**Nagaland Board**
**Class XI**
**Chemistry**
**Sample Paper-2**

**Time allowed: 3 hours** **Maximum Marks: 70**

**General Instructions:**

i. Approximately 15 minutes is allotted to read the question paper and revise the answers.
ii. The question paper consists of 30 questions. All questions are compulsory.
iii. Marks are indicated against each question.
iv. Internal choice has been provided in some questions.

**N.B: Check that all pages of the question paper is complete as indicated on the top left side.**

**1.** Which of the following cannot be prepared by Kolbe's electrolysis process? [1Mark]
(i) $C_3H_8$
(ii) $C_4H_{10}$
(iii) $C_2H_6$
(iv) $C_6H_{14}$

**2.** Which of the following compounds will exhibit geometrical isomerism? [1Mark]
(i) 1- Phenyl-2-Butene
(ii) 3- Phenyl-1-Butene
(iii) 2- Phenyl-1-Butene
(iv) 1, 1 - Diphenyl - 1 propane

**3.** A substance which gives a brick red flame and breaks down on heating giving oxygen and brown gas is [1Mark]
(i) Calcium carbonate
(ii) Calcium nitrate
(iii) Magnesium carbonate
(iv) Magnesium nitrate

**4.** Clark's method of water softening uses [1Mark]
(i) $Na_2CO_3$
(ii) $Ca(OH)_2$
(iii) Ion exchange resin
(iv) $Na_6P_6O_{18}$

**5.** Which of the following is NOT true about the oxidation state of oxygen? [1Mark]
(i) It shows oxidation state +3
(ii) It shows oxidation state +2
(iii) It shows oxidation state -1/2
(iv) It shows oxidation states -1

**6.** Give an example of a basic buffer. [1Mark]

**7.** Which of the two is more acidic and why? Acetic acid and chloroacetic acid [1Mark]

**8.** What happens to the ionic product of water if some acid is added to it? [1Mark]

**9.** What is the approximate molecular mass of dry air containing 78% $N_2$ and 22% $O_2$? (Atomic mass N = 14, O =16 u) [1Mark]

**10.** Give an example of a decomposition redox reaction. [1Mark]

**11.** Predict the effect of addition of 2 moles of an ideal gas
a) At constant volume
b) At constant pressure on the equilibrium:

$$Na_2CO_3(s) + SO_2(g) + ½O_2(g) \rightleftharpoons Na_2SO_4(s) + CO_2(g)$$

**Or**

a) What is the condition required for precipitation to occur?
b) In which of the two solutions, solubility of sodium sulphide is more: solution with pH 3.7 or with pH 4.2?

[2Mark]

**12.** Why is acid rain considered to be a threat for Taj Mahal? Explain with chemical reaction.

**Or** [2Mark]

What is the hybridization of B in $BF_3$ and N in $NH_3$? How does hybridization change when both compounds react to a coordinate bond?

**13.** Predict the shape of following molecules on the basis of VSEPR theory
a)$XeF_4$ b) $ClF_3$ [2Mark]

**14.** [2Mark]
a) What is Boyle's temperature?
b) What type of intermolecular forces exists between HCl molecules in liq.HCl?

**15.** Balance the following equation by the half reaction method (acidic medium):
$C_2H_5OH + MnO_4^- \rightarrow Mn^{2+} + CH_3COOH$ [2Mark]

**16.**

a) Calculate the mass of one atom of oxygen.
b) How many He atoms are present in 4u of He.

**Or** [2Mark]

Calculate the mass percentage composition of copper pyrites ($CuFeS_2$)

**17.**

a) Second ionization enthalpy of Na is more than Mg.Why?
b) Arrange the following in the increasing order of radius. N, O, P
c) Write the general outer electronic configuration of transition elements.

