$ ), having density  $1.06 \text{ gml}^{-1}$ , is dissolved in 1 litre of water. The depression in freezing point observed for this strength of acid was  $0.0205^\circ\text{C}$ . Calculate the van't Hoff factor and the dissociation constant of acid.
    - Define reverse osmosis and write its use.
    - 2g of benzoic Acid dissolved in 25g of benzene shows a depression in freezing point equal to 1.62k. Molal depression constant benzene is  $4.9 \text{ k kg mol}^{-1}$ . What is the percentage association of acid if it forms dimer in solution ?
- Define pseudo first order reaction with suitable example.
  - The rate of chemical reaction doubles for an increase of 10k in absolute temperature from 298k. Calculate  $E_a$ .
    - Define the following term.

- b. The rate constants of a reaction at 500k and 700k are 0.025-1 and 0.075-1 respectively. Calculate the value of  $E_a$  and  $A$

• **BIOLOGY**

Page-17	QNo.- 2, 3, 6
Page-18	QNo.- 7, 8,12, 13, 14
Page-40	QNo.- 4, 5, 6
Page-41	QNo. - 7, 8, 9, 10, 13, 17, 18
Page-56	QNo.- 2, 3, 6, 7 ,8, 10, 12, 17, 18

• **COMPUTER**

1. What is switch statement in C++. Explain with an example
2. What are the different control statement in C++
3. Explain the difference between call by value and call by reference.
4. What is the difference between break and continue statement in C++?
5. What is the difference between pre increment and post increment statements? Explain with an example.
6. What is data abstraction? Explain with an example.
7. What you mean by polymorphism? Explain with an example
8. What is the difference between class and object?
9. What is a constructor? Explain with an example.
10. What do you mean by function overloading?
11. What is copy constructor? Give an example.
12. Rewrite the following program after removing the syntactical errors (if any). Underline each correction.

```
#Include <iostream.h>
void main()
{
    int s=10,i;
    int a[s];
    for (I=0; I<s; I++)
        cout >> Enter any no.;
    cin<<a[I];
}
```

13. Sita suggests Rama to include some header files that are essentially required to be included to execute the following C++ code. What are the header files suggested by Sita.

```
void main()
{
    char Text[20],c;
    gets(Text);
    c=toupper(Text[0]);
    puts(Text);
}
```

14. Find the output of the following program.

```
#include<iostream.h>
struct STOCK
{
    int lno, Qty;
};
void Busy(STOCK &l, int TQ=2)
{
    l.qty += TQ;
}
void main()
{
    STOCK l[2] = {{101,50},{103,20}};
```

```

        Busy(l[1],5);
        cout<<l[1].Ino<<": "<<l[1].Qty<<endl;
        Busy(l[0],10);
        cout<<l[0].Ino<<": "<<l[0].Qty<<endl;
        Busy(l[1]);
        cout<<l[1].Ino<<": "<<l[1].Qty<<endl;
    }

```

15. Answer the questions (i) and (ii) after going through the following class:

```

class Planet
{
    char Name[20];
    char distance[20];
public:
    Planet()                                //Function 1
    {
        strcpy(name,"Venus");
        strcpy(distance,"38 million km");
    }
    void display(char na[],char d[])//Function 2
    {
        cout<<na<<"has"<<d<<"distance"<<endl;
    }
    Planet(char na[],char d[])              //Function 3
    {
        strcpy(name,na);
        strcpy(distance,d);
    }
    ~planet()                               //Function 4
    {
        cout<<"Planetarium time over"<<endl;
    }
};

```

- (i) In Object Oriented Programming, what is Function 1 referred as and when does it get invoked/called ?
- (ii) Write suitable C++ statement to invoke Function 2.

### WORK SHEET

1. Write a program which contains the definition of a class TEST in C++ with the following description:

Private Members:

- TestCode of type int
- Description of type string
- NoCandidates of type int
- CenterReqd (number of centers required) of type int
- A member function CALCNTR( ) to calculate and return number of centers required as (NoCandidates/100+1).

