

**SAMPLE QUESTION PAPER (I)**  
**Sub-Chemistry**  
**Class-XI**

**Time : 3 hrs.**

**M.M.70**

Instruction:-

1. All Questions' are compulsory.
2. Internal Choice has been given in 2,3,5 marks Questions.
3. Question No 1 to 8 are very short answer questions carrying 1 mark each.
4. Question No 9 to 18 are Short answer question's carrying 2 marks each.
5. Question No 19 to 27 are Short answer question's carrying 3 marks each.
6. Question No 28 to 30 are Long answer question's carrying 5 marks each.
7. Use Log table if necessary.

Q 1. What designation is given to an orbital having  $n=3, l=0$

Q 2. What are the units of surface tension?

Q 3. State modern periodic law.

Q 4. Give the IUPAC name of tertiary butyl alcohol.

Q 5. Write conjugate acid and base  $\text{NH}_3$ .

Q 6. Give the relation between standard Free energy change and Equilibrium constant.

Q 7. An alkene A on ozonolysis gives a mixture of Ethanal & Propanal. Write the structure of A

Q 8. Determine the oxidation number of underlined element in.



Q 9. What do you understand by the term Electron gain enthalpy ? How it is different from Electro negativity

Q 10. What are the various factors due to which the Ionisation enthalpy of the main group Element tends to decrease down a group.?

Q 11. Define the terms -: ( a) Entropy ( b) Enthalpy of combustion

OR

Explain Hess law of constant heat summation with the help of an example

Q 12. In what ways Be shows anomalous behavior than other elements of same group chemically ( Give equations).

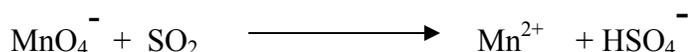
Q 13. Complete the following reactions.



Q 14. Explain Why ?

- (a) Pb (IV) is less stable than Pb (II).  
(b)  $\text{BCl}_3$  Molecule has Zero dipole moment.

Q 15. Balance the given redox reaction in acidic medium.



Q 16. What is the maximum number of emission lines obtained when the excited electron of a H atom in  $n=6$  drops to the ground state .

Q 17. Compare the relative stability of the following species and indicate their magnetic Properties on the basis of MOT (i)  $\text{O}_2$ , (ii)  $\text{O}_2^{2-}$

Q 18 Explain why ?

- (a) Cs is used in photoelectric cell.  
(b) Potassium carbonate can not be prepared by solvey process.

Q 19. (a) Calculate the molarity of Oxalic acid in the solution prepared by dissolving its 2.52 gm in enough water to form 250 ml of the solution.

(b) Round off the following in three significant figures

- (a) 3289 (b) 0.03265

Q 20 (a) State Pauli's exclusion principle.

(b) Write the electronic configuration of  $\text{Co}^{+3}$ . & find out the number of unpaired electrons present in it.

Q 21. Calculate the enthalpy of combustion of Ethylene gas to form carbon dioxide and water at 298 K and 1 atm pressure. The enthalpies of formation of  $\text{CO}_2$ ,  $\text{H}_2\text{O}$  &  $\text{C}_2\text{H}_4$  are -393.5, -241.8 & +52.4  $\text{kJ mol}^{-1}$  respectively.

Q 22. Explain the following.

- (a) (i) Carbon monoxide is more dangerous than carbon dioxide .why ?  
(ii) Statues and monuments in India are affected by acid rain How?  
(b) What are the full forms of MIC & BOD.?

- Q 23. (a) What are Electrophiles explain with example  
(b) Define Position isomerism with example.

Q 24. (a) 0.50 gm of an organic compound was Kjeldahlised and the ammonia obtained was passed into 100 ml of M/10  $\text{H}_2\text{SO}_4$ . The excess acid required 160 ml of M/10 NaOH for neutralization. Calculate the percentage of nitrogen in the compound.

- Q 25. (a) Write the favorable factors for the formation of Ionic bond.  
(b) Discuss the shape of  $\text{NH}_3$  molecule using VSEPR theory.

