

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

Time: 3 Hours**Maximum Marks: 70****General Instructions**

1. All questions are compulsory.
2. Question nos. 1 to 8 are very short answer questions and carry 1 mark each.
3. Question nos. 9 to 18 are short answer questions and carry 2 marks each.
4. Question nos. 19 to 27 are also short answer questions and carry 3 marks each.
5. Question nos. 28 to 30 are long answer questions and carry 5 marks each.
6. Use log tables if necessary, use of calculators is not allowed.

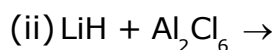
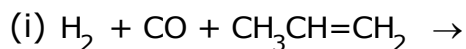
-
1. Calculate the number of atoms in 4g of He. [1]
 2. Which quantum numbers originate from Schrodinger wave equation? [1]
 3. Which of the two is bigger in size and why? Cl or Cl^- [1]
 4. Predict the shape of ClF_3 and BF_3 on the basis of VSEPR theory [1]
 5. What is the conjugate base of HCO_3^- and H_2O ? [1]
 6. Define displacement reactions. Give one example for it. [1]
 7. Why are metallic hydrides used for storing hydrogen? [1]
 8. Name the two methods for estimation of nitrogen. [1]
 9. How many grams of Na_2CO_3 should be dissolved to make 100 cc of 0.15M Na_2CO_3 ? [2]
 10. Yellow light emitted from a sodium lamp has a wavelength (λ) of 580 nm. Calculate frequency (ν) and wave number of the yellow light? [2]
 11.
 - (a) What is the hybridization of central atom in following? NH_3 , C_2H_2 [2]
 - (b) What is the dipole moment of CCl_4 molecule? Account for your answer.
 12. Describe the hybridization in case of PCl_5 . Why are axial bonds longer as compared to the equatorial bonds? [2]
 13. Calculate the root mean square speed of methane molecules at 27°C . [2]

14. Name the intermolecular forces between

- (a) He atoms in liquid He
- (b) Two HF molecules [2]

15. Calculate the oxidation number of Mn in K_2MnO_4 and N in HNO_3 [2]

16. Complete the given equations [2]



17. Give reasons for the following [2]

- (a) Alkali metals impart colour to the flame.
- (b) Explain why alkali and alkaline earth metals cannot be obtained by chemical reduction methods?

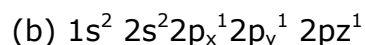
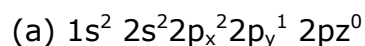
Or

Account for the following

- (a) Second ionization enthalpy of Na is higher than Mg.
- (b) Cs is used extensively in photoelectric cells.

18. Calculate the volume of oxygen at N.T.P that would be required to convert 5.2 L of carbon monoxide to carbon dioxide. [2]

19. An element with atomic number 7 has following given configurations



Which of the two is correct and why? [3]

20. Write balanced equations or reactions between: [3]

- (i) Na_2O_2 and water
- (ii) KO_2 and water
- (iii) Na_2O and CO_2

21.

(a) Define: [3]

- (i) Intensive properties
- (ii) Adiabatic process

(b) Starting with thermodynamic relationship $G = H - TS$ derive the following relationship
 $\Delta G = -T\Delta S_{total}$

22. Ruchi's father is suffering from high blood pressure. Ruchi's mother cooks food with very little salt in it. [3]

- Why?
- Doctor did not advise him not to consume salt at all. Why?
- What value do you get from this?

23.

(i) How would you justify the presence of 18 elements in the 5th period of the Periodic Table? [3]

(ii) Write the general electronic configuration of p-block and f-block elements

Or

(i) Which of the following will have the most negative electron gain enthalpy and which will have the least negative electron gain enthalpy?

P, S, Cl, F. Explain your answer.

(ii) Predict the formula of binary compound of

- Aluminium and iodine
- Lithium and oxygen

24. Give IUPAC names of following: [3]

(i) $\text{C}_6\text{H}_5\text{CH}_2\text{COOH}$

(ii)
$$\begin{array}{c} \text{CH}_2\text{-OH} \\ | \\ \text{CH-OH} \\ | \\ \text{CH}_2\text{-OH} \end{array}$$

(iii)
$$\begin{array}{ccccccc} & & \text{Br} & & \text{O} & & \\ & & | & & || & & \\ \text{CH}_3 & - & \text{CH} & - & \text{CH}_2 & - & \text{C} & - & \text{Cl} \end{array}$$

25.

(a) What conclusion would you draw if the Lassaigne's extract gives a blood red colouration with FeCl_3 ? [3]



(b)

Which of the given free radicals is most stable and why?

(c) Why is an organic compound fused with metallic sodium for testing for N, S and halogens?

26. Write a short note on the following: [3]

- (i) Wurtz Reaction
- (ii) Friedel-Crafts alkylation

27. Define: [3]

- (i) Biochemical Oxygen Demand (BOD)
- (ii) Ozone Hole
- (iii) Green Chemistry

28. Calculate the molar solubility of $\text{Ni}(\text{OH})_2$ in 0.10 M NaOH. The solubility product of $\text{Ni}(\text{OH})_2$ is 2.0×10^{-15} . [5]

Or

Equal volumes of 25.0 cm³ of 5.0×10^{-2} M $\text{Ba}(\text{NO}_3)_2$ and 2×10^{-2} M NaF solution are mixed. Predict whether BaF_2 will be precipitated or not (K_{sp} of $\text{BaF}_2 = 1.7 \times 10^{-6}$ at 298 K)

29. Give reasons for the following: [5]

- (a) $[\text{SiF}_6]^{2-}$ is known whereas $[\text{SiCl}_6]^{2-}$ is not known.
- (b) Diamond is covalent, yet has high melting point.
- (c) PbX_2 is more stable than PbX_4 (X = Cl, Br)
- (d) Boron is unable to form BF_6^{3-} ion.
- (e) BF_3 behaves as Lewis acid.

Or

- (a) Give one method for industrial preparation and one for laboratory preparation of CO and CO₂ each.
- (b) Select the member(s) of group 14 that (i) forms the most acidic dioxide (ii) used as semiconductors.
- (c) Explain structure of Diborane.

30. Assign structures for the following: [5]

- (a) An alkyne (X) has molecular formula C_5H_8 . It reacts neither with sodamide nor with ammoniacal cuprous chloride.
- (b) A hydrocarbon 'Y' decolourises bromine water. On ozonolysis it gives 3-Methylbutanal and formaldehyde. Give the name of the compound.
- (c) A hydrocarbon (Z) has molecular formula C_8H_{10} . It does not decolourise bromine water and is oxidized to benzoic acid on heating with $K_2Cr_2O_7$. It can also have three other isomers A, B and C. Write the structure of Z, A, B and C.

Or

- (a) One mole of a hydrocarbon (A) reacts with one mole of bromine giving a dibromo compound, $C_5H_{10}Br_2$. Substance (A) on treatment with cold dilute alkaline $KMnO_4$ solution forms a compound $C_5H_{12}O_2$. On ozonolysis (A) gives equimolar quantities of propanone and ethanal. Deduce the structural formula of (A).
- (b) How will you convert?
 - (i) Ethyne to Methane
 - (ii) Ethene to Ethyne
 - (iii) Methane to Ethane