

1st Year Chemistry

2023 Guess Paper

پنجاب کے تمام بورڈز (لاہور، راولپنڈی، فیصل آباد، سرگودھا، گوجرانوالہ، ساہیوال، ملتان، بہاولپور، اور ڈیرہ غازی خان) کے لئے۔

Chapter-1

☆Short Questions

1. Define and explain the concept of Mole and Avogadro's number with example.
2. Define limiting reactant. And how limiting reactant is identified?
3. What are isotopes and why the isotopes have the same chemical properties?
4. The atomic masses may be in fractions. Why?
5. Differentiate *b/w* actual & theoretical yield.
6. Give the reason to explain that actual yield is less than the theoretical yield?
7. Define molecular ion. How it is formed?
8. Define Yield. How is efficiency of a reaction measured? Or (Percentage yield)
9. What is stoichiometry? Write its assumptions.
10. Mg atom is twice heavier than that of carbon atom. Justify the statement.
11. Calculate gram atoms in 0.1g of sodium.
12. Differentiate *b/w* empirical and molecular formula with examples.
13. N₂ and CO have the same number of electrons protons and neutrons. Explain it.
14. No individual Neon atom in the sample of the element has a mass of 20.18 amu, why?
15. What is the justification of two strong peaks in the mass spectrum for bromine, while for iodine only one peak at 127 amu is indicated?

☆Long Questions

1. What is difference between actual yield and the theoretical yield? Why actual yield is less than theoretical yield?
2. What is mass spectrometer? How is it used to determine the relative atomic masses of isotopes?
3. Write down various steps to calculate the empirical formula of a Compound.
4. Define stoichiometry. Give assumptions, mention any two important laws which help to perform stoichiometric calculation.

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Chapter-2

☆Short Questions

1. Differentiate between stationary and mobile phase?
2. Differentiate *b/w* adsorption & partition chromatography.
3. Why is there a need to crystallize the crude product?
4. What is *R_f* value? Why it has no units?
5. Define crystallization. Write the name of various steps.
6. What is difference *b/w* qualitative and quantitative analysis?
7. Write four properties of good solvent.
8. How crystals are dried by reliable method?
9. How undesired colours are removed from the crystals?

10. Define distribution law. How it is helpful in solvent extraction?
11. Define sublimation with any two examples?
12. What is solvent extraction? Give its example & technique.
13. Define chromatography. Give its two uses and describe its importance.
14. Write uses of paper chromatography.

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Chapter-3

☆Short Questions

1. Convert $^{\circ}\text{C}$ into $^{\circ}\text{F}$ and vice versa.
2. Define absolute zero. What is its value?
3. Explain Boyle's law according to kinetic molecular theory of gases.
4. Calculate the value of R in SI units.
5. What do you mean by absolute zero temperature of gases?
6. Define Avogadro's law of gases?
7. Differentiate b/w diffusion & effusion.
8. What are the faulty points in the Kinetic molecular theory of gases?
9. State Dalton's Law of partial pressure. Write its two applications.
10. Define critical temperature & critical pressure by giving an example of each.
11. State under what conditions the real gases deviate from the ideal behaviour.
12. What is plasma? How it is formed? Write four applications/ uses of plasma.
13. Lighter gases diffuse more rapidly than heavier gases.
14. Why water vapours do not behave ideally at 273 K?
15. SO_2 is non-ideal at 273 K but behaves like an ideal gas at 327°C . Justify.
16. What are isotherms? What happens to the positions of isotherms when they are plotted at high temperatures for a particular gas?

17. Do you think that the volume of any quantity of a gas becomes zero at -273.16°C ? Is it not against the law of conservation of mass? How do you deduce the idea of absolute zero from this information?

☆Long Questions

Numerical

Example# 3, 4, 5, 6, 7

Exercise Question# 18, 19, 20, 21 and 23

These are the most important numerical and examples from this chapter. For better preparation, prepare all numerical type questions of this chapter.

Chapter-4

☆Short Questions

1. Why ice floats on water? Or (Ice has less density than liquid water. Why?)
2. Why boiling point of water varies from sea level to higher level?
3. Define molar heat of fusion with one example.
4. Evaporation causes cooling. Explain.
5. Define (a) Anisotropy (b) Polymorphism (c) isomerism
6. Earthenware vessels keeps water cool. Explain.
7. The electrical conductivity of metals decreases with the increase in temperature, why?
8. Define lattice energy. Give examples.
9. Explain why ionic crystals are brittle?
10. Define transition temperature and give two examples.
11. What are crystallographic elements? Explain with diagram.
12. Why ionic solids do not conduct electricity?
13. Diamond is hard and an electrical insulator, why?
14. Define Hydrogen Bonding. Why H_2O is liquid at room temperature but H_2S is a gas.
15. Define unit cell. Define crystallographic elements.