Q 26. Density of a gas is found to be  $5.46 \text{ g/dm}^3$  at  $27^\circ\text{C}$  at 2 bar pressure. Calculate the density at STP.

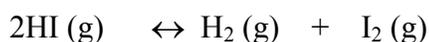
OR

- (a) Explain the physical significance of van der Waals parameter also give their units.  
(b) In terms of Charles's law explain why  $-273^\circ\text{C}$  is the lowest possible temperature?

Q27. What causes the temporary and permanent hardness of water. Discuss the method of softening of hard water by ion exchange method.

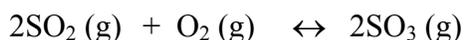
- Q28 (a) write short notes on -:  
(i) common ion effect  
(ii)  $\text{p}^{\text{H}}$   
(iii) Heterogeneous equilibrium

(b) A sample of HI (g) is placed in a flask at a pressure of 0.2 atm. At equilibrium partial pressure of HI (g) is 0.04 atm. What is  $K_p$  for the given equilibrium? reaction



OR

- (a) What are the applications of equilibrium constant.  
(b) Write expression for  $K_c$  for the reaction  
 $\text{CaCO}_3 \text{(s)} \leftrightarrow \text{CaO (s)} + \text{CO}_2 \text{(g)}$   
(c) Discuss the effect of catalyst & addition of inert gas at constant pressure for the reaction



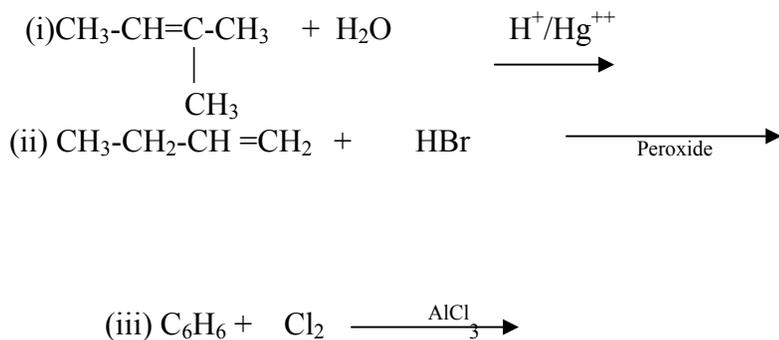
Q29 (a) Write the IUPAC names of the product obtained by the ozonolysis of following compounds

- (i) Hex-2-ene (ii) 2-Ethyl but -1-ene

(b) Why is Wurtz reaction not preferred for alkanes containing odd number of carbon atoms? Illustrate your answer by taking one example

OR

(a) Complete the following equations

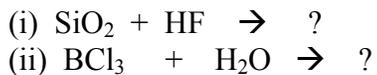


(b) What are the necessary conditions for any system to be aromatic?

Q30. (a) Assign reason for each of the following

- (i) Ga (I) undergoes disproportionation reaction.
- (ii) Anhy.  $\text{AlCl}_3$  used as catalyst
- (iii) Boron is unable to form  $\text{BF}_6^-$  ion explain

(b) Complete the following equation.



OR

(a) Write equation to justify amphoteric nature of Aluminium.

(b) Give reasons :

- (i) Conc  $\text{HNO}_3$  can be stored in Aluminium container
- (ii) Ionization enthalpy decreases from carbon to silicon.
- (iii)  $\text{BCl}_3$  Has Zero Dipole moment

