



# SD DAV PUBLIC SCHOOL, JAMTARA

## Summer Vacation Assignment (2024-25)

### Class:- XII(SCIENCE)

#### ENGLISH

1. Answer at least 5 unseen passages collecting from different sources.
2. Draft Notices on the topics – Tour & Travel, Cultural Events, Sports & school competitions (1 each). ( words -50)
3. Draft advertisements on – Situations Vacant, Situation Wanted, Sale & Purchase, Lost & Found. (1 each)
4. Write Formal Letters of compliant, Letter to Editor, Letter of Placing Order & Application for job inventing details. (1 each)
5. Draft News Paper Report & School Report (1 each) following proper format collecting necessary details. (Word Limit -150)
6. Describe your everyday schedule of living during the vacation including any travel experiences if.
7. Reading Assignment  
Go through the Biography of the authors – Anes Jung & Jack Finney.  
N.B. Do answer the assignment in separate copies.

#### Chemistry

- Calculate the mass percentage of benzene ( $C_6H_6$ ) and carbon tetrachloride ( $CCl_4$ ) if 22 g of benzene is dissolved in 122 g of carbon tetrachloride.
2. Calculate the molarity of each of the following solutions
    - (a) 30 g of  $Co(NO_3)_2 \cdot 6H_2O$  in 4.3 L of solution
    - (b) 30 mL of 0.5 M  $H_2SO_4$  diluted to 500 mL.
  3. Calculate the mass of urea ( $NH_2CONH_2$ ) required in making 2.5 kg of 0.25 molal aqueous solution.
  4. Calculate
    - (a) molality
    - (b) molarity and
    - (c) mole fraction of KI if the density of 20% (mass/mass) aqueous KI solution is  $1.202 \text{ g mL}^{-1}$ .
  5. The vapour pressures of pure liquids A and B are 450 mm and 700 mm of Hg respectively at 350 K. Calculate the composition of the liquid mixture if total vapour pressure is 600 mm of Hg. Also find the composition in the vapour phase.
  6. Calculate the mass of ascorbic acid (vitamin C,  $C_6H_8O_6$ ) to be dissolved in 75 g of acetic acid to lower its melting point by  $1.5^\circ C$ . ( $K_f$  for  $CH_3COOH$ ) =  $3.9 \text{ K kg mol}^{-1}$ )
  7. Define the following terms:
    - (i) Mole fraction
    - (ii) Molality
    - (iii) Molarity
    - (iv) Mass percentage
  8. Calculate the percentage composition in terms of mass of a solution obtained by mixing 300 g

of a 25% and 400 g of a 40% solution by mass.

9. What role does the molecular interaction play in solution of alcohol in water?

10. State Henry's law and mention some of its important applications.

11. According to Raoult's law, what is meant by positive and negative deviations and how is the sign of  $\Delta_{sol}H$  related to positive and negative deviations from Raoult's law?

12. The vapour pressure of water is 12.3 kPa at 300 K. Calculate vapour pressure of 1 molal solution of a non-volatile solute in it.

13. Can you store copper sulphate solutions in a zinc pot?

14. State function of salt bridge.

15. Draw a Daniel cell and label Electrode and electrolytes and salt bridge used.

Project : write titration of Mohr's salt and oxalic acid in practical lab manual.

### PHYSICS.

Q1) Distinguish between an insulator (dielectric) and a conductor.

Q2) Deduce the dimensional formula for the permittivity of free space.

Q3) What is the limitation of Coulomb's law?

Q4) Why do the electric field lines not form any closed loops?

Q5) Define electric field intensity. Write its SI unit. Write the magnitude and direction of electric field intensity due to an electric dipole of length  $2a$  at the mid-point of the line joining the two charges.

Q6) An electric dipole is free to move in a uniform electric field. Explain its motion when it is placed (i) parallel to the field, and (ii) perpendicular to the field.

Q7) Show diagrammatically the orientation of the dipole in the field for which the torque is

(i) maximum, (ii) half the maximum value, and (iii) zero.

