K.V.M. PUBLIC SCHOOL HALDWANI
HOLIDAY WORK-2025-26
CLASS – XII A
CHEMISTRY

1. **Read the passage and answer question a to d that follows:**
The vapour pressure of solvent is lowered by the presence of non-volatile solute and this lowering of vapour pressure is governed by Raoult's law, according to which 'the relative lowering of vapour pressure of the solvent over a solution is equal to mole fraction of solute present in the solution. However in a binary solution if both the components are volatile then another form of Raoult's law is used. The partial vapour pressure of each component is directly proportional to their mole fraction. Solution which obeys Raoult's law over the entire range of concentration are called ideal solutions. Two types of deviations from Raoult's law are observed, positive and negative deviation.
(a) What type of solution is formed by ethanol and water?
(b) What type of solution is formed by benzene and toluene?
(c) Identify which liquid will have a higher vapour pressure at 90 ^{0}C if the boiling point of two liquids A and B are 140^{0}C and 180^{0}C respectively.
(d) Why the vapour pressure of an aqueous solution of glucose is is lower than that of water?

2. **Read the passage and answer question a to d that follows:**
Oxidation –reduction reactions are commonly known as redox reactions. They involve transfer of electrons from one species to another. In a spontaneous reaction, energy is released which can be used to do useful work. The reaction is split into two half reactions. Two different container are used and a wire is used to drive the electrons from one side to the other and a Galvanic cell is created. It is an electrochemical cell that uses spontaneous redox reactions to generate electricity. A salt bridge also connects the two half cells. The reading of the voltmeter gives the cell potential or emf. If E^0_{cell} is positive, the reaction is spontaneous and if it is negative, the reaction is non-spontaneous and is referred to as electrolytic cell. Electrolysis refers to the decomposition of a substance by an electric current.
(a) Is silver plate the anode or cathode in Zn- $AgNO_3$ cell? What will happen if the salt bridge is removed?
(b) When electrochemical cell does behave like an electrolytic cell?
(c) What will happen to the concentration of Zn^{2+} and Ag^+ when $E_{cell} = 0$?
(d) Why conductivity of a solution does decreases with dilution?

Directions: Q.no.3 and Q. no, 4 consists of two statements, one is Assertion and the other is Reason. Give answer:

3. Assertion (**A**): Mercury cell does not steady potential.
Reason (**R**): In the cell reaction, ions are not involved in solutions.
(a) Both A and R are true and R is the correct explanation of A.
(b) Both A and R are true but R is not the correct explanation of the A.
(c) A is true but R is false.
(d) A is false but R is true.

4. Assertion (**A**): When NaCl is added to water a depression in freezing point is observed.
Reason (**R**): The lowering in vapour pressure of a solution causes depression in freezing point
(a) Both A and R are true and R is the correct explanation of A.
(b) Both A and R are true but R is not the correct explanation of the A.
(c) A is true but R is false.
(d) A is false but R is true

5. Calculate the molarity of each of the following solutions:
(i) 30 g of $Co(NO_3)_2.6H_2O$ in 4.3 L of solution. (At. mass of Co = 58.7 u)

(ii) 30 mL of 0.5 M H_2SO_4 diluted to 500 mL.

6. Calculate the emf of the cell in which the following reaction takes place:

$Ni(s) + 2Ag^+ (0.002\ M) \longrightarrow Ni^{2+} (0.160\ M) + 2Ag(s)$

Given that $E^0cell = 1.05$ V

7. Explain Kohlrausch's law of independent migration of ions. Mention any three application's of Kohlrausch's law.

8. Define the following terms:

(a) Standard Hydrogen Electrode
(b) Osmosis and Osmotic pressure
(c) Henry's Law and its application
(d) Raoult's Law
(e) Nernst Equation
(f) Lead storage cell
(g) Electrochemical theory of Rust
(h) Electrode reaction of Fuel cell.

9. Write the Nernst equation and the EMF of the following cell at 298 K:

$Mg(s) \mid Mg^{2+}$ (**0.001**M) $\parallel Cu^{2+}$ (**0.0001**M) $\mid Cu(s)$

[Given, $E^0_{Mg^{2+}/Mg} = \mathbf{-2.37}$ V, $E^0_{Cu^{2+}/Cu} = \mathbf{+0.34}$ V]

10. The air is a mixture of a number of gases. The major components are oxygen and nitrogen with approximate proportion of 20 % is to 79 % by volume at 298 K. The water is in equilibrium with air at a pressure of 10 atm. At 298 K, if the Henry's law constants for oxygen and nitrogen are 3.30×10^7 mm and 6.51×10^7 mm respectively, calculate the composition of these gases in water.

11. To prepare an investigatory project based on any topic of your own choice.

PHYSICS

Solve the following questions in the classwork note book: -

Directions: These questions consist of two statements, each printed as Assertion and Reason. While answering these questions, you are required to choose any one of the following four responses.