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K.Singh



12	<p>Be does not react with water even at high temperature  <math>\text{Mg} + \text{H}_2\text{O} \rightarrow \text{MgO} + \text{H}_2</math></p> <p>BeO is amphoteric while oxide of other alkaline earth metal are basic in nature  <math>\text{BeO} + 2\text{HCl} \rightarrow \text{BeCl}_2 + \text{H}_2\text{O}</math>  <math>\text{BeO} + 2\text{NaOH} \rightarrow \text{Na}_2\text{BeO}_2 + \text{H}_2\text{O}</math></p>	1  1
13	<p>(i) <math>\text{CH}_3\text{-CH(OH)CH}_3</math></p> <p>(ii) <math>\text{CH}_3\text{-CH}_2\text{-CH}_2\text{-CH}_3 + \text{NaBr}</math></p>	1+1
14	<p>Correct reasons (i) Due to inert pair effect  (ii) trigonal planar structure ( sp<sup>2</sup> hybridization )</p>	1+1
15	<p><math>\text{MnO}_4^- + 8\text{H}^+ + 5\text{e}^- \rightarrow \text{Mn}^{2+} + 4\text{H}_2\text{O} ) \times 2</math></p> <p><math>\text{SO}_2 + 2\text{H}_2\text{O} \rightarrow \text{HSO}_4^- + 3\text{H}^+ + 2\text{e}^- ) \times 5</math></p> <p>.....</p> <p><math>2\text{MnO}_4^- + 5\text{SO}_2 + 2\text{H}_2\text{O} + \text{H}^+ \rightarrow 2\text{Mn}^{2+} + 5\text{HSO}_4^-</math></p>	1/2  1/2  1
16	<p>No. of lines when electron from nth shell drops to ground state = <math>n(n-1)/2</math>  = <math>6(6-1)/2 = 15</math></p> <p>6→5    5→4    4→3    3→2    2→1  6→4    5→3    4→2    3→1  6→3    5→2    4→1  6→2    5→1  6→1</p> <p>5 Lines   4 Lines   3 Lines   2 Lines   1 Lines = 15 Lines</p>	1  1
17	<p><math>\text{O}_2 = \text{KK} \{ \sigma(2s)^2 \sigma^*(2s)^2 \sigma(2p_z)^2 \pi(2p_x)^2 \pi(2p_y)^2 \pi^*(2p_x)^1 \pi^*(2p_y)^1 \}</math></p> <p>Bond Order = 2    Paramagnetic</p> <p><math>\text{O}_2^{2-} = \text{KK} \{ \sigma(2s)^2 \sigma^*(2s)^2 \sigma(2p_z)^2 \pi(2p_x)^2 \pi(2p_y)^2 \pi^*(2p_x)^2 \pi^*(2p_y)^2 \}</math></p> <p>Bond Order = 1    Diamagnetic</p> <p><math>\text{O}_2</math> is more stable than <math>\text{O}_2^{2-}</math> because its bond order is more</p>	1/2  1/2  1/2  1/2
18	(i) Due to low I.E	1+1



24	<p>To determine the volume of H<sub>2</sub>SO<sub>4</sub> used  Volume of acid taken = 100 mL of M/10 H<sub>2</sub>SO<sub>4</sub> = 10 mL of 1M H<sub>2</sub>SO<sub>4</sub></p> <p>Volume of alkali used for neutralization of excess acid ≡ 160 mL of M/10 NaOH = 16 mL of 1M NaOH</p> <p>Now 1 mole of acid neutralizes 2 mole of NaOH  So 16 ml of NaOH ≡ 8 mL of H<sub>2</sub>SO<sub>4</sub></p> <p>Volume of acid used by ammonia = 10 – 8 = 2 mL</p> <p>To determine the percentage of nitrogen  1 mole of H<sub>2</sub>SO<sub>4</sub> neutralizes 2 mole of NH<sub>3</sub>  2 mL of 1M of H<sub>2</sub>SO<sub>4</sub> ≡ 4 mL of 1M NH<sub>3</sub>  but 1000 mL of 1M NH<sub>3</sub> contain Nitrogen = 14 g  Then 4 mL of 1M NH<sub>3</sub> will contain Nitrogen = 14 x 4 /1000 = 0.056g  But this much of amount of nitrogen is present in 0.50 g of the organic compound  Then % of N<sub>2</sub> = (0.056 / 0.5) x100 = 11.2 %</p> <p>Alternate Method:  <math display="block">\% \text{ of N}_2 = \frac{1.4 \times \text{Molarity of acid} \times \text{basicity of acid} \times \text{vol of acid used}}{\text{Mass of substance taken}}</math></p> $\% \text{ of N}_2 = \frac{1.4 \times 1 \times 2 \times 2\text{mL}}{0.50 \text{ g}} = 11.2 \%$	1+1+1
25	<p>(i) Low ionization energy of metal  (ii) High electron gain enthalpy of non metal  (iii) High Lattice enthalpy</p> <p>Shape of ammonia molecule is Pyramidal hybridization is sp<sup>3</sup>, Bond angle is 107°</p>	1½  1½
26	<p>(a) <math>d = MP/RT</math>  At STP Pressure is 1bar and temp is equal to 273K</p> $d_1/d_2 = P_1T_2/P_2T_1$ $d_2 = 5.46 \times 300 \times 1 \text{ bar} / 273 \times 2 \text{ bar}$ $= 3 \text{ gm/ dm}^3$ <p style="text-align: center;"><b>OR</b></p> <p>(a) vander wall parameter a is the measure of</p>	1  1  1  1

