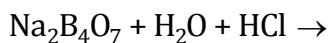


CBSE Board
Class XI Chemistry
Sample Paper - 7

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

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

Q1: Complete and balance the given equation:



Q2: If value of Azimuthal quantum number l is 2 & 3 respectively, state the number of orbitals it will contain.

Q3: Write Lewis dot symbol for Br atom.

Q4: Calculate pH of solution having concentration of hydrogen ion as 10^{-3}M

Q5: Give an example for disproportionation reaction along with appropriate oxidation state of element undergoing simultaneous oxidation and reduction.

Q6: What does the statement "10 volume of hydrogen peroxide" convey?

Q7: Why boron does not form B^{3+} ions?

Q8: Identify electrophilic centre in CH_3CN .

Q9: Calculate the number of molecules and number of atoms present in 11.2 litres of oxygen of oxygen (O_2) at N.T.P.

Q10: An element with mass number 81 contains 31.7% more neutrons as compared to protons. Assign the atomic symbol to the element.

OR

Q10: Calculate the kinetic energy of the ejected electron when ultra-violet radiation of frequency $1.6 \times 10^{15}\text{s}^{-1}$ strikes the surface of potassium metal.

Threshold frequency of potassium is $5 \times 10^{14}\text{s}^{-1}$. ($h = 6.63 \times 10^{-34}\text{Js}$)

Q11: Among the elements B, Al, C and Si:

- Which element has the highest first ionization enthalpy? Explain briefly.
- Which element has the largest atomic radius? Explain briefly.

Q12: Generally electron gain enthalpy becomes less negative as we move down the group. However electron gain enthalpy of O & F is less than that of succeeding elements (i.e. S and Cl) in their respective group. Explain

Q13: Draw molecular orbital energy level for O₂ molecule. Calculate its bond order.

Q14: Give reasons:

- NH₃ shows hydrogen bonding while HCl does not, although N & Cl have same electronegativity (3.0).
- BeH₂ molecule has zero dipole moment although the Be-H bonds are polar.

Q15: Calculate the number of moles of hydrogen (H₂) present in a 500 mL sample of hydrogen gas at a pressure of 1 bar and 27°C. (R = 0.083 bar mol⁻¹ K⁻¹)

Q16: Define surface tension. Explain effect of temperature on it.

Q17: Permanganate ion (MnO₄⁻) reacts with bromide ion in basic medium to give manganese dioxide (MnO₂) and bromate ion (BrO₃⁻). Write the balanced ionic equation for the reaction, using oxidation number method.

Q18: Why do saline hydrides produce fire on reacting with water? Give reactions of sodium hydride and calcium hydride with water.

Q19:

- Two particles A and B are in motion. If the wavelength associated with the particle A is 5×10^{-8} m calculate the wavelength of particle B if its momentum is half of A.
- Symbols ${}^{79}_{35}\text{Br}$ and ${}^{79}\text{Br}$ can be written, whereas symbols ${}^{35}_{79}\text{Br}$ and ${}^{35}\text{Br}$ are not acceptable. Answer briefly.

Q20: A Chemist while studying the properties of gaseous C₂Cl₂F₂, a chlorofluorocarbon refrigerant cooled a 1.25 g sample at constant atmospheric pressure of 1.0 atm from 320 to 293 K. During cooling, the sample volume decreased from 274 to 248 mL. Calculate ΔH and ΔU for the chlorofluorocarbon for this process. For C₂Cl₂F₂, C_p = 80.7 J/mol K.

Q21: Shreya is feeling very hot in the house. Her sister asks her to come to the sea shore along with her. Shreya denies going at sea shore during day but her sister insists saying that she'll better there.

- Is going to sea shore during day helpful in getting relief from heat? How?
- What values do you get from it?

Q22: Explain:

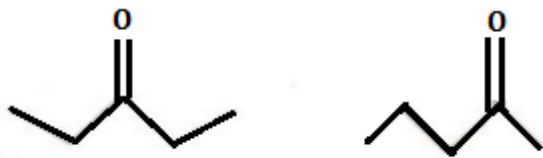
- Ionisation enthalpy decreases sharply from B to Al and then the ionisation enthalpy of Ga is unexpectedly higher than that of Al.
- Lead (IV) chloride is highly unstable towards heat.