**Or**

Give reason:

a) Be and Mg do not impart colour to the flame.
b) $Li^+$ is heavily hydrated in water. [3Mark]

**18.** Calculate the volume of 1.0 M aq.NaOH that is neutralized by 200 mL of 2.0 M aq.HCl. Also calculate the mass of NaCl produced [3Mark]

**19.**

a) Which of the two has higher ionic character and why? NaCl or NaI
b) Write the molecular orbital configuration of $C_2$.Predict its magnetic behaviour.
$H_2O$ is a liquid at room temperature. Why? [3Mark]

**20.** In an equilibrium, A + B $\rightleftharpoons$ C + D, A and B are mixed in a vessel at a temperature T. The initial concentration of A was twice the initial concentration of B. After equilibrium was attained, concentration of C becomes thrice the equilibrium conc. of B. Calculate $K_c$ .

**Or** [3Mark]

a) Give values for all 4 quantum numbers for unpaired electron of Cl (Z=17).
b) Which quantum number defines orientation of an electron?
How many electrons in Cr (Z=24) have l =1?

**21.** What is Perlon? How it is prepared? [3Mark]

**22.** Explain the following terms giving one example of each type:

(i) Antacids

(ii) Disinfectants

(iii) Enzymes [3Mark]

**23.** What are analgesic medicines? How are they classified and when are they commonly recommended for use? [3Mark]

**24.** Account for the following:
(i) Electrophilic substitution in case of aromatic amines takes place more readily than benzene.
(ii) $CH_3CONH_2$ is a weaker base than $CH_3CH_2NH_2$.
(iii) Nitrocompounds have higher boiling points than hydrocarbons having almost same molecular mass. [3Mark]

**25.** Give chemical tests to distinguish between the following pairs of compounds:
(i) Propanal and propanone
(ii) Methyl acetate and ethyl acetate
(iii) Benzaldehyde and benzoic acid [3Mark]

**26.** State the general uses of phenol. [3Mark]

**Or**

Which one among alcohols and phenols are more acidic and why?

**27.** What is the reason that Haloarenes are less reactive than haloalkane towards nucleophilic substitution reaction? [3Mark]

**28.**

a) Calculate the enthalpy change for the reaction:
$C_2H_4 + H_2 \rightarrow C_2H_6$
Given enthalpies of combustions of $C_2H_4$, $H_2$ and $C_2H_6$ are -1401, -1550,-286 kJ mol respectively.
b) Identify the state and path functions in the expression given: $\Delta U=q+w$
c) Predict the sign of $\Delta G$ for the following processes:
i. Melting of ice below $0^oC$
ii. Flow of heat from high to low temperature.

**Or**

a) Standard enthalpies of combustions of $C_6H_{10}$ ,$H_2$ and $C_6H_{12}$ are -3880, -241,-3920 kJ $mol^{-1}$ resp. Calculate the standard enthalpy of hydrogenation of $C_6H_{10}$.

b) Calculate the work done when 1 mole of an ideal gas expands freely in vaccuum.
c) What is the difference between H-H bond enthalpy and enthalpy of formation of H atom?

[5Mark]

**29.**

(a) Give the formulae of components of borax bead.
(b) Why does Si not show catenation to the extent as carbon does?
(c) $Al_2Br_6$ is a poor conductor of electricity. Why?
(d) $N(CH_3)_3$ is pyramidal while $N(SiH_3)_3$ is planar.Why?

**Or**

(a) Why does B resemble Si in its properties?
(b) Pb (IV) chloride is a good oxidising agent. Why?
(c) Which of the following is acidic and Why? $SiO_2, Al_2O_3, PbO_2$
(d) B-F bond length in $BF_3$ is more than in $[BF_4]^-$.Why? [5Mark]

**30.**

(a) Which type of isomerism is observed in xylenes?
(b) Predict the major products of the following:
i. $C_6H_6 \xrightarrow{H_2SO_4}$
ii. $CH_3CH_2CH(Br)CH_3 \xrightarrow{Alc.KOH}$
(c) Name the reagent used to distinguish between following pairs of compounds
i. propane and propene
ii. but-1-yne and but-2-yne

**Or**

(a) Alkanes with even number of carbon atoms have higher melting point than the corresponding ones with odd number. Why?
(b) Name the two conformations of ethane. Which of the two is more stable?
(c) A hydrocarbon 'A' has a vapour density 36. It forms a single monochloro substitution product. Predict the structure of 'A'. Justify your answer. Convert acetic acid to methane.