	<p>intermolecular forces while b is the measure of effective size of gaseous molecules</p> <p>Unit of a = bar lt<sup>3</sup> mol<sup>-2</sup> Unit of b = lt mol<sup>-1</sup></p> <p>(b) volume of the gas will be zero which is not possible</p>	<p>½ + ½</p> <p>1</p>																					
27	<p>(i) Temporary and permanent hardness is due to presence of bicarbonates chlorides and sulphates of Ca &amp; Mg (ii) Ion exchange resins are giant organic molecules of high molecular masses .These are of two types Cation exchange resin &amp; Anion exchange resin</p> $2R-COO^-H^+ + CaCl_2 \rightarrow (RCOO)_2Ca + 2H^+ + 2Cl^-$ $R-NH_3^+-OH^- + Cl^- \rightarrow R-NH_3^+-Cl^- + OH^-$ $H^+ + OH^- \rightarrow H_2O$	<p>1</p> <p>1</p> <p>1</p>																					
28	<p>(a) (i) Suppression of degree of dissociation of weak electrolyte in presence of similar type of ion is called common ion effect (ii) Negative logarithm of Hydrogen ion concentration is called P<sup>H</sup> (iii) Equilibrium in which reactants and products are in two or more than two phases</p> <p>(b)</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td></td> <td style="text-align: center;">2HI (g)</td> <td style="text-align: center;">↔</td> <td style="text-align: center;">H<sub>2</sub> (g)</td> <td style="text-align: center;">+</td> <td style="text-align: center;">I<sub>2</sub> (g)</td> <td></td> </tr> <tr> <td>Initial pressure</td> <td style="text-align: center;">0.2 atm</td> <td></td> <td style="text-align: center;">0 atm</td> <td></td> <td style="text-align: center;">0 atm</td> <td style="vertical-align: bottom;">½</td> </tr> <tr> <td>At Equilibrium</td> <td style="text-align: center;">0.04 atm</td> <td></td> <td style="text-align: center;">0.16/2 atm = 0.08 atm</td> <td></td> <td style="text-align: center;">0.16/2 atm = 0.08 atm</td> <td></td> </tr> </table> <p>K<sub>p</sub> = P(H<sub>2</sub>) x P(I<sub>2</sub>) / P<sup>2</sup>(HI) = 0.08 x 0.08 / (0.04)<sup>2</sup> K<sub>p</sub> = 4.0</p> <p style="text-align: center;"><b>OR</b></p> <p>Applications of equilibrium constant</p> <p>(i) predicting the extent of reactions (ii) predicting direction of reactions if Q = K the reaction is in equilibrium Q &gt; K reaction will proceed in backward direction Q &lt; K reaction will proceed in forward direction</p> <p>(b) K<sub>c</sub> = ( CO<sub>2</sub> )<sub>g</sub></p> <p>(c) (i) No effect of catalyst</p>		2HI (g)	↔	H <sub>2</sub> (g)	+	I <sub>2</sub> (g)		Initial pressure	0.2 atm		0 atm		0 atm	½	At Equilibrium	0.04 atm		0.16/2 atm = 0.08 atm		0.16/2 atm = 0.08 atm		<p>1</p> <p>1</p> <p>1</p> <p>½</p> <p>½</p> <p>1</p> <p>1+1</p> <p>1</p>
	2HI (g)	↔	H <sub>2</sub> (g)	+	I <sub>2</sub> (g)																		
Initial pressure	0.2 atm		0 atm		0 atm	½																	
At Equilibrium	0.04 atm		0.16/2 atm = 0.08 atm		0.16/2 atm = 0.08 atm																		

