

Sample Paper-01
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. "BeH₂ molecule has zero dipole moment although the Be-H bonds are polar" Explain.
2. Give water gas shift reaction.
3. Arrange the following metals in the order in which they displace each other from the solution of their salts. Al, Cu, Fe, Mg and Zn.
4. What is the maximum number of electrons in f subshell with same spin?
5. Two litres of an ideal gas at a pressure of 10 atm expands isothermally into a vacuum until its total volume is 10 litres. How much heat is absorbed and how much work is done in the expansion?
6. Why the symbols of ⁷⁹₃₅Br and ₃₅Ba are not acceptable?
7. Why alkali and alkaline earth metals cannot be obtained by chemical reduction methods?
8. Give reason:
 - (a) F has lower electron gain enthalpy than Cl.
 - (b) Ionization enthalpy of N is higher than O.
9. Arrange benzene, hexane and ethyne in decreasing order of acidic behaviour by giving reasons.
10. How domestic waste can be used as manure?

Or

- (a) Give reasons: "Extra-ordinary stability of benzene though it contains three double bonds".
- (b) Give the balanced ionic reaction of Mn³⁺ on disproportionation.
11. Give reasons: "The reaction $2Na(s) + H_2(g) \rightarrow 2NaH(s)$ is a redox change".
12. Give reason:
 - (i) Graphite is used as lubricant.
 - (ii) Diamond is used as an abrasive.
 - (iii) Aluminium alloys are used to make aircraft body.

Or

Explain isomerization in alkanes with examples.

13. An alkyl halide compound 'A' ($C_5H_{11}Br$) reacts with ethanolic KOH to give compound 'B', an alkene. 'B' on reaction with bromine gives compound 'C'. 'C' on further dehydrobromination gives compound 'D'. When one mole of 'D' is treated with sodium metal in liquid ammonia, it gives one mole of sodium salt of 'D' and half a mole of hydrogen gas. On complete hydrogenation, 'D' gives a straight reactions involved.
14. Calculate the amount of ammonia formed when 50 kg of N_2 (g) and 10.0 kg H_2 (g) of are mixed to produce NH_3 (g). Identify the limiting reagent.
15. Give reasons:
- Evaporation causes cooling.
 - Falling liquids drops are spherical.
 - Vapour pressure of acetone is less than that of ether at same temperature.
16. What happens when alkali metals reacts in air?
17. Give the Lewis representation of:
- Nitric acid
 - Ammonia
 - Ozone molecule
18. In the reaction: $2SO_2(g) + O_2 \rightleftharpoons 2SO_3(g) + 189.4 \text{ kJ}$
- Indicate the direction in which the equilibrium will shift when:
 - Concentration of SO_2 is increased.
 - Concentration of SO_3 is increased.
 - Temperature is increased.
19. Calculate the wavelength in nm, of visible light having a frequency of $4.37 \times 10^{14}/s$.
20. Comment on each of the following observations:
- Lithium forms a nitride directly like magnesium. Give equation involved.
 - BaO is soluble but $BaSO_4$ is insoluble in water.
21. Give a note on:
- Mist
 - Smoke
 - Fumes
 - Dust
22. Calculate the enthalpy change when 2.38g of CO vaporizes at its normal boiling point, if the enthalpy of vaporization of CO is 6.04 kJ/mol.
23. John takes snacks every day to school, but Mala takes vegetables, chapattis and curd. Chips and snacks packet are filled with nitrogen gas. If they are filled with oxygen, they will get rancid.
- What is meant by rancidity?
 - How do you preserve butter?
 - Why chips are packed with nitrogen gas?
24. Differentiate valency and oxidation number. [Any five points]

Or

Calculate equilibrium concentrations of CO_2 , H_2 , CO and H_2O in $\text{CO(g)} + \text{H}_2\text{O (g)} \rightleftharpoons \text{CO}_2\text{(g)} + \text{H}_2\text{(g)}$ at 800 K, if only CO and H_2O are present initially at concentrations of 0.1 M each. [$K_c = 4.24$] for the reaction:

25. Explain the rules for calculating oxidation number.

Or

(i) Write the chemical reactions when borax solution is acidified.

(ii) Explain why BF_3 exists whereas BH_3 does not?

(iii) SiO_2 is solid but CO_2 is a gas at room temperature.

26. (a) In which C-C bond of $\text{CH}_3\text{CH}_2\text{CH}_2\text{Br}$, the inductive effect is expected to be least?

(b) Which of the following compound shows geometrical isomerism?

(i) Pent-1-ene

(ii) Pent-2-ene

(iii) 2-Methylbut-2-ene

(c) What type of isomerism is present in the following pairs?

(i) $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{OH}$ and $\text{CH}_3 - \text{CH}(\text{OH}) - \text{CH}_3$

(ii) $\text{CH}_3 - \text{CH}_2 - \text{CO} - \text{CH}_2 - \text{CH}_3$ and $\text{CH}_3 - \text{CO} - \text{CH}_2 - \text{CH}_2 - \text{CH}_3$

(iii) $\text{CH}_3 - \text{CH}_2 - \text{OH}$ and $\text{CH}_3 - \text{O} - \text{CH}_3$

Or

(a) How will you convert ethanoic acid into benzene?

(b) "Branched chain hydrocarbons have lower boiling point than straight chain hydrocarbon". Why?