

## Model Paper Class XI (Chemistry)

Time Allowed: 25 Minutes

Marks: 17

### Section-A

Q.No.01. Choose The Correct Answer:

- (i) Number of atoms present in 36 grams of magnesium is:  
A.  $12.06 \times 10^{23}$  B.  $6.02 \times 10^{23}$  C.  $18.06 \times 10^{23}$  D.  $1.5 \times 10^{23}$
- (ii) Number of moles present in 65 grams of ethyne ( $C_2H_2$ ) are:  
A. 3 B. 2.5 C. 3.5 D. 2
- (iii) The quantum number values for 4s orbital are:  
A.  $n=4, \ell=1$  B.  $n=0, \ell=2$  C.  $n=4, \ell=0$  D.  $n=4, \ell=3$
- (iv) The shape of orbital for which  $\ell=1$ ?  
A. Spherical B. Dumbell C. Double Dumbell D. Complicated
- (v) Volume of gas would be theoretical zero at?  
A.  $0^\circ C$  B. 0 K C. 273K D.  $273^\circ C$
- (vi) The molar volume of  $CH_4$  gas is  $22.4dm^3$  at .  
A.  $0^\circ C$  and 1 atm B. 0K and 1 atm C.  $25^\circ C$  and 0.5 atm D. 25K and 0.5 atm
- (vii) Hydrogen bond is not found in:  
A.  $CH_4$  B.  $C_6H_6$  C. HF D. A & B
- (viii) Diamond is an example of:  
A. Ionic solid B. Covalent solid C. Metallic solid D. Molecular solid
- (ix) Crystalline solid among following is?  
A. Alum B. Rubber C. Plastic D. Glass
- (x) The term active mass used in law of mass action means?  
A. No. of mole B. No. of molecules C. Moles per  $dm^3$  D. Gram per  $dm^3$
- (xi) Which oxide is amphoteric in nature?  
A.  $K_2O$  B.  $CO_2$  C. CaO D.  $Al_2O_3$
- (xii) The unit of rate constant (K) for the first order reaction is:  
A.  $S^{-1}$  B.  $Conc \cdot S^{-1}$  C.  $Conc^{-1} \cdot S$  D.  $Conc^{-1} \cdot S^{-1}$
- (xiii) Rate constant of reaction is affected by:  
A. Conc. Of reactants B. Conc. Of products C. Temperature D. Reactions time
- (xiv) The sum of mol fraction of components of a solution is equal to:  
A. 10 B. 1.0 C. 0.0 D. 100
- (xv) The strongest oxidizing agent in the electro chemical series is:  
A. Li B. Cu C.  $H_2$  D.  $F_2$
- (xvi) Oxidation number of "S" in  $H_2SO_4$  is:  
A. +2 B. +6 C. -2 D. -6
- (xvii) S.I Unit of pressure is :  
A. psi B. torr C. pascal D. atm

Time Allowed: 2.35 Hours

Marks: 68

### Section-B

(From Chapter 01 to 04)

Q.No.02. Attempt any **SEVEN** (07) parts. All part carry equal marks. (Marks:  $7 \times 3 = 21$ )

- (i) Write down the postulates of Valance Bond Theory.
- (ii) Differentiate between Sigma and pi bond.
- (iii) Define any three of the following terms.  
(a) Bond Length (b) Orbital (c) Hybridization (d) Critical Temperature (e) Absolute zero
- (iv) Explain the following with scientific reasons.  
(a) HF has greater ionic character than HCl.  
(b) The practical yield is always less than theoretical yield.  
(c) Oil is insoluble in water but soluble in hexane
- (v) Write down the Electronic configuration of the following.  
(a) Cl (Z=17) (B)  $O^{-2}$  (Z=8) (C) Sc (Z=21)
- (vi) State the postulates of Bohr's Atomic Theory.
- (vii) Calculate the number of moles present in 100 grams of the following.  
(i)  $C_6H_{12}O_6$  (ii) NaOH (iii)  $Ca(OH)_2$
- (viii) Predict the shapes of molecules on the basis of VSEPR.  
(i)  $NH_3$  (ii)  $BF_3$  (iii)  $CH_4$
- (ix) Derive the general gas equation.
- (x) Explain how an ideal gas is differentiated from real gas.