	(ii) equilibrium will shift towards backward direction	1+1
29	<p>(a)</p> <p>(i) Ethanal &amp; Butanal</p> <p>(ii) Pentan-2-one &amp; methanal</p> <p>(b) for alkanes containing odd number of carbon atoms a mixture of two alkyl halide has to be used since two alkyl halide can react in three different ways therefore e gives mixture of three alkane.</p> $\text{CH}_3\text{-Br} + \text{Br-CH}_2\text{-CH}_3 \rightarrow \text{CH}_3\text{-CH}_2\text{-CH}_3$ $\text{CH}_3\text{-Br} + \text{Br-CH}_3 \rightarrow \text{CH}_3\text{-CH}_3$ $\text{CH}_3\text{-CH}_2\text{-Br} + \text{Br-CH}_2\text{-CH}_3 \rightarrow \text{CH}_3\text{-CH}_2\text{-CH}_2\text{-CH}_3$ <p style="text-align: center;"><b>OR</b></p> <p>(a) (i) <math>\text{CH}_3\text{-CH}_2\text{C(OH)-CH}_3</math>  <math>\begin{array}{c}   \\ \text{CH}_3 \end{array}</math></p> <p>(ii) <math>\text{CH}_3\text{-CH}_2\text{-CH}_2\text{-CH}_2\text{Br}</math></p> <p>(iii) </p> <p>(b) (i) it should have a single cyclic cloud of delocalized pi electrons above and below the plane of the molecule</p> <p>(ii) It should be planar</p> <p>(iii) it should have 2,6,10,14 pi electrons</p>	<p>1</p> <p>1</p> <p>3</p> <p>1</p> <p>1</p> <p>1</p> <p>2</p>
30	<p>(a) (i) Because its +3 oxidation state is more stable</p> $\text{Ga}^+ \rightarrow \text{Ga} + \text{Ga}^{+3}$ <p>(ii) It is a lewis acid</p> <p>(iii) Due to absence of d orbital</p> <p>(b) (i) <math>\text{H}_2\text{SiF}_6</math></p> <p>(ii) <math>\text{H}_3\text{BO}_3 + 3\text{HCl}</math></p> <p style="text-align: center;"><b>OR</b></p> <p>(a) <math>2\text{Al} + 6\text{HCl} \rightarrow 2\text{Al}^{3+} + 6\text{Cl}^- + 3\text{H}_2</math></p> $\text{Al} + 2\text{NaOH} \rightarrow \text{Na}_2\text{AlO}_2 + \text{H}_2$ <p>(b) (i) It forms aluminium oxide on the surface so Al become passive</p> <p>(ii) Due to increase in Size</p> <p>(iii) due to trigonal planar geometry</p>	<p>1+1+1</p> <p>1+1</p> <p>1+1</p> <p>1+1+1</p>

# SAMPLE QUESTION PAPER (III)

Class – XI

SUB :-

CHEMISTRY

M.M. 70

Max Time 3hrs

General Instructions :

All Questions are Compulsory.

- (i) Q.No 1 to 5 are very short answer questions, carrying 1 mark each. Answer them in about one Sentence.
- (ii) Q. no. 6 to 12 are short answer questions, carrying 2 marks each. Answer them in about 30 words.
- (iii) Q. no. 13 to 24 are short answer questions of 3 marks each. Answer them in about 40 words.
- (iv) Q. no. 25 to 27 are long answer questions of 5 marks each. Answer them in above 70 words.
- (v) Use log tables if necessary.