Public Members:

- A function SCHEDULE() to allow user to enter the values for TestCode, Description, NoCandidates and call function CALCNTR() to calculate the number of centers.
- A function DISPTST() to allow user to view the content of all the data members.

2. Write a program which contains the definition of a class **BILL** in C++ with the description given below :

Private members:

- Bcode type of integer
- Cname type of string
- unit type of integer
- Ctype type of integer
- month type of integer

- billamt type of long integer

Public members:

- A constructor which assign NULL in Cname and 0 in all other data members.
- A parameterized constructor which gets suitable value for all data members and assign them.
- A function which get data for all member of bill class from user at run time.
- A function calculate() which calculate the bill amount as follow :

Ctype	Per unit charge
1	2
2	3
3	4
4	5

\* surcharge is 4% of bill amount and education tax is 10% of surcharge is added to above calculated amount to get full bill amount.

- A function showbill() which display the all detail of bill.

For example :

if Ctype is 2 and unit is 500 then

calculated amt is  $500 * 3 = 1500$

surcharge is 4 % of 1500 = 60

and education tax is 10% of 60 = 6

billamt is  $1500 + 60 + 6 = \text{Rs } 1566$

3. Write a program which contains the definition of a class **Journey** in C++ with the following description:

Private Members:

- TCode of type long
- Place of type string
- No\_of\_travellers of type integer
- No\_of\_buses of type integer

Public Members:

- A constructor to assign initial values of TCode as 104, Place as "Pune", No\_of\_travellers as 25, No\_of\_buses as 2.
- A function EnterTravel() to allow user to enter TCode, Place, and No\_of\_travellers and also assign the value of No\_of\_buses as per the following conditions.

No_of_travellers	No_of_buses
Less than 40	1
Equal to or more than 40 and less than 100	3
Equal to or more than 100 and less than 500	9

- A function ShowTravel() to display the content from all the data members on screen.

4. Write a program which contains the definition of a class **candidate** in C++ with following

Description: Private Members

- A data member RNo (Registration Number) of type long
- A data member Name of type string
- A data member Score of type float

- A data member Remark of type string
- A member function AssignRem( ) to assign Remarks as per the Score obtained by a candidate. Score range and the respective Remarks are shown as follows:

Score	Remarks
$\geq 50$	Selected
less than 50	Not selected

Public members

- A function ENTER( ) to allow user to enter values for RNo, Name, Score & call function AssignRem() to assign the remarks.
- A function DISPLAY( ) to allow user to view the content of all the data members

### • MATHEMATICS

- Q1. Let A be the set of all students of a boys school. Show that the relation R in A given by  $R = \{(a, b) : a \text{ is sister of } b\}$  is the empty relation and  $R' = \{(a, b) : \text{the difference between heights of } a \text{ and } b \text{ is less than 3 meters}\}$  is the universal relation.
- Q2. Let T be the set of all triangles in a plane with R a relation in T given by  $R = \{(T1, T2) : T1 \text{ is congruent to } T2\}$ . Show that R is an equivalence relation.
- Q3. Let L be the set of all lines in a plane and R be the relation in L defined as  $R = \{(L1, L2) : L1 \text{ is perpendicular to } L2\}$ . Show that R is symmetric but neither reflexive nor transitive.
- Q4. Show that the relation R in the set  $\{1, 2, 3\}$  given by  $R = \{(1, 1), (2, 2), (3, 3), (1, 2), (2, 3)\}$  is reflexive but neither symmetric nor transitive.
- Q5. Show that the relation R in the set  $\{1, 2, 3\}$  given by  $R = \{(1, 2), (2, 1)\}$  is symmetric but neither reflexive nor transitive.
- Q6. Show that the relation R in the set A of all the books in a library of a college, given by  $R = \{(x, y) : x \text{ and } y \text{ have same number of pages}\}$  is an equivalence relation.
- Q7. Show that the relation R in the set  $A = \{1, 2, 3, 4, 5\}$  given by  $R = \{(a, b) : |a - b| \text{ is even}\}$ , is an equivalence relation. Show that all the elements of  $\{1, 3, 5\}$  are related to each other and all the elements of  $\{2, 4\}$  are related to each other. But no element of  $\{1, 3, 5\}$  is related to any element of  $\{2, 4\}$ .
- Q8. Show that each of the relation R in the set  $A = \{x \in \mathbf{Z} : 0 \leq x \leq 12\}$ , given by
- $R = \{(a, b) : |a - b| \text{ is a multiple of } 4\}$
  - $R = \{(a, b) : a = b\}$  is an equivalence relation. Find the set of all elements related to 1 in each case.
- Q9. Give an example of a relation. Which is?
- Symmetric but neither reflexive nor transitive.
  - Transitive but neither reflexive nor symmetric.
  - Reflexive and symmetric but not transitive.
  - Reflexive and transitive but not symmetric.