Q8) Write Coulomb's law in vector form. Also show that it obeys Newton's third law of motion.

Q9) An electric dipole is held in a uniform electric field.

(i) Using suitable diagram, show that it does not undergo any translatory motion, and (ii) derive an expression for the torque acting on it and specify its direction.

Q10) Using Gauss's theorem, deduce an expression for the electric field intensity at any point due to a thin, infinitely long wire of charge/length  $\lambda$  C/m.

Q11) Using Gauss's theorem, show mathematically that for any point outside the shell, the field due to a uniformly charged thin spherical shell is the same as if the entire charge of the shell is concentrated at the centre. Why do you expect the electric field inside the shell to be zero according to this theorem?

Q12) State Gauss theorem in electrostatics. Prove that no electric field exists inside a hollow charged sphere.

Q13) a) Using Gauss law, derive an expression for the electric field intensity at any point outside a uniformly charged thin spherical shell of radius  $R$  and charge density  $\sigma$  C/m<sup>2</sup>. Draw the field lines when the charge density of the sphere is (i) positive, (ii) negative.

Q14) A uniformly charged conducting sphere of 2.5 m in diameter has a surface charge density of 100  $\mu$ C/m<sup>2</sup>. Calculate the (i) charge on the sphere, and (ii) total electric flux passing through the sphere.

Q15) How much positive and negative charge is there in a cup of water? Assume that the mass of one cup of water is 250 g.

Project Work - Make the Model of simple electroscope

or

Make the water overflow alarm.

### MATHEMATICS

1. The relation  $R$  on the set  $A = \{1, 2, 3\}$  given by  $R = \{(1, 1), (1, 2), (2, 2), (2, 3), (3, 3)\}$  is

a) Reflexive b) Symmetric c) Transitive d) Equivalence

2. Let  $f: R \rightarrow R$  be defined as  $f(x) = 3x - 2$ . 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

3. Let  $R$  be a relation defined on  $Z$  as  $R = \{(a, b) ; x^2 + y^2 = 25\}$ , the domain of  $R$  is;

(a)  $\{3, 4, 5\}$  (b)  $\{0, 3, 4, 5\}$  (c)  $\{0, 3, 4, 5, -3, -4, -5\}$  (d) none

4. Set  $A$  has 3 elements and set  $B$  has 4 elements. Then the number of injective functions that can be defined from set  $A$  to set  $B$  is

(a) 144 (b) 12 (c) 24 (d) 64

5. Let  $T$  be the set of all triangles in the Euclidean plane, and let a relation  $R$  on  $T$  be defined as  $aRb$

if  $a$  is congruent to  $b \forall a, b \in T$ . Then  $R$  is

(a) reflexive but not transitive (b) transitive but not symmetric  
(c) equivalence (d) None of these

6. Let  $A = \{1, 2, 3\}$  and define  $R = \{(a, b) : 2a = b; a, b \in A\}$ . Show that  $R$  is a relation on  $A$ . What are the possible number of relations on  $A$ ?

7. Write the total number of functions from set  $A$  to set  $B$ , where

(i)  $A = \{1, 2, 3\}$ ,  $B = \{a, b, c\}$  (ii)  $A = \{1, 2, 3\}$ ,  $B = \{a, b, c, d\}$  (iii)  $A = \{1, 2, 3, 4\}$ ,  $B = \{a, b, c\}$

8. Write the total number of one-one functions from set  $A$  to set  $B$ , where

- (i)  $A=\{1,2,3\}$ ,  $b=\{a,b,c\}$     ii)  $A=\{1,2,3\}$ ,  $b=\{a,b,c,d\}$     iii)  $A=\{1,2,3,4\}$ ,  $b=\{a,b,c\}$

9. Write the total number of onto functions from set A to set B ,where

- (i)  $A=\{1,2,3\}$ ,  $b=\{a,b,c\}$     ii)  $A=\{1,2,3\}$ ,  $b=\{a,b,c,d\}$     iii)  $A=\{1,2,3,4\}$ ,  $b=\{a,b,c\}$

10. Show that the relation R on the set Z of integers, given by

$$R = \{(a, b): 2 \text{ divides } a - b\}, \text{ is an equivalence relation.}$$

11. Show that the relation R on the set  $A = \{x \in Z; 0 \leq x \leq 12\}$ , given by  $R = \{(a, b): a = b\}$ , is an equivalence relation. Find the set of all elements related to 1.