1. Calculate the amount of  $\text{CO}_2$  produced when 1 mole of carbon is burnt in 16 g of dioxygen.

2. what are pesticides ?

3. Will Water boil at higher temperature at sea level or at the top of the mountain ?

4. Give an example of basic Buffer.

5. Write the electronic configuration of divalent ion of copper.

6. Write one chemical reaction to show the amphoteric nature of water.

7. Why is LiF insoluble in water?

8. Name the method which can be used to separate two compounds with different solubilities.

9.  $\text{CaCO}_3$  reacts with aq HCl to give  $\text{CaCl}_2$  &  $\text{CO}_2$  according to reaction



(ii) What mass of  $\text{CaCO}_3$  is required to completely react with 25ml of 0.75M HCl.

10. (i) Select from the group of special which of them has smallest atomic Radi  $\text{O} \cdot \text{O}^{-1}$  &  $\text{O}^{-2}$ .

(ii) Calculate the Oxidation state and covalent of Al in  $[\text{Al}(\text{H}_2\text{O})_5\text{Cl}]^{+2}$

11. Why Beryllium and magnesium have low electron gain enthalpy.

Or

Explain how various spectral line are produced when electric discharge is passed though gaseous hydrogen.?

12. (i) What are the possible value of 'm' for 3d orbital?

(ii) Calculate the no. of electrons in  $\text{H}_2^+$  ion.

13. (i) write reaction involved in water gas shift reaction.

(ii) give one example each of ionic and covalent hydride.

14. The mobilities of alkali metal ion in aq solution follow the order  $\text{Li}^+ < \text{Na}^+ < \text{Rb}^+ < \text{Cs}^+$ . Why?

15. Explain:

(i) Alkali metal impart characteristic colour to the flame.

(ii) Why Beryllium shows anomalous behavior.

16.(i)  $\text{B}(\text{OH})_3$  is acid or base & why?

(ii) Aluminium forms  $[\text{AlF}_6]^{3-}$  While Boron does not form  $[\text{BF}_6]^{3-}$  why?

17. How will you account for lower atomic radii of Ga as compared to Al?

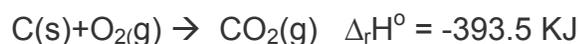
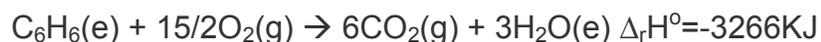
18. What is green chemistry?

19. A photon of wave length  $4 \times 10^{-7} \text{m}$  strikes on a metal surface, the work function of metal being 2.13eV calculate (i) energy of photon in eV (ii) K.E. of emission (iii) Velocity of photo electron  
( $1 \text{eV} = 1.6020 \times 10^{-19} \text{J}$ ).

20. Explain why ?

- (a) Liquids like ether and acetone are kept in cool places.
- (b) Why is it not possible to cool gas at 0 K?
- (c) Which type of intermolecular forces exist between two non polar molecules?

21. Calculate the Enthalpy of formation of Benzene using the following data.

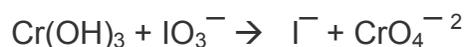


22.(i) Predict the sign of Entropy Change for  $\text{I}_2(\text{g}) \rightarrow \text{I}_2(\text{s})$

(ii) Evaporation of water though endothermic is spontaneous, Why ?

(iii) Express the change in internal Energy of the system when no heat is absorbed but work is done. What type of wall the system has ?

23. Balance the Equation in basic medium by ion electron method.



24. (a) What happens when?

- (i) Borax is heated
- (ii) Silicon dioxide is treated with Hydrogen fluoride
- (b) Identify  $\text{PbO}_2$  as Acidic, basic or amphoteric.