16. Differentiate between isomorphism and polymorphism with suitable example.

☆Long Questions

1. Describe manometric method for determination of vapour pressure of a liquid with diagram. **(vv imp)**
2. Classify solid on the basis of bonding. Ionic solid, covalent solids, metallic solid with its properties. **(vv imp)**
3. Define liquid crystals and write their uses. **(vv imp)**
4. What is H-bonding? Discuss H-bonding in biological compounds and ice. **(imp)**
5. Write a note on three factors affecting London forces. **(imp)**

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Chapter-5

☆Short Questions

1. Why the nature of cathode rays is independent of the nature of gas used in discharge tube.
2. How it was inferred that cathode rays are material particles?
3. What is nuclear reaction? Write equation for the production of neutron.
4. What happens when a neutron is decayed? Or Give products formed due to decay of neutron?
5. Write defects in Rutherford's atomic model.
6. Calculate the radius of n^{th} orbit for hydrogen atom.
7. Describe Zeeman's and Stark's effect?
8. State Moseley's law. Give its mathematical expression.
9. Differentiate between Atomic Emission Spectrum and Atomic Absorption Spectrum?
10. How does Bohr introduce Plank's quantum theory in his model? Give its two postulates?
11. Differentiate between line spectrum and continuous spectrum?

12. What is de-Broglie's Equation and Heisenberg uncertainty principle?

13. What is $(n + l)$ rule?

14. Define Pauli's exclusion principle with example.

15. Differentiate between frequency and wavelength?

16. Define Hund's rule. Give an example.

17. Give electronic configuration of ${}_{24}\text{Cr}$, ${}_{29}\text{Cu}$, ${}_{26}\text{Fe}$, ${}_{24}\text{Cr}_2$ and ${}_{35}\text{Br}$.

☆Long Questions

1. Write down Millikan's oil drop method for the measurement of charge of an electron.
2. Calculate radius of a Bohr's atom using Bohr's atomic model.
3. Give main postulates and defects of Bohr's atomic model.
4. Define quantum numbers. Discuss briefly azimuthal quantum number.
5. Write a detailed note on X – rays.

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Chapter-6

☆Short Questions

1. Define octet rule. Give two examples of compounds that do not obey this rule.
2. Cationic radius is smaller than the parent atom, while anionic is larger than parent atom. Why?
3. Define ionization energy and electron affinity. Give its trend in periods and group of periodic tables?
4. Define electronegativity? How the electronegativity difference decides the nature of chemical bond?
5. Differentiate between covalent and coordinate covalent bond.
6. Explain the term bond order.
7. Why π bonds are more diffused than sigma bonds?

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9. Define covalent radii and atomic radii. Give example?
10. Define Pi-bond and Sigma-bond. Why is Pi-bond weaker than Sigma bond?
11. Differentiate between bonding molecular orbitals and anti-bonding molecular orbitals.
12. Why the bond distance in the compromise distance between two atoms?
13. Define bond order What is bond order of O_2^{+2} .
14. Define atomic radius. How does it vary in groups and periods?
15. Why MOT is superior to VBT?
16. Define dipole moment. The dipole moments of CO_2 and CS_2 are zero but that of SO_2 is 1.61D.
17. 2nd ionization energy is greater than 1st. Why?
18. Why 2nd electron affinity shown with positive sign?

☆Long Questions

1. Write the main points of VSEPR theory and explain the structure of ammonia on the basis of this theory.
2. Define hybridization and explain structure of water on its basis.
3. Describe N_2 and O_2 molecules on basis of MOT
4. Sp^2 and Sp hybridization with examples
5. Explain ionization energy giving one example. Also describe its periodic trend.
6. Define electron affinity. Name the factors affecting it. How does it vary in the periodic table?

Chapter-7

☆Short Questions

1. What is the First Law of Thermodynamics with examples?
2. Differentiate b/w spontaneous & non-spontaneous reactions.

3. Describe that burning of candle is a spontaneous process. Justify.
4. Define ΔH_r^0 (enthalpy of reaction). Can it be negative? How?
5. Explain what is Lattice energy? Give Example.
6. Define enthalpy of formation and atomization with an example.
7. Define standard enthalpy of combustion & solution with example of each.
8. Define standard enthalpy of atomization with an example.
9. Define internal energy, system, surrounding, state, and state function.
10. Why is it necessary to mention the physical states of reactants and products in a thermochemical reaction? Apply, Hess's law to justify your answer.
11. Differentiate between exothermic and endothermic reactions.

☆Long Questions

1. What is first law of thermodynamics? Prove that $\Delta E = qv$
2. Define Enthalpy and prove that $qp = \Delta H$
3. Describe bomb-calorimeter method for determination of enthalpy of reaction.
4. Define and explain Hess's law of constant heat summation with examples.
5. Define enthalpy of reaction. How is it measured by glass calorimeter?