12. Give an example of a function

- (i) Which is one-one but not onto.    (ii) Which is not one-one but onto.    (iii) Which is neither one-one nor onto.

13. Let L be the set of all lines in XY plane and R be the relation in L defined as

$$R = \{(L_1, L_2) : L_1 \text{ is parallel to } L_2\}. \text{ Show that R is an equivalence relation. Find the set of all lines related to the line } y = 2x + 4$$

14. Find the principal values of the following:

i.  $\sin^{-1}(\frac{-1}{2})$     ii.  $\tan^{-1}(-\sqrt{3})$     iii.  $\cos^{-1}(\frac{-1}{2})$     iv.  $\sec^{-1}(\frac{2}{\sqrt{3}})$

15.  $\tan^{-1}[2 \cos(2 \sin^{-1} \frac{1}{2})]$

16. If a matrix has 18 elements, what are the possible orders it can have? What, if it has 5 elements?

17. Construct a  $3 \times 4$  matrix, whose elements are given by

(i)  $a_{ij} = \frac{1}{2} |-3i + j|$     (ii)  $\frac{(i+j)^2}{2}$

18. Compute the indicated product  $\begin{pmatrix} 2 & 3 & 4 \\ 3 & 4 & 5 \\ 4 & 5 & 6 \end{pmatrix} \begin{pmatrix} 1 & -3 & 5 \\ 0 & 2 & 4 \\ 3 & 0 & 5 \end{pmatrix}$

19. Find X and Y ,if

$$2X + 3Y = \begin{bmatrix} 2 & 3 \\ 4 & 0 \end{bmatrix} \text{ and } 3X + 2Y = \begin{bmatrix} 2 & -2 \\ -1 & 5 \end{bmatrix}$$

20. If  $A = \begin{bmatrix} 1 & 0 & 2 \\ 0 & 2 & 1 \\ 2 & 0 & 3 \end{bmatrix}$ , prove that  $A^3 - 6A^2 + 7A + 21I = 0$

ACTIVITY:

1. To verify that the relation R in the set of lines in a plane ,obtained by  $R = \{(l,m):(l \perp m)\}$  is symmetric but neither reflexive nor transitive.

2. To verify the types of functions

- i. One-One function(injection)    ii. Many one function    iii. Onto function(Surjection)

iv. Into function

v. Bijection (one-one, onto function)

3. To draw the graph of  $\sin^{-1} x$ , using the graph of  $\sin x$  and demonstrate the concept of mirror reflection (about the line  $y=x$ )

## Physical Education

### Case Study Question

1.

Clubs.	Matches	Won.	Drawn.	Lost	Points
ATK Mohun Bagan.	20	10.	7.	3.	37
Bengaluru FC	20.	8	5.	7	29
Chennaiyin FC	20	5	5	10.	20
FC Goa.	20	4	7	9	19
Hyderabad FC.	20	11	5	4	38
Jamshedpur FC	20	13	4	3	43
Kerala Blasters FC.	20	9	7	4	34
Mumbai City FC.	20	9	4	7	31
NorthEast UFC	20	3	5	12	14
Odisha FC	20	6	5	9	23
SC East Bengal	20	1	8	11	11

a. Based on the table given above place the teams according to their ranking

b. List down two advantages of this kind of tournament

c. Write down the formula for calculating points

2. XYZ School is conducting an invitation tournament in which 25 teams have sent their entries. Matches have to be conducted on a knockout basis.

a. How many total matches will be played?

b. How many matches will be played in the first round of the tournament?

c. How many rounds will be played?

d. Which team will get 4th bye of the tournament?