### Section-C

(Chapters 5 to 12)

Q.No.03. Attempt any **SEVEN** (07) parts. All part carry equal marks. (7 × 3 = 21)

- (i) State any three of the following terms.  
(a) Oxidation (b) Molarity (c) Sublimation (d) Viscosity (e) Catalyst
- (ii) Describe any factors which affect the rate of chemical reaction.
- (iii) Differentiate between Electrolytic and Electrochemical cell.
- (iv) Explain the following with scientific reason.
- (v) Density of water is highest at 4°C.

- (vi) Evaporation is cooling process.
- (vii) A falling drop of liquid is spherical.
- (viii) The hydroxide ion concentration in an antiseptic solution at 25 °C is 0.001M. Calculate its pH.
- (ix) Explain the Bronsted –Lowry theory of acids and Bases with example.
- (x) State law of mass action and derive Kc expression of a general reversible reaction.
- (xi) A solution is prepared by mixing the 46 grams ethanol (C<sub>2</sub>H<sub>5</sub>OH) and 180 grams water. Calculate the mole fraction of both components.
- (xii) Determine the oxidation number of the following:
- (xiii) Cr in K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub> (b) N in NH<sub>3</sub> (c) Cl in HClO<sub>4</sub>.
- (xiv) Write down conjugate base of the following acids.
- (xv) H<sub>2</sub>SO<sub>4</sub> (b) HCOOH (c) NH<sub>4</sub><sup>+</sup>

## Section-D

### (Chapters 1 to 12)

**Note: Attempt any TWO (02) parts. All part carry equal marks. (2 × 13 = 26)**

**Q.No.04. (a) Explain hydrogen spectrum in term of Bohr's theory. (06)**

**(b) Find the radius of 4<sup>th</sup> orbit of Hydrogen atom. (04)**

**(c) Calculate the number of electrons, protons and neutrons of the following: (03)**

- (a) S<sup>-2</sup> (Z=16, At. Mass=32)      (b) <sup>13</sup>Al<sup>27</sup>      (c) <sup>38</sup>Sr<sup>88</sup>

**Q.No.05.**

**(a) State Le-chatelier's principle. Explain its industrial application using Haber's process. (08)**

**(b) Write expression of Kc for the following reversible reaction: (05)**

- a. N<sub>2</sub>O<sub>4</sub> ⇌ 2 NO<sub>2</sub>
- b. H<sub>2</sub>(g)+I<sub>2</sub>(g)→2HI(g)
- c. CH<sub>3</sub>COOH ⇌ CH<sub>3</sub>COO<sup>-</sup> + H<sup>+</sup>
- d. 2 SO<sub>2</sub> (g) + O<sub>2</sub> (g) ⇌ 2 SO<sub>3</sub> (g)
- e. N<sub>2</sub> (g) + 3 H<sub>2</sub> (g) ⇌ 2 NH<sub>3</sub> (g)

**Q.No.06.**

**(a) State and explain Hess's Law of enthalpy summation with example. (08)**

**(b) Calculate the enthalpy of formation of methane from the following data: (05)**

- I. C(s)+2H<sub>2</sub>(g)→CH<sub>4</sub>(g)      ΔH= ???
- II. C(s)+O<sub>2</sub>(g)→CO<sub>2</sub>(g);      ΔrH°=-393.5kJ
- III. 2H<sub>2</sub>(g)+O<sub>2</sub>(g)→2H<sub>2</sub>O(l);      ΔrH°=-571.8kJ
- IV. CH<sub>4</sub>(g)+2O<sub>2</sub>(g)→CO<sub>2</sub>(g)+2H<sub>2</sub>O(l);      ΔrH°=-890.3kJ