Chapter-8

☆Short Questions

1. State law of mass action.
2. Define K_c . How the value of K_c of a reaction helps to predict the direction of a reversible reaction?
3. How does catalyst effects reversible reactions?
4. Define Le-Chatelier's principle.

- How does the change of pressure shift the equilibrium position in the synthesis of NH_3 ?
- Define pH and pOH.
- Define PK_a and PK_b .
- What is common ion effect explain with the example of NaCl.
- Differentiate b/w acidic buffers & basic buffers with example of each. How a basic buffer can be prepared?
- Why the solubility of glucose increases on increasing temperature?
- Define solubility and solubility product. Write solubility product of PbCl_2 & Ag_2CrO_4 .
- Define buffers and buffers capacity. Also explain their uses.
- What is Henderson equation for acids and buffers?
- The change of volume disturbs the equilibrium position for some of the gaseous phase reactions but not the equilibrium constant.

☆Long Questions

Numerical

Example# 2, 4, 5, 6, 7

Exercise Question# 21, 22, 23, 24 and 25

These are the most important numerical and examples from this chapter. For better preparation, prepare all numerical type questions of this chapter.

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Chapter-9

☆Short Questions

- NaCl and KNO_3 are used to lower the melting point of ice. Justify.
- Differentiate b/w molarity & molality with example of each. Also write formulas.

- One molar solution of urea is more dilute than one molar solution. Why?
- Define upper consolute temperature with example.
- Define mole fraction and parts per million.
- Sum of the mole fraction of components of solution n is always equal to unity. Justify.
- Differentiate between Ideal and non-Ideal solutions?
- What is ebullioscopic constant and cryoscopic constant with example?
- Differentiate b/w hydration & hydrolysis.
- What is solubility and solubility curve? Name its two types.
- Differentiate between hydration and hydrolysis, with one example each.
- Boiling points of the solvents increase due to the presence of solutes. Give reason.
- What is water of crystallization? Give example.
- Define critical solution temperature. Also give an example.
- What are colligative properties? Colligative properties obeys when solutions are dilute. State reason?
- Define hydration energy. On what factors does it depends.

☆Long Questions

- Define colligative properties. Explain elevation of boiling point.
- Raoult's law
- Solubility curves
- Depression of freezing point
- Azeotropic mixtures

Chapter-10

☆Short Questions

- Calculate oxidation number of Mn in (i) KMnO_4 (ii) K_2MnO_4 (iii) Na_2MnO_4

- Define oxidation number and calculate the oxidation state of underlined element.
a) H_3PO_7 b) $\text{Ca}(\text{CrO}_3)_2$
- Impure copper can be purified by electrolytic process. Explain.
- What is the use of salt bridge?
- A salt bridge maintains the electrical neutrality in the cell. Explain with reason.
- SHE acts as an anode when connected with copper electrode but as cathode with zinc electrode. Why?
- What is electrochemical series? Give its applications.
- Na^+ and K^+ can displace hydrogen from acids but Pt, Pd, and Cu cannot explain.
- Give discharging reaction of lead accumulator.
- Explain the working of alkaline battery.
- How is Aluminum anodized in an electrolytic cell?
- Define terms, electrochemistry, electrolysis, oxidation, reduction, Voltaic cell and electrolytic cell.
- Explain the following with reasons. The standard oxidation potential of Zn is 0.76 V and its reduction potential is - 0.76 V
- Rule for assigning oxidation number.

☆Long Questions

- Voltaic or Galvanic cell
- Electrochemical series and its four applications...
- Explain lead accumulator battery and its discharging process.
- Importance of electrolysis and electrolysis of fused and aqueous NaCl solution

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Chapter-11

☆Short Questions

- Define the rate of reaction. Give its units.
- Differentiate b/w instantaneous & average rate of reaction.
- What is pseudo first order reaction?
- What is half-life period? Give one example.
- What is effect of surface area on rate of a reaction?
- How order of reaction can be calculated from half-life method?
- Differentiate b/w homogeneous catalysis & heterogeneous catalysis with examples.
- Define autocatalysis with one example.
- Give two characteristics of enzyme catalysis.
- A finely divided catalyst may prove more effective. Give reason.
- How a catalyst is specific in its action?
- What do you mean by activation energy?
- The radioactive decay is always a first order reaction. Justify.
- Rate of reaction is an ever-changing parameter. Give Reasons.

☆Long Questions

- Half Life method to determine the order of reaction
- Activation Energy
- Arrhenius Equation
- Catalysis and its types & any four characteristics of catalyst.
- Define order of reaction and explain 2nd and zero order reactions.
- What is meant by Enzyme Catalysis? Write reaction showing the catalysis of urea. Also write two characteristics of Enzyme Catalysis.

Note:

- This guess paper consists of the most important questions from exam's point of view.
- This does not mean that the entire paper will come from it.
- These guess papers can help you pass the exam if you didn't prepare well.
- Prepare the complete syllabus along with it if you wish to secure high marks.

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