Meghalaya Board
Class XI
Chemistry
Sample Paper 2

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

General Instructions:

(i) Write all answers in the answer script.
(ii) Attempt all parts of a question together in one place.
(iii) All questions are compulsory.
(iv) Marks for each question are indicated against it.
(v) Question No. 1 of Part ––I is of Multiple-choice Type, each of **½** mark. Choose and write the correct answer in the Answer Script from the four options given.
(vi) Question Nos. 2 to 9 of Part ––II are very Short-answer Type Questions of 1 mark each. Answer these either in *one* sentence or in *one* word each.
(vii) Question Nos. 10 to 17 of Part––III are Short-answer Type–I Questions of 2 marks each. Answer these in about *20–30* words each.
(viii) Question Nos. 18 to 26 of Part––IV are Short-answer Type–II Questions of 3 marks each. Answer these in about *40–50* words each.
(ix) Question Nos. 27 to 29 of Part––V are Long-answer Type Questions of 5 marks each. Answer these in about *70–80* words each.
(x) Use of ordinary Scientific calculators and Log Tables are allowed.
(xi) Mobile phones and Pagers are not allowed in the examination Hall.

PART-I

1. Choose and write the correct answer in the answer script: **½ x 8=4**

(a) Which of the following cannot be prepared by Kolbe's electrolysis process? **½**
(i) C_3H_8
(ii) C_4H_{10}
(iii) C_2H_6
(iv) C_6H_{14}

(b) Which of the following compounds will exhibit geometrical isomerism? **½**
(i) 1 - Phenyl - 2 – butene
(ii) 3 - Phenyl - 1 – butene
(iii) 2 - Phenyl - 1 – butene
(iv) 1, 1 - Diphenyl - 1 propane

(c) A substance which gives a brick red flame and breaks down on heating giving oxygen and brown gas is: **½**

(i) Calcium carbonate
(ii) Calcium nitrate
(iii) Magnesium carbonate
(iv) Magnesium nitrate

(d) Clark's method of water softening uses **½**

(i) Na_2CO_3
(ii) $Ca(OH)_2$
(iii) Ion exchange resin
(iv) $Na_6P_6O_{18}$

(e) Which of the following is NOT true about the oxidation state of oxygen? **½**

(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

(f) The equilibrium constant expression depends on which of the following for the reversible reaction **½**

(i) mechanism
(ii) stoichiometry and mechanism
(iii) the quantities of reactants and products initially present
(iv) temperature (Level-M)

(g) Which of the following is true for expansion of an ideal gas into vacuum? **½**

(i) Energy is gained
(ii) Energy is released
(iii) Work is done by gas
(iv) No change in energy at all

(h) A mixture of gases contains H_2 and O_2 gases in the ratio of 1:4 (w/w). What is the molar ratio of the two gases in the mixture? **½**

(i) 1:4
(ii) 4:1
(iii) 16:1
(iv) 2:1

PART-II

2. Give an example of a basic buffer. **1**

3. Which of the two is more acidic and why? Acetic acid and chloroacetic acid **1**

4. What happens to the ionic product of water if some acid is added to it? **1**

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

6. Give an example of a decomposition redox reaction. **1**

7. Give the molecular formula of two gases responsible for depletion of ozone layer **1**

8. Write the name and atomic number of the second transition element. **1**

9. Why does H_2 behave as an inert gas? **1**

PART-III

10. Why is acid rain considered to be a threat for Taj Mahal? Explain with chemical reaction. **2**

11. Predict the effect of addition of 2 moles of an ideal gas

a) At constant volume

b) At constant pressure on the equilibrium:

$$Na_2CO_3(s) + SO_2(g) + \tfrac{1}{2}O_2(g) \rightleftharpoons Na_2SO_4(s) + CO_2(g)$$

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? **2**

12. 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? **2**

13. Predict the shape of following molecules on the basis of VSEPR theory

a)XeF_4 b) ClF_3 **2**

14.

a) What is Boyle's temperature?

b) What type of intermolecular forces exists between HCl molecules in liq.HCl? **2**

15. Balance the following equation by the half reaction method (acidic medium):

$C_2H_5OH + MnO_4^- \rightarrow Mn^{2+} + CH_3COOH$ **2**

16. **2**

a) Calculate the mass of one atom of oxygen.

b) How many He atoms are present in 4u of He. **2**

17. Calculate the mass percentage composition of copper pyrites($CuFeS_2$) **2**

PART-IV

18. Calculate the wavelength, frequency and wave number of a light wave whose period is 2.0×10^{-10} s. **2**

19. Calculate the root mean square and average speed of oxygen molecules at 27^0C.

2

20.

a) An electron in which orbit of Li^+(Z=3) would have same energy as the electron in second orbit of H atom?

b) State Aufbau's principle

Or

a) What is the condition required for precipitation to occur?

b) In which of the two solutions, solubility of sodium sulphide be more: solution with pH 3.7 or with pH 4.2?

21. **3**

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.

22. Give reason: **3**

a) Be and Mg do not impart colour to the flame.

b) Li^+ is heavily hydrated in water.

23. 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. **3**

24. **3**

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.

c) H_2O is a liquid at room temperature. Why?

25. 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. **3**

26. **3**

a) Give values for all 4 quantum numbers for unpaired electron of Cl (Z=17).

b) Which quantum number defines orientation of an electron?

c) How many electrons in Cr (Z=24) have l =1?

PART-V

27.

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 ΔG 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?

28.

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?

29.

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.