Guess Paper/ Important Questions

Based on updated Syllabus, session 2024-25

11th Class

Chemistry

By: Students of Kashmir

Unit-I: Some Basic Concepts of Chemistry (07 Marks)

1. Define mole concept and calculate the number of molecules in 10g of H_2O.
2. Explain Dalton's Atomic Theory and its limitations.
3. Derive the empirical and molecular formula for a given compound.
4. Explain stoichiometry with an example.
5. Define the law of multiple proportions.

Uni-II: Structure of Atom (09 Marks)

6. Describe Rutherford's atomic model and its limitations.
7. What is Heisenberg's Uncertainty Principle? Explain with an example.
8. Explain the quantum numbers and their significance.
9. Write the electronic configuration of atomic numbers 24 and 29 using Aufbau's principle.
10. Explain Hund's Rule with an example.
11. Differentiate between orbitals and orbits.

Unit-III: Classification of Elements and Periodicity in Properties (06 Marks)

12. Explain the modern periodic law and its significance.
13. Discuss the variation of atomic radius and ionization enthalpy across a period.
14. What are inert gas radii? How do they vary in the periodic table?
15. How does the periodic table explain trends in **atomic size, ionization energy, and electronegativity**?

Unit-IV: Chemical Bonding and Molecular Structure (07 Marks)

16. Differentiate between ionic and covalent bonds with examples.
17. Explain the VSEPR theory and predict the shape of NH_3 and H_2O.
18. What is resonance? Explain with an example.
19. Explain the concept of hybridization involving **s, p, and d-orbitals** with examples.

Unit-V: Thermodynamics (09 Marks)

20. State and explain the first law of thermodynamics.
21. Define enthalpy and entropy. How do they affect spontaneity?
22. Explain Hess's Law of constant heat summation with an example.
23. Derive the first law of thermodynamics equation and explain the terms involved.

Unit-VI: Equilibrium (07 Marks)

24. Explain Le Chatelier's principle with examples.
25. What is the common ion effect? Give an example.
26. Define pH and calculate the pH of a **0.01M HCl solution**.
27. Derive the relationship between **Kp and Kc** for a gaseous reaction.

Unit-VII: Redox Reactions (04 Marks)

28. Define oxidation and reduction with suitable examples.
29. How do you balance a redox reaction using the oxidation number method?
30. Write a balanced redox reaction for the reaction between Fe^{2+} and MnO_4^- in an acidic medium.
31. Explain the applications of redox reactions in daily life.

Unit-VIII: Organic Chemistry – Some Basic Principles and Techniques (11 Marks)

32. What are electrophiles and nucleophiles? Give examples.
33. Explain the concept of **inductive effect and resonance effect**.
34. Differentiate between homolytic and heterolytic bond fission.
35. What is Markovnikov's rule? Explain with an example.
36. Explain the mechanism of **electrophilic addition in alkenes** with an example.

Unit-IX: Hydrocarbons (10 Marks)

37. Write the IUPAC nomenclature for the following compounds:
    a) CH_3-CH=CH_2
    b) CH_3-C≡CH
38. Explain Markovnikov's and anti-Markovnikov's addition reactions.
39. What are aromatic hydrocarbons? Explain benzene's resonance structure.
40. Write the mechanism of Friedel-Crafts alkylation.
41. Describe the resonance structure of benzene.
42. Discuss the mechanism of **nitration of benzene** with chemical equations.

Some additional important numerical problems

Numericals on Some Basic Concepts of Chemistry

1. Calculate the number of **atoms** in **5g of Ca (Atomic Mass = 40 u)**.
2. A sample of **$MgSO_4.7H_2O$** contains **9g of water**. Find the mass of **anhydrous $MgSO_4$** present.
3. A gas sample contains **2.5 moles of O_2** at STP. Calculate:
    - a) Volume occupied by the gas
    - b) Number of molecules present
4. A compound contains **30.4% oxygen, 69.6% iron**. Calculate its **empirical formula**. (Fe = 56, O = 16)

Numericals on Atomic Structure

5. The wavelength of an electron moving with velocity **5×10^6 m/s** is **1.46×10^{-10} m**. Find its mass using **de Broglie's equation**.
6. Calculate the energy of a photon whose frequency is **5×10^{14} Hz**.

7. Find the energy required to remove an electron from **n=3** in a hydrogen atom. (Rydberg's constant **$R_H = 2.18 \times 10^{-18}$ J**)

Numericals on Chemical Bonding

8. The bond order of O_2 is **2**, while for O_2^- it is **1.5**. Explain the stability of these molecules based on bond order calculations.
9. A molecule has **sp^3 hybridization**. Predict its shape and bond angle.
10. Calculate the formal charge on the oxygen atom in **O_3 (Ozone)**.

Numericals on Thermodynamics

11. Calculate the **work done** when 1 mole of an ideal gas expands **isothermally** from **10L to 20L** at **300K**. (Use R = 8.314 J/mol K)
12. For a reaction: **$C(graphite) + O_2(g) \rightarrow CO_2(g)$**,

- Given **$\Delta H = -393.5$ kJ/mol**, find the **enthalpy change** for the formation of **2 moles of CO_2**.

13. A system absorbs **250 J of heat** and does **150 J of work**. Calculate the **change in internal energy (ΔU)**.

Numericals on Equilibrium

14. For the reaction **$N_2 + 3H_2 \rightleftharpoons 2NH_3$**, the equilibrium constant Kp = **0.5 at 500K**. Calculate Kc.
15. A 0.01M solution of HCl is given. Calculate its **pH**.
16. The solubility product (Ksp) of **AgCl** is **1.8×10^{-10}**. Find the **solubility of AgCl in pure water**.

Numericals on Redox Reactions

17. Determine the oxidation number of **Cr** in **$K_2Cr_2O_7$**.
18. A reaction involves **10g of Fe reacting with excess HCl**. Find the volume of **H_2 gas produced at STP**. (Fe = 56 g/mol)
19. Balance the redox reaction: **$MnO_4^- + Fe^{2+} \rightarrow Mn^{2+} + Fe^{3+}$** in acidic medium.

Numericals on Organic Chemistry

20. Calculate the molecular mass of:

- a) Ethanol (C_2H_5OH)
- b) Benzene (C_6H_6)

21. 10g of an **organic compound containing C, H, and O** was burned completely, producing **22g of CO_2 and 9g of H_2O**. Determine its **empirical formula**.

Important Note:

Dear Students, Don't rely **only** on these questions! Understand concepts, practice more, and revise regularly. These questions are **most probable** based on past patterns, but **don't rely solely on them**. Exams can be **unpredictable**, so prepare thoroughly as per Syllabus. **Best of luck!**