### Art Integration

1. Prepare a report on the Annual Sports Day of your school for publishing in a National daily.

2. Your School is hosting CBSE Regional Sports Meet. Plan and present a Folk Dance for the Opening Ceremony.

### Informatics Practices

Write all the questions in practical copy

**Q1. Write the code in python to create an empty Series.**

**Ans.**

```
import pandas as pd
S1 = pd.Series( )
print(S1)
```

**OR**

```
import pandas as pd
S1 = pd.Series( None)
print(S1)
```

OUTPUT : Series([ ], dtype: float64)

**Q2. Write a program in Python to create a series of first five even numbers.**

**Ans.**

```
import pandas as pd
S1 = pd.Series([2, 4, 6, 8, 10])
print(S1)
```

**OUTPUT :**

```
0    2
1    4
2    6
3    8
4   10
dtype: int64
```

**Q3. Write a program in Python to create a Series in Python from the given dictionary. D = {"Jan" : 31, "Feb" : 28, "Mar" : 31}**

**Ans.**

```
import pandas as pd
D = {"Jan" : 31, "Feb" : 28, "Mar" : 31}
S1 = pd.Series(D)
print(S1)
```

**OUTPUT :**

```
Jan    31
Feb    28
Mar    31
dtype: int64
```

**Q4. Write the output of the following :**

```
import pandas as pd
```

```
L1=[1,"A",21]
S1 = pd.Series(data=2*L1)
print(S1)
Ans.
```

```
0    1
1    A
2   21
3     1
4    A
5   21
dtype: object
```

**Q5. Write the output of the following :**

```
import numpy as num
import pandas as pd
arr=num.array([31,47,121])
S1 = pd.Series(arr)
print(S1[0])
```

**Ans. 31**

**Q6. Complete the code to get the required output :**

```
import _____ as pd
_____ = pd.Series([31, 28, 31], index = ["Jan", "Feb", "Mar"])
print(S1["_____"])
```

**OUTPUT :**

**28**

**Ans.**

```
import pandas as pd
S1 = pd.Series([31,28,31], index = ["Jan","Feb","Mar"])
print(S1["Feb"])
```

**Q7. Write the output of the following code :**

```
import pandas as pd
S1 = pd.Series([31, 28, 31, 30, 31], index = ["Jan", "Feb", "Mar", "Apr", "May"])
print("-----")
print(S1[1:3])
print("-----")
print(S1[:5])
print("-----")
print(S1[3:3])
print("-----")
print(S1["Jan":"May"])
```

**Ans.**

```
-----
Feb  28
Mar  31
```

```
dtype: int64
```

```
-----  
Jan 31  
Feb 28  
Mar 31  
Apr 30  
May 31  
dtype: int64
```

```
-----  
Series([ ], dtype: int64)
```

```
-----  
Jan 31  
Feb 28  
Mar 31  
Apr 30  
May 31  
dtype: int64
```

Q8. Write the code in python to create dataframe from given list.

```
L1 = ["Anil", "Ruby", "Raman", "Suman"]  
L2 = [35, 56, 48, 85]
```

Ans.

```
import pandas as pd  
L1 = ["Anil", "Ruby", "Raman", "Suman"]  
L2 = [35, 56, 48, 85]  
DF = pd.DataFrame([L1, L2])  
print(DF)
```

Q9. Complete the following code to get the Output given below:

```
import pandas as _____  
L1 = [{"Aman", 45}, {"Ankit", 56}, {"_____", 67}]  
DF = pd._____(L1, _____=["Name", "Marks"], index=[_____] )  
print(DF)
```

OUTPUT :

	Name	Marks
1	Aman	45
2	Ankit	56
3	Sunita	67

Ans. import pandas as pd

```
L1 = [{"Aman", 45}, {"Ankit", 56}, {"Sunita", 67}]  
DF = pd.DataFrame(L1, columns = ["Name", "Marks"], index = [1, 2, 3])  
print(DF)
```

