

3 marks :-

Unit 1 : Basic concepts of Chemistry and Chemical Calculations

1. Distinguish between oxidation and Reduction. ✂
2. Calculate the molar mass of Urea [$Co(NH_2)_2$] and Sulphuric acid [H_2SO_4].
3. How many moles of ethane is required to produce 44g of CO_2 (g) after Combustion?
4. What is the difference between Molecular Mass and Molar Mass? ✂
5. Balance $Zn + NO_3^- \rightarrow Zn^{2+} + NO$ (in acidic medium by ion electron method)
6. Calculate the equivalent mass of [H_2SO_4].
7. $X_2 + 3Y_2 \rightarrow 2XY_3$, In this reaction 2 moles of X_2 and 4.5 moles of Y_2 react to give products. Which is the limiting reagent and calculate the no. of moles of X_2 , Y_2 and XY_3 in the reaction mixture?
8. What are disproportionation reaction? Give example.

Unit 2 : Quantum Mechanical Model of Atom

1. How many orbitals are possible for $n=4$?
2. Determine the values of all the four Quantum numbers of 8th electron in O – atom and 15th electron in Cl – atom. ✂
3. S.T the circumference of the Bohr orbit for the hydrogen atom is an integral multiple of the de-Broglie wavelength associated with the electron revolving around the nucleus.
4. Which ion has stable electronic configuration? Ni^{2+} (or) Fe^{3+} ? ✂
5. Derive De-Broglie relation.
6. Write short notes on exchange energy.
7. The stabilisation of a half filled d-orbital is more pronounced than that of p-orbital. Why? ✂
8. Calculate the orbital angular momentum for d and f orbital.

Unit 3 : Periodic Classification of Elements

1. Ionisation potential of N is greater than O. Why? ✂
2. The Electron Affinity values of Be, Mg are Zero and those of N (0.02 eV) and P (0.80 eV) are very low. Give reason.
3. Explain diagonal relationship. ✂
4. Explain Slater's rule. ✂
5. Why halogens act as oxidising agents?
6. Second Ionisation Potential is always higher than first Ionisation Potential. Give reason.
7. State and Explain Dobreiner's Triad.
8. How does IE vary across a period and down the group?
9. Compare the first IE of B and C.
10. Explain Pauling's scale of Electronegativity.

Unit 4 : Hydrogen

1. Discuss the three types of Covalent hydrides.
2. Write the expected formula for the hydrides of 4th period elements. What is the trend in the formula? In what way the first two member of series different from others? ✂
3. Convert para hydrogen into ortho hydrogen. ✂
4. Hydrogen Peroxide can function as an oxidising agent as well as reducing agent. Substantiate this statement with suitable examples. ✂
5. Explain exchange reactions of Deuterium.
6. Explain preparation of hydrogen using electrolysis.
7. Write a note on Metallic hydrides. (Interstitial)
8. Why hydrogen peroxide is stored in plastic containers but not in glass container?
9. $Ca(OH)_2$ cannot be used to remove permanent hardness of water. Why?
10. Explain the types of hydrogen bonding with an example.

Unit 5 : Alkali and Alkaline Earth Metals

1. Why blue colour appears during the dissolution of alkali metals in liquid ammonia? ✂
2. Why Sodium hydroxide is much more water soluble than sodium chloride?
3. Mention the uses of plaster of paris.
4. Write the equations for the amphoteric nature of Beryllium hydroxide.
5. Among the alkali halides, which is covalent? Give reason.
6. Give reason for the anomalous behaviour of Beryllium.

Unit 6 : Gaseous State

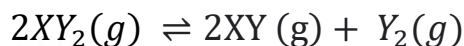
1. Aerated water bottles are kept under water during summer. Give reason.
2. Distinguish Diffusion and Effusion. ✂
3. The tyre of an automobile is inflated to slightly lesser pressure in summer than in winter. Why?
4. What are ideal gases? In what way they differ from real gas? (or) Distinguish ideal gas and real gas. ✂
5. Name the different methods of liquefaction of gases.
6. At identical temperature and pressure, the rate of diffusion of hydrogen gas is $3\sqrt{3}$ times that of a hydrocarbon having molecular formula C_nH_{2n-2} . What is the value of 'n'?
7. Derive ideal gas equation. ✂
8. What is Boyle's temperature? What happens to real gas above and below Boyle's temperature?

