**SAMPLE PAPER-04 (unsolved)**

CHEMISTRY (Theory)

**Class - XI**

Time allowed: 3 hours Maximum Marks: 70

**General Instructions:**

a) All the questions are compulsory.
b) There are **26** questions in total.
c) Questions **1** to **5** are very short answer type questions and carry **one** mark each.
d) Questions **6** to **10** carry **two** marks each.
e) Questions **11** to **22** carry **three** marks each.
f) Questions **23** is value based question carrying **four** marks.
g) Questions **24** to **26** carry **five** marks each.
h) There is no overall choice. However, an internal choice has been provided in one question of two marks, one question of three marks and all three questions in five marks each. You have to attempt only one of the choices in such questions.
i) Use of calculators is **not** permitted. However, you may use log tables if necessary.

1. Which element in periodic table has highest electron gain enthalpy?
2. Comment: "Equilibrium is a dynamic in nature".
3. If the density of methanol is 0.793 kg $L^{-1}$, what is its volume needed for making 2.5 L of its 0.25 M solution?
4. What will be the sin of work does in the following equation?

   $$2SO_2(g)+O_2(g)\Leftrightarrow 2SO_2(g)$$

5. Classify the following as extensive and intensive properties:
   i) Molar heat capacity
   ii) Enthalpy
   iii) volume
6. Complete the following equations

   $a\ LiNO_3 \longrightarrow$ ϕι

   $b\ NaNO_3 \longrightarrow$ ϕι
7. Complete the following equations

   $a\ NaBH_4 + I_2 \longrightarrow$ ϕι

   $b\ SiCl_4 + H_2O \longrightarrow$ ϕι

Or

What happen when?

a) Quicklime is heated with coke.
b) Carbon monoxide reacts with $Cl_2$.

Write the chemical equations for the reactions

8. Define the following:
   i. Critical temperature
   ii. Avogadro law
9. A) What type of isomerism is shown by cis-2-butene and trans-2- butane?
   B) Why is conc. $HNO_3$ added to sodium extract before testing for halogens?
10. How will you test the presence of halogens in organic compounds? Write the chemical reactions involved.
11. A) What is heavy water? Calculate the molecular weight of heavy water.
    B) Why should heavy water plants be near to fertilizer industry?
12. Calculate the volume occupied by 8.8 g of $CO_2$ at $31.1^0$ C and 1 bar pressure. [R =0.083 bar L $K^{-1}$ $mol^{-1}$].
13. Among CO, $H_2O$, $CH_4$ and NO, which gases will occupy the greatest and smallest volume, if a1g of each are taken at STP?
14. How many electrons occupy the bonding orbitals in hydrogen and oxygen molecule?
15. Give reasons:
    a) Sodium is found to be more useful than potassium.
    b) A solution of sodium carbonate is alkaline.
    c) LiI is more soluble than KI in ethanol.

    Or

    Calculate the pH of 0.04 M sodium nitrite solution and also its degree of hydrolysis, if the ionization constant of nitrous acid is $4.5 \times 10^{-4}$.
16. We know that calcium and phosphorus are necessary for healthy teeth and bones. It plays an important role in neuro-muscular function and inter-neuronal transmission. Calcium is found to be rich in milk and milk products. Phosphorus is abundant in vegetables. So, children must take milk, milk products and vegetables every day.
    a) Name the minerals present in the green peas.
    b) Give the percentage of calcium present in bones and teeth.
    c) Name the hormone that regulates calcium in plasma.
17.
    a) What are the harmful effects of photochemical smog?
    b) How can they be controlled?
    c) Differentiate classical and photochemical smog
18.
    a) Write any two similarities in properties of Br and Al.
    b) How would you convert limestone to calcium carbide?
19. Water is essential for life and so we cannot image life without water. Human activities, organic wastes, municipal and industrial discharge create lot of water pollution. Immersing of statues in sea also lead to water pollution. This gives a threat to aquatic animals and phytoplankton.
    a) Give any three ways to reduce water pollution.
    b) What are the consequences of water pollution?
    c) What is the threat caused to aquatic animals due to water pollution?
20. Give the electronic configurations of

a) $H^+$
b) $Na^+$
c) $O_2^-$
d) $F^-$.

21.
a) What is the advantage of fuel cell over burning of fossil fuels?
b) Why is $H_2$ - $O_2$ fuel cell called reversible?
c) What reaction takes place at anode in $H_2$ - $O_2$ fuel cell? Why?

22. Give reason:
a) $RbO_2$ is paramagnetic in nature
b) Lithium does not form peroxides and superoxide
c) $Li_2CO_3$ decomposes on heating whereas other alkali metal carbonates do not decompose.

23. Thermal power plants usually use coal as a fuel which liberates $SO_2$, $CO_2$ and CO gases. It produces huge amount of ash called fly ash. Fly ash causes air pollution. Mr. Sarathy engineer, suggested that fly ash should be used as substitute of cement. Using fly ash as cement substitute will reduce pollution to lot of extent. It can also be used in agriculture.
a) What are the advantages of using fly ash in cement?
b) How does it help in agriculture?
c) What values are possessed by Mr. Sarathy
d) Why are gas power plants better than thermal power plants

24.
b) Define isomerism.
c) What are the various types of isomerism?
d) Cite two examples for each.

Or

a) Define tautomerism.
b) Explain keto-enol tautomerism in aldehydes and ketones.
c) What are the conditions under which enol form predominates?

25. How does the following properties of elements in group 13 change with increasing atomic number
a) Atomic radius
b) Ionization energy
c) Oxidation states
d) Reducing character
e) Electron affinity

Or

Write the balanced equation for:
a) Boron trifluoride with ammonia.
b) Aluminium with dilute sodium hydroxide.
c) Carbon monoxide with zinc oxide.
d) Hydrated alumina with aqueous sodium hydroxide solution.

e) Silicon dioxide with hydrogen fluoride.

26. The metal 'M' when treated with sodium hydroxide, produces a white precipitate 'A' which is soluble in excess of sodium hydroxide to give soluble complex 'B'. 'A' gets soluble in dilute HCl to form 'C'. 'A' when heated strongly gives 'D', which is used to extract metal. Identify 'A', 'B', 'C', 'D' and 'M' with suitable equations.

Or

a) Explain the preparation of silicon tetrachloride.
b) Discuss its important properties and uses.