(a) Both Assertion and Reason are correct and the Reason is a correct explanation of the Assertion.
(b) Both Assertion and Reason are correct but Reason is not a correct explanation of the Assertion.
(c) Assertion is correct, Reason is incorrect
(d) Both Assertion and Reason are incorrect.

1. **Assertion:** Electron move away from a region of lower potential to a region of higher potential.
   Reason: An electron has a negative charge.
2. **Assertion :** Electric lines of force never cross each other.
   Reason : Electric field at a point superimpose to give one resultant electric field.
3. **Assertion :** Coulomb force and gravitational force follow the same inverse-square law.
   Reason : Both laws are same in all aspects.
4. **Assertion :** The property that the force with which two charges attract or repel each other are not affected by the presence of a third charge.
   Reason : Force on any charge due to a number of other charge is the vector sum of all the forces on that charge due to other charges, taken one at a time**.**
5. **Assertion :** A metallic shield in form of a hollow shell may be built to block an electric field.
   Reason : In a hollow spherical shield, the electric field inside it is zero at every point.
6. **Assertion :** A point charge is brought in an electric field, the field at a nearby point will increase or decrease, depending on the nature of charge.
   Reason : The electric field is independent of the nature of charge.
7. **Assertion**:The equatorial plane of a dipole is an equipotential Surface. **Reason:** The electric potential at any point on equatorial plane is zero.
8. **Assertion :** Two metal plates having charges Q, –Q face each other at some separation and are dipped into an oil tank. If the oil is pumped out, the electric field between the plates increases.
   Reason : Electric field between the plates, $E_{med} = E_{air}/K$

9. **Assertion :** A dielectric is inserted between the plates of a battery connected capacitor. The energy of the capacitor increases.
   Reason : Energy of the capacitor, $U=CV^2/2$
10. **Assertion :** In a simple battery circuit, the point of the lowest potential is positive terminal of the battery.
    Reason : The current flows towards the point of the higher potential, as it does in such a circuit from the negative to the positive terminal.
11. **Assertion :** A larger dry cell has higher emf.
    Reason : The emf of a dry cell is proportional to its size.
12. **Assertion :** A current continues to flow in superconducting coil even after switch is off.
    Reason : Superconducting coils show Meissner effect.
13. **Assertion :** Voltmeter is connected in parallel with the circuit.
    Reason : Resistance of a voltmeter is very large.
14. **Assertion :** Ohm's law is applicable for all conducting elements.
    Reason : Ohm's law is a fundamental law.
15. **Assertion :** An electric bulb becomes dim, when the electric heater in parallel circuit is switched on.
    Reason : Dimness decreases after sometime.

PHYSICAL EDUCATION

Prepare track and field file. The file must include the following points and should be in the given sequence: -
*Hockey, football, volleyball, kho kho, kabaddi, basketball, table tennis, cricket, judo (any one game)
*History (world and Indian) *Dimensions of game with diagram * Equipment used in game
*Terminology use in game *Skill of game *Awardes name (Arjun Award, Dronacharya Award, Major Dhyaan Chand Khel Ratna Award)
(Write only those who got first time and recently only)
*Famous personality international (5 males and 5 female) and national both (5 males and 5 female)
(Write few points regarding the players)
*Venue (5 International and 5 National))

- Relevant pictures and maps must be pasted.

ENGLISH

1.Read any of the following classic texts from the options below:
a) Hamlet - William Shakespeare b) Twelfth Night – Shakespeare c) Julius Caesar - Shakespeare
e) Arms and the Man- George Bernard Shaw f) Strife - John Galsworthy
2. Write an analytical response for any of the plays. (400–500 words each) including:
a. Summary (in your own words, 100–120 words) b. Main conflict (internal or external? How is it resolved?)
c. Character analysis – Focus on one main character d. Central theme/message of the story
e. Use of literary devices (irony, symbolism, foreshadowing, etc.)
f. Personal reflection – What did the story teach you? Did it surprise you?

YOGA

1. What are the benefits of practicing yoga for physical and mental health?
2. Explain the concept of Asanas and their importance in yoga.
3. Describe the different types of Pranayama and their benefits.
4. What is the significance of Shatkarma in yoga and how does it contribute to overall well-being?
5. Discuss the importance of relaxation and meditation in yoga.

INFORMATICS PRACTICES

General Instructions:

▪ Neatly write all the answers in your I.P notebook.

Answer the following questions:

Q1.What is the difference between a Series and Data Frame data structure of Pandas?

Q2.Consider the following command to generate a data series "b".

```
b=pd.Series([37,20,45.5,np.NaN,40],index=['a','b','c','d','e'])
```

Write the command to sort the values in ascending order for the above mentioned series. Also write the output generated after sorting.