- Predict the feasibility and possibility of a reaction when
 - both ΔH and ΔS are +ve
 - both ΔH and ΔS are -ve
 - ΔS increases but ΔH decreases.
- State Hess's law. ✂
- State third law of thermodynamics.
- A gas contained in a cylinder fitted with a frictionless piston expands against a constant external pressure of 1 atm from a volume of 5 litres to a volume of 10 litres. In doing so, it absorbs 400J thermal energy from its surrounding. Determine the change in internal energy of the system.
- Distinguish Extensive and Intensive properties.
- Derive the relation between C_p and C_v for an ideal gas.
- Write down the Born-Haber cycle for the formation of CaCl_2 .
- "Enthalpy of neutralisation is always a constant when a strong acid is neutralised by a strong base". Give reason. ✂
- What are state and path function? Give examples.
- Calculate $\Delta H^\circ f$ for the reaction
$$\text{CO}_2(g) + \text{H}_2(g) \rightarrow \text{CO}(g) + \text{H}_2\text{O}(g)$$
Given that $\Delta H^\circ f$ for $\text{CO}_2(g)$, $\text{CO}(g)$ and $\text{H}_2\text{O}(g)$ are -393.5, -111.31, -242 kJ mol⁻¹ respectively
- Calculate the work done when 2 moles of an ideal gas expands reversibly and isothermally from a volume of 500ml to 2L at 25°C and normal pressure.
- An Engine operating between 127°C and 47°C takes some specified amount of heat from a high temperature reservoir. Assuming that there are no frictional losses, calculate the % of efficiency of an Engine.

Unit 8 : Physical and Chemical Equilibrium

- Explain how will you predict the direction of equilibrium reaction.
- Write a balanced chemical equation for the equilibrium reaction for which the equilibrium constant is given by the expression
$$K_c = \frac{[\text{NH}_3]^4 [\text{O}_2]^5}{[\text{NO}]^4 [\text{H}_2\text{O}]^6}$$
- The Equilibrium concentrations of NH_3 , N_2 , H_2 ARE $1.8 \times 10^{-2} M$, $1.2 \times 10^{-2} M$, $3 \times 10^{-2} M$ respectively. Calculate the equilibrium constant for the formation of NH_3 from N_2 and H_2 .
- What is Homogeneous and Heterogeneous equilibrium? Give examples for each. ✂
- One mole of H_2 and I_2 are allowed to attain equilibrium in 1 litre container. If the equilibrium mixture contains 0.4 mole of HI, calculate the equilibrium constant.

6. Find Δn_g , write K_p and K_c for the
 - i) Decomposition of ammonia
 - ii) Formation of NO
7. One mole of PCl_5 is heated in one litre closed container. If 0.6 mole of chlorine is found at equilibrium, calculate the value of equilibrium constant.
8. The equilibrium for the dissociation of XY_2 is given as



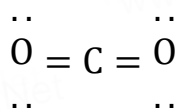
If the degree of dissociation of X is so small compared to one, S.T $2K_p = PX^3$ where P is the total pressure and K_p is the dissociation equilibrium constant of XY_2 .

Unit 9 : Solutions

1. State the limitations of Henry's law. ✂
2. Calculate the mole fraction of methanol and water when 0.5 mole of methanol is mixed with 1.5 mole of water
3. What is the mass of glucose [$C_6H_{12}O_6$] in one litre solution which is isotonic with $6gL^{-1}$ of urea [NH_2CONH_2]?
4. You are provided with solid 'A' and three solutions of A dissolved in water-one saturated, one unsaturated and one super saturated. How would you determine which solution is which?
5. What is vapour pressure of liquid? What is relative lowering of vapour pressure?
6. Write a note on Van't Hoff factor.
7. Define Osmosis and Osmotic pressure.
8. Distinguish ideal and non-ideal solutions.
9. Draw and explain the graph obtained by plotting solubility versus temperature for calcium chloride.