Q23:

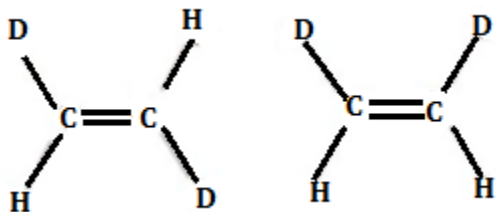
- Define limiting reagent.
- 3.0g of H_2 reacts with 29g of O_2 to yield H_2O . Which is the limiting reagent?

Q24: What is the relation between members of the following pairs of structures? Are they identical structures, structural isomers, geometrical isomers or resonance contributors?

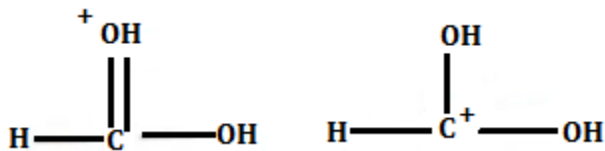
a)



b)



c)

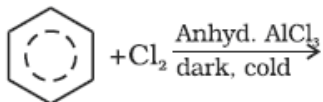


Q25:

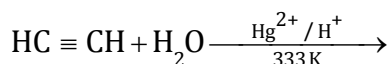
- Draw the resonance structures of phenol. Show the electron shift using curved arrow notation.
- Name the method used to separate chloroform (B.P. 334 K) and aniline (B.P. 457K). Explain briefly

Q26: Complete the following reactions:

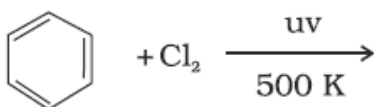
a)



b)



c)


Q27: Name any three major water pollutants and their sources.

OR

Q27:

- Give only chemical equations for formation of ozone in stratosphere.
- Also mention only chemical equations for breakdown of ozone by chlorofluorocarbons in stratosphere.
- Give one important use of ozone layer in stratosphere

Q28: Give reasons for the following

- Unlike Na_2CO_3 , K_2CO_3 cannot be prepared by Solvay process. Why?
- Why are alkali metals not found in nature?
- Sodium is less reactive than potassium why?
- Alkali metals are good reducing agents. Why?
- Alkali metals are paramagnetic but their salts are diamagnetic. Why?

OR

Q28:

- Sodium fire in the laboratory should not be extinguished by pouring water. Why?
- LiCl is soluble in organic solvents. Explain
- Though Be & Mg are alkaline earth metals, they do not give any colour in Bunsen flame.
- Hydroxides of alkaline earth metal are less basic than alkali metals of corresponding period.
- Na_2SO_4 is soluble in water whereas BaSO_4 is insoluble in water. Explain

Q29:

- At 700 K, the equilibrium constant K_p for the reaction $2\text{SO}_3(\text{g}) \rightleftharpoons 2\text{SO}_2(\text{g}) + \text{O}_2(\text{g})$ is 1.8×10^{-3} kPa. What is the numerical value in moles per dm^3 of K_c for the reaction at the same temperature
- Calculate the solubility of A_2X_3 in pure water, assuming that neither kind of ion reacts with water. The solubility product of A_2X_3 , $K_{\text{sp}} = 1.1 \times 10^{-23}$
- What is the effect of temperature on ionic product of water?

OR

Q29:

- The equilibrium constant for the reaction: $\text{H}_2(\text{g}) + \text{Br}_2(\text{g}) \rightleftharpoons 2\text{HBr}(\text{g})$ at 1024 K is 1.6×10^5 . Find the equilibrium pressure of all gases if 10 bar of HBr is introduced into a sealed container at 1024 K.
- What does the equilibrium constant K less than 1 indicates?

Q 30:

- Give two tests to distinguish 1-pentene from n-pentane.
- How do you account for the formation of ethane during chlorination of methane?

OR

Q30: Addition of HBr to propene yields 2-bromopropane, while in the presence of benzoyl peroxide, the same reaction yields 1-bromopropane. Explain and give mechanism.