Q3.What is Head and tail Function in Pandas data structures? What happens when no parameter is passed to these functions? Explain with an example

Q4.Give the output for the following:

```
import pandas as pd1
s = pd1.Series ([1, 2, 3, 4, 5], index = ['a','b','c','d','e'])
 print (s.head (3))
 print (s.tail (3))
```

Q5. Write the output of the following: import pandas as pd

```
emp={'TNO':['T01','TO2','T03','T04','TO5'],'TNAME':['AMIT','RAJESH','BINNY','CHARU
','MEENAKSHI'],'TADD':['123 PASCHIM VIHAR','6/11 RAMESH NAGAR','5 WEST PUNJABHI BAG
H','23 MALVIYA NAGAR','19 MEERA BAGH'],'SALARY':[23000,34000,12000,45000,34000]}
df=pd.DataFrame(emp,columns=['TNO','TNAME','TADD','SALARY'])
```

(a) print(df) (b) print(df['TNAME']) (c) print(df.iloc[1:3]) (d) print(df.loc[2:6])

MATHEMATICS

1. Show that: $2\tan^{-1}\left\{\tan\frac{\alpha}{2}\tan\left(\frac{\pi}{4}-\frac{\beta}{2}\right)\right\}=\tan^{-1}\left(\frac{\sin\alpha\cos\beta}{\cos\alpha sin\beta}\right)$.
2. Find the real solution of $\tan^{-1}\sqrt{x\,(x+1)}+\sin^{-1}\sqrt{x^2+x+1}=\frac{\pi}{2}$
3. Show that each of the relation R in the set A = $\{x \in Z : 0 \le x \le 12\}$, given by
   (i) R = { (a, b): |a-b| is a multiple of 4}
   (ii) R = { (a, b): a=b is an equivalence relation.
   Find the set of all elements related to 1 in each case
4. Let f : R - $\left\{-\frac{4}{3}\right\}$ →R be a function defined as f(x) = $\frac{4x}{3x+4}$. Show that in f: R - $\left\{-\frac{4}{3}\right\}$ → Range of f , f is one – one and onto.
5. Express the following matrix as the sum of symmetric and skew symmetric matrix, and verify your result. $\begin{bmatrix}3 & -2 & -4\\ 3 & -2 & -5\\ -1 & 1 & 2\end{bmatrix}$
6. Let A = $\begin{bmatrix}2 & 3\\ -1 & 2\end{bmatrix}$ Then show that A^2 - 4A + 7I=0. Using this result calculateA^8.
7. Find the matrix A satisfying the matrix equation$\begin{bmatrix}2 & 1\\ 3 & 2\end{bmatrix}A\begin{bmatrix}-3 & 2\\ 5 & -3\end{bmatrix}=\begin{bmatrix}1 & 0\\ 0 & 1\end{bmatrix}$.
8. Prove that every square matrix can be uniquely expressed as the sum of a symmetric and skew symmetric matrix.
9. If A and B are symmetric matrices, such that AB and BA are both defined, the prove that AB-BA is a skew symmetric matrix.
10. Determine the product $\begin{bmatrix}-4 & 4 & 4\\ -7 & 1 & 3\\ 5 & -3 & 1\end{bmatrix}\begin{bmatrix}1 & -1 & 1\\ 1 & -2 & -2\\ 2 & 1 & 3\end{bmatrix}$ and use it to solve the system of equations x- y+ z=4, x-2y-2z=9 , 2x+y+3z=1.
11. If X and Y are two sets having 2 and 3 elements respectively, then find the number of functions from X to Y
12. Let A = $\{x \in R : -1 \le x \le 1\}$= B. show that f: A→ B given by f(x) = x |x| is a bijection.
13. Let A = R – {2} and R = R- {1}. If f: A→ B is a function defined by f(x) = $\frac{x-1}{x-2}$, show that f is one-one and onto.
14. Determine whether each of the following relations are reflexive, symmetric and transitive:
    (i)Relation R in the set A = {1, 2, 3…13, 14} defined as
    R = $\{(x, y): 3x - y = 0\}$
    (ii) Relation R in the set **N** of natural numbers defined as
    R = $\{(x, y): y = x + 5 \text{ and } x < 4\}$
    (iii) Relation R in the set A = {1, 2, 3, 4, 5, 6} as
    R = $\{(x, y): y \text{ is divisible by } x\}$
    (iv)Relation R in the set **Z** of all integers defined as
    R = $\{(x, y): x - y \text{ is as integer}\}$
15. Check the injectivity and surjectivity of the following functions:
    (i) f: **N** → **N** given by $f(x) = x^2$(ii) f: **Z** → **Z** given by $f(x) = x^2$(iii) f: **R** → **R** given by $f(x) = x^2$