**[CLASS - XI]**

**CHEMISTRY (THEORY)**

**[SAMPLE PAPER-VII]**

**Time Allowed: 3 hrs M.M.: 70**

1. How many elements can be accommodated in the present set up of the long form of the periodic table? (1)
2. An aqueous solution of sodium carbonate gives alkaline tests. Why? (1)
3. What is the oxidation state of S in Na2S2O3? (1)
4. What will be the pH of a 0.1 M ammonium acetate if pKa = pKb = 4.74? (1)
5. Write the conjugate acids of C6H5OH and NH2NH2. (1)
6. The equilibrium constant of a reaction at 27°C and 127°C are 1.52 x 10-4 and 1.26 x 10-2 respectively. Is the reaction exothermic or endothermic? (1)
7. The enthalpy change for the reaction: 2NH3 (g) 🠖 N2 (g) + 3H2 (g) is 92.2 kJ. What is the enthalpy of formation of ammonia? (1)
8. What would be the SI units for the quantity pV2T2/n? (1)
9. Give molecular electronic configuration of peroxide ion and oxygen molecule. Which of the two has larger bond length? (2)
10. How would you explain the fact that the first ionization enthalpy of sodium is lower than that of magnesium but its second ionization enthalpy is higher than that of magnesium? (2)
11. Calculate the wavelength of an electron having mass = 9.1 x 10-31 kg and kinetic energy =3.0 x 1025 J. (2)
12. If 20.0 g of CaCO3 is treated with 20.0 of HCl, how many grams of CO2 can be produced according to the reaction: CaCO3(s) + 2HCl(aq) 🠖 CaCl2(aq) + H2O(l) + CO2(g) (2)
13. Explain the following:
14. Liquids like acetone and ether are kept at cold places.
15. Hydrogen and helium are not liquefied at room temperature. (2)
16. For the water gas reaction:

C(s) + H2O (g) 🠖 CO (g) + H2(g) the standard Gibbs energy for the reaction at 1000 K is -8.1 kJ mol-1. Calculate its equilibrium constant. (2)

1. What is Le Chatelier’s principles. With the help of this explain: ice melts when pressure is applied on it. (2)
2. Calculate the strength in volumes of a solution containing 30.36 g/L of H2O2. (2)
3. Discuss the various reactions that occur in the solvay process. (2)
4. Give the basic difference between Duma’s method and Kjeldahl’s method for the estimation of nitrogen. (2)
5. Draw structures of cyclic and acylic isomers of molecular formula C3H6O. (3)
6. (a) Which of the two: O2N CH2CH2O⁻ or CH3CH2O⁻ is expected to be more stable and why?

(b) Why alkyl groups act as electron donors when attached to a p-system.

(c) Which of the following carbocation is more stable:

(i) (CH3)3 CCH2+

(ii) CH3 C+H2CH3

(iii) CH3CH2CH2+ (3)

1. (a) How will you convert:

(i) Ethane to butane

(ii) Ethane to ethyne

(iii) Ethyne to methane

(b) What effect does branching of alkane change has on its boiling into.

(c) Draw cis and trans isomers of hex-2-ene. Which isomer will have higher boiling point? (3)

1. (a) Write down the products of ozonolysis of 1, 2-Dimethylbenzene. How do the results support the Kekule structure of benzene?

(b) Why is benzene extra ordinarily stable though it contains three double bonds? (3)

1. Give the reasons:
2. Aluminium wires are used to make transmission cables.
3. Diamond is used as an abrasive.
4. Aluminium utensils should not be kept in water overnight. (3)
5. Complete the following reactions:
6. Ca3N2 (s) + H2O (l)
7. MnO4⁻ + H+ +H2O2
8. I2 + H2O2 + OH⁻ (3)
9. (a) The Mn3+ ion is unstable in solution and undergoes disproportionation to give Mn2+

MnO2 and H+ ion. Write a balance ionic equation for the reaction.

(b) Predict the product of electrolysis of an aqueous solution of AgNO3 with Ag electrodes. (3)

1. (a) The wavelength of first spectral line in the Balmer series is 6561 Å. Calculate the wavelength of the second spectral line in Balmer series.

(b) How many electrons in a given atom can have the following quantum number values: n = 4, l = 2, m = 1 (3)

1. Commercially available sulphuric acid contains 93% acid by mass and has a density of 1.84 g mL-1. Calculate (i) the molarity of the solution (ii) volume of concentrated acid required to prepare 2.5 L of 0.50 M H2SO4. (3)
2. (a) On the basis of VSEPR theory, explain the shapes of following:

H2O and NH3 molecules

(b) Draw resonance structures for SO3 and CO2 molecules.

(c) Which out of NH3 and NF3 has higher dipole moment and why? (5)

1. (a) What is solubility product? How is it different from ionic product.

(b) Calculate the molar solubility of Ni(OH)2 in 0.10 M and NaOH.

Ksp of Ni(OH)2 = 2.0 x 10-15.

(c) What are acidic buffers? Give on example.

(d) Calculate the pH of 10-8 M HCl solution. (5)

1. (a) Assign structures for the following:
2. An alkyne (X) has molecular formula C5H8. It reacts neither with sodamide nor with amoniacal cuprous chloride.
3. A hydrocarbon ‘Y’ decolourises bromine water. On ozonolysis it gives 3-Methyl butanal and formaldehyde. Give the name of the compound.
4. A hydrocarbon (Z) has molecular formula C8H10. It does not decolourise bromine water and is oxidised to benzoic acid on heating with K2Cr2O7. It can also have three other isomers A, B and C. Write the structures of Z, A, B and C.

(b) What effect does branching of an alkane chain has on its boiling point?

(c) Draw cis and trans isomers of hex-2-ene. Which isomer will have higher boiling point? (5)