Q10. Complete the following code to get the Output given below:

```
import pandas as pd
```



```
L1 = {"Name" : ["Aman", "Ankit", "Sunita"], "Marks" : [45, 56, 67]}
DF = pd.DataFrame(L1, columns = [_____], index = [1, 2, 3])
print(DF)
```

**OUTPUT :**

	Marks	Name
1	45	Aman
2	56	Ankit
3	67	Sunita

**Ans.**

```
import pandas as pd
L1 = {"Name" : ["Aman", "Ankit", "Sunita"], "Marks" : [45, 56, 67]}
DF = pd.DataFrame(L1, columns = ["Marks", "Name"], index = [1, 2, 3])
print(DF)
```

Q11. Consider the code given below and answer the following questions:

```
Ld = [{'a' : 10, 'b' : 20}, {'a' : 5, 'b' : 10, 'c' : 20}]
DF = pd.DataFrame(Ld)
print(DF)
```

- How many rows will be there in dataframe "DF"
- How many columns will be there in dataframe "DF"
- How many NaN will be there in dataframe "DF"
- Write the missing import statement in the above code.
- How many dictionaries are used in the above code.

**Ans. a. There will be 2 rows in dataframe "DF".**

**b. There will be 3 columns in dataframe "DF".**

**c. There will be 1 NaN in dataframe "DF".**

**d. import pandas as pd**

**e. 2**

12. What will be returned by the given query?

```
SELECT ROUND(153.669,2);
```

- (a) 153.6 (b) 153.66 (c) 153.67 (d) 153.7

**Ans. (c)ROUND() function will round off the decimal places up to 2 places.**

13. What will be returned by the given query ? `SELECT INSTR('INDIA', 'DI');`

- (a) 2 (b) 3 (c) -2 (d) -3

**Ans. (b) INSTR function returns the starting index of the substring that is passed as second argument in the function.**

14. Write the output of following MySQL queries:

(i) `SELECT ROUND(6.5675,2);`

(ii) `SELECT TRUNCATE(5.3456,2);`

(iii) `SELECT DAYOFMONTH(curdate());`

(iv) `SELECT MID('PRE_BOARDCLASS 12',4,6);`

Ans(i) 6.57

(ii) 5.34 (iii) based on current date day of the month will be displayed

(iv) \_BOARD

15. Write commands in SQL for (i) to (iii) and output for (iv) and (v):

**Table: Store**

StoreId	Name	Location	City	NoOfEmp	DateOpen	SalesAmt
S101	Planet Fashion	Bandra	Mumbai	7	2015-10-16	40000
S102	Vogue	Karol Bagh	Delhi	8	2015-07-14	120000
S103	Trends	Powai	Mumbai	10	2015-06-24	30000
S104	Super Fashion	Thane	Mumbai	11	2015-02-06	45000
S105	Annabelle	South Extn.	Delhi	8	2015-04-09	60000
S106	Rage	Defence Colony	Delhi	5	2015-03-01	20000

- (i) To display names of stores along with Sales Amount of those stores that are located in Mumbai.
- (ii) To display the details of store in alphabetical order of name.
- (iii) To display the City and the number of stores located in that City, only if number of stores is more than 2.
- (iv) `SELECT MIN(DateOpen) FROM Store;` (v) `SELECT COUNT(StoreId), NoOfEmp FROM Store GROUP BY NoOfEmp HAVING MAX(SalesAmt)<60000;`

Ans. (i) `SELECT Name,SalesAmt FROM Store WHERE City='Mumbai';`

(ii) `SELECT * FROM Store ORDER BY Name;`

(iii) `SELECT City, COUNT(*) FROM Store GROUP BY Store HAVING COUNT(*)>2;`

(iv) 2015-02-06

(v) `COUNT(StoreId) NoOfEmp`

1	10
1	11
1	5
1	7