(v) Symmetric and transitive but not reflexive.

- Q9.. Show that the relation  $R$  in the set  $A$  of points in a plane given by  $R = \{(P, Q) : \text{distance of the point } P \text{ from the origin is same as the distance of the point } Q \text{ from the origin}\}$ , is an equivalence relation. Further, show that the set of all points related to a point  $P \neq (0, 0)$  is the circle passing through  $P$  with origin as centre.
- Q10. Show that the relation  $R$  defined in the set  $A$  of all triangles as  $R = \{(T_1, T_2) : T_1 \text{ is similar to } T_2\}$ , is equivalence relation. Consider three right angle triangles  $T_1$  with sides 3, 4, 5,  $T_2$  with sides 5, 12, 13 and  $T_3$  with sides 6, 8, 10. Which triangles among  $T_1, T_2$  and  $T_3$  are related?
- Q11.. Show that the relation  $R$  defined in the set  $A$  of all polygons as  $R = \{(P_1, P_2) : P_1 \text{ and } P_2 \text{ have same number of sides}\}$ , is an equivalence relation. What is the set of all elements in  $A$  related to the right angle triangle  $T$  with sides 3, 4 and 5?
- Q12.. Let  $L$  be the set of all lines in  $XY$  plane and  $R$  be the relation in  $L$  defined as  $R = \{(L_1, L_2) : L_1 \text{ is parallel to } L_2\}$ . Show that  $R$  is an equivalence relation. Find the set of all lines related to the line  $y = 2x + 4$ .
- Q13. Let  $R$  be the relation in the set  $\{1, 2, 3, 4\}$  given by  $R = \{(1, 2), (2, 2), (1, 1), (4,4), (1, 3), (3, 3), (3, 2)\}$ . Choose the correct answer.  
(A)  $R$  is reflexive and symmetric but not transitive.  
(B)  $R$  is reflexive and transitive but not symmetric.  
(C)  $R$  is symmetric and transitive but not reflexive.  
(D)  $R$  is an equivalence relation.
- Q14. Let  $R$  be the relation in the set  $\mathbf{N}$  given by  $R = \{(a, b) : a = b - 2, b > 6\}$ . Choose the correct answer.  
(A)  $(2, 4) \in R$     (B)  $(3, 8) \in R$     (C)  $(6, 8) \in R$     (D)  $(8, 7) \in R$
- Q15. Show that the function  $f : \mathbf{N} \rightarrow \mathbf{N}$ , given by  $f(x) = 2x$ , is one-one but not onto.
- Q16. Prove that the function  $f : \mathbf{R} \rightarrow \mathbf{R}$ , given by  $f(x) = 2x$ , is one-one and onto.
- Q17. Show that the function  $f : \mathbf{N} \rightarrow \mathbf{N}$ , given by  $f(1) = f(2) = 1$  and  $f(x) = x - 1$ , for every  $x > 2$ , is onto but not one-one.
- Q18. Show that the function  $f : \mathbf{R} \rightarrow \mathbf{R}$ , defined as  $f(x) = x^2$ , is neither one-one nor onto.
- Q19. In each of the following cases, state whether the function is one-one, onto or bijective. Justify your answer.  
(i)  $f : \mathbf{R} \rightarrow \mathbf{R}$  defined by  $f(x) = 3 - 4x$   
(ii)  $f : \mathbf{R} \rightarrow \mathbf{R}$  defined by  $f(x) = 1 + x^2$
- Q20. Let  $A = \mathbf{R} - \{3\}$  and  $B = \mathbf{R} - \{1\}$ . Consider the function  $f : A \rightarrow B$  defined by  $f(x) = \frac{x-2}{x-3}$   
Is  $f$  one-one and onto? Justify your answer.
- Q21. Let  $f : \mathbf{R} \rightarrow \mathbf{R}$  be defined as  $f(x) = 3x$ . Choose the correct answer.