Unit 10 : Chemical Bonding

1. In CH_4 , NH_3 , H_2O the central atom undergoes sp^3 hybridisation yet their bond angles are different –why?
2. Draw MO diagram of CO and calculate its bond order.
3. Explain resonance with reference to carbonate ion. ✂
4. Explain bond formation in acetylene.
5. What type of hybridisation is possible in the following geometries?
 - a) Octohedral
 - b) Tetrahedral
 - c) Square Planar
6. Calculate the formal charge on carbon and oxygen for the following structure

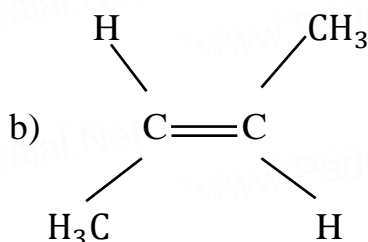
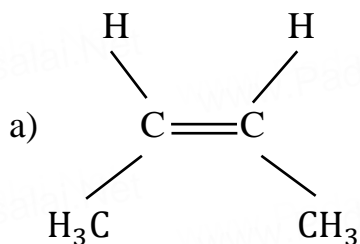


7. Of the two molecules OCS , CS_2 which has higher dipole moment value? Why ? ✂

8. Bond angle in PH_4^+ is higher than in PH_3 . Why?
9. Explain sp^2 hybridisation in BF_3 .
10. Mention the salient features of VB theory. ✂
11. Define Bond Angle.

Unit 11 : Fundamentals of Organic Chemistry

1. Write a note on Homologous series.
2. Describe the reactions involved in detection of Nitrogen by Lassaigne method.
3. Define Isomerism. Identify the cis and trans isomers in ✂



4. Write the structural formula for ✂
 - i) m-dinitrobenzene
 - ii) p-dichloro benzene
 - iii) 1,3,5 trimethyl benzene
5. 0.284 g of an organic substance gave 0.287g AgCl in a carius method for the estimation of Halogens. Find the % of Cl in that compound.
6. 0.26g of an organic compound gave 0.039g of water and 0.245 g of carbondioxide on combustion calculate the % of C & H.
7. Give the IUPAC name of
 - i) $CH_3 - O - CH_3$
 - ii) $CH_3 - CH_2 - \underset{\substack{| \\ OH}}{CH} - CHO$
 - iii) $CH_3 - C \equiv C - \underset{\substack{| \\ Cl}}{CH} - CH_3$
8. Give the functional group for
 - i) Alcohols
 - ii) Carboxylic acid
 - iii) Ethers

9. Explain functional isomerism.
10. Give the principle involved in the estimation of halogen in organic compound by Carius method.

Unit 12 : Basic concept of Organic Reactions

1. Write short notes on Hyperconjugation ✂
(or)
Explain Baker-Nathan effect with example.
2. Write a note on β elimination reaction. ✂
3. Explain with example the positive Mesomeric effect.
4. The bond length between all the four atoms is same in 1,3 buta diene. Explain with reason.
5. Write a note on Electromeric effect.

Unit 13 : Hydrocarbons.

1. How does Huckel rule help to decide the aromatic character of a compound? ✂
2. How is BHC prepared? (or) Write the structure and use of Gammmaxane. ✂
3. What happens when acetylene undergoes ozonolysis?
4. Define polymerisation. Explain the types of polymerisation of acetylene.
5. Write any four different components you get during fractional distillation of coal tar at different temperature.
6. A simple aromatic hydrocarbon (A) reacts with Bromine to give (B). Compound (A) reacts with Raney Ni and gives (C). Identify A, B and C.
7. How is toluene prepared from Benzene in the presence of anhydrous $AlCl_3$? Name the reaction and write the equation.
8. Suggest a simple chemical test to distinguish propane and propene.
9. Write Markovnikoff rule and Peroxide effect/Anti-Markovnikoff rule.
10. Why benzene undergoes electrophilic substitution whereas alkene undergoes addition reaction?
11. Toluene undergoes nitration easily than benzene. Why? ✂

Unit 14 : Haloalkanes and Haloarenes

1. Mention any three methods of preparation of haloalkanes from alcohols.
2. Predict the products formed when bromoethane is treated with i) KNO_2 ii) $AgNO_2$ ✂
3. What are Freons? List their uses and effects.
(or)
Prepare Freon – 12 from Carbon Tetrachloride.
4. How is DDT prepared? Give its uses. ✂
5. Write a note on i) Raschig Process ii) Dow Process. ✂
6. Convert Chlorobenzene to i) Phenol ii) Aniline.
7. Write about i) Wurtz – Fittig ii) Swarts reaction.

8. Arrange the compounds O-dichlorobenzene, m-di-chloro benzene and p-dichloro benzene, which has higher melting point? Explain with reason. www.CBSEtips.in

Unit 15 –Environmental Chemistry

1. Which is considered to be Earth's protective umbrella? Why? ✂
2. Explain how greenhouse effect cause global warming.
3. How is classical smog differ from photochemical smog?

Question bank prepared by

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For any doubts and clarifications, feel free
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