(A)  $f$  is one-one onto

(B)  $f$  is many-one onto

(C)  $f$  is one-one but not onto

(D)  $f$  is neither one-one nor onto.

Q22. Show that if  $f: R - \left\{\frac{7}{5}\right\} \rightarrow R - \left\{\frac{3}{5}\right\}$  is defined by  $f(x) = \frac{3x+4}{5x-7}$  and  $g: R - \left\{\frac{3}{5}\right\} \rightarrow R - \left\{\frac{7}{5}\right\}$  is defined by  $f(x) = \frac{7x+4}{5x-3}$  then  $f \circ g = I_A$  and  $g \circ f = I_B$ , where  $A = R - \left\{\frac{3}{5}\right\}, B = R - \left\{\frac{7}{5}\right\}, I_A(x) = x$  on  $A, I_B(x) = x$  on  $B$  are called identity functions on sets  $A$  and  $B$  respectively..

Q23. Let  $*$  be a binary operation defined on  $Q$ . such that  $a * b = ab/4$

find  $(3 * 5) * 4$ ,

Q24. Let  $*$  be a binary operation defined on  $Q$ . such that  $a * b = a - b + ab$  find

$(2 * 3) * 4$ ,

Q25. Let  $*$  be a binary operation defined on  $Q$ . such that  $a * b = ab^2$ , find  $2 * (4 * 3)$

Q26 State how many number of binary operations are possible on the set  $\{a, b\}$ .

Q27. Check whether the following  $*$  are binary operations, If not state reason:

(i) On  $Z^+$ , define  $*$  by  $a * b = a - b$

(ii) On  $Z^+$ , define  $*$  by  $a * b = |a - b|$

(iii) On  $R$ , define  $*$  by  $a * b = ab^2$

Q28. If  $f: R \rightarrow R$  be given by  $f(x) = (3 - x^3)^{\frac{1}{3}}$  then find  $f \circ f(x)$

Q29. State with reason whether the following functions have inverse

(i)  $f: \{1, 2, 3, 4\} \rightarrow \{10\}$  with  $f = \{(1, 10), (2, 10), (3, 10), (4, 10)\}$

(ii)  $g: \{5, 6, 7, 8\} \rightarrow \{1, 2, 3, 4\}$  with  $g = \{(5, 4), (6, 3), (7, 4), (8, 2)\}$

(iii)  $h: \{2, 3, 4, 5\} \rightarrow \{7, 9, 11, 13\}$  with  $h = \{(2, 7), (3, 9), (4, 11), (5, 13)\}$

Q30. Check whether  $f$  is one to one and onto

(i)  $f: R \rightarrow R$  be defined as  $f(x) = x^4$ ,

(ii)  $f: R \rightarrow R$  be defined as  $f(x) = 3x$ .