25. What happens when?

- (i) Propene Undergoes Ozonolysis
- (ii) Benzene is alkylated in presence of anhy  $\text{AlCl}_3$

(iii) Ethyl alcohol is heated in presence of  $\text{H}_2\text{SO}_4$  at 443k.

26. Draw various resonating structures of Benzaldehyde & show its directive influence.

27. (i) Give bond line notation of Hexan-1,6-dial.

(ii) Out of cis and trans 2,3-dichlorobut-2-ene which is more polar and why?

(iii) Why is nitric acid added to sodium extract before adding silver nitrate for testing halogen?

28. (i) What is meant by hybridization of atomic orbital? Discuss

Hybridization in case of Ethylene molecule.

(ii) Calculate the bond order in case of  $\text{N}_2^+$

OR

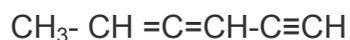
(a) Name the hybrid orbitals used by carbon atom in the following molecule  $\text{CH}_3\text{-CHO}$ .

(b) What are Lewis bases. Give example

(c) Bond angle of water is less than ammonia. Why?

(d)  $\text{BeH}_2$  has a zero dipole moment although Be-H bond is polar?

(e) Calculate total no. of sigma and pi bonds in



29. Calculate the  $\text{pH}$  of 0.3 g of NaOH in 200 ml of solution.

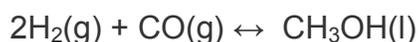
(ii) Which indicator will be more suitable for the acid-base titration of  $\text{NH}_4\text{OH}$  &  $\text{HNO}_3$ .

(iii) Predict in the reaction what will be present in the greater amount (Reactant or Product) at equilibrium.



Or

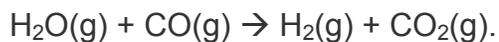
(a) Describe the effect of removal of  $\text{CH}_3\text{OH}$  on the equilibrium of the reaction



(b) Calculate the solubility of  $\text{AgCl}(\text{s})$  in pure water at  $25^\circ\text{C}$  :

$$K_{sp} \text{ AgCl} = 2.8 \times 10^{-10}$$

(c) One mole of  $\text{H}_2\text{O}$  & one mole of  $\text{CO}$  are taken in 1L Vessel & is heated to 720K. At Equilibrium 40% water by mass reacts with  $\text{CO}$  according to Equation.



calculate the equilibrium Constant for the reaction .

30. (i) How will you convert Ethyne to Benzene?  
(ii) Define cracking.  
(iii) Why is Benzene stable although it contains three double bonds?  
(iv) What type of isomerism exist between ethyl alcohol and diethyl ether?  
(v) The boiling point of Alkanes decreases with branching.

OR

- (a) How will you convert Benzene to :-  
(i) p-nitro, Bromobenzene  
(ii) p-nitrotoluene  
(iii) Acetophenone
- (b) Why does Benzene undergoes electrophilic substitution reactions easily and nucleophilic substitution with difficulty?

## Sample Question Paper (III)

### Marking scheme XI

#### CHEMISTRY

1.  $C + O_2 \rightarrow CO_2$  : 32g  $O_2$  gives – 44g  $CO_2$  so 16g will give 22g of  $CO_2$

1

2. those chemical which are used to destroy pests like rats, Parasites & fungi are

called pesticides

1

3. At sea level where pressure is high

1

4. Mixture of  $NH_4Cl$  &  $NH_4 OH$ .

1

5.  $3d^9$

1

6.  $H_2O + H_2O \rightarrow H_3O^+ + OH^-$

1

7. Due to covalent character

1

8. Crystallization

1

9. Acc<sup>n</sup> to Equation 100g  $CaCO_3$  react with 73 g HCl Amount of HCl in 25ml of

$$0.75M = 0.75 \times 36.5 \times 25 / 1000 = 0.6844$$

1

2mol Hcl = 2x 36.5 g of HCl react with 100g  $CaCO_3$

Than 0.6844 g of HCl will react completally with  $CaCO_3$

$$= 100 \times 0.6844 / 73$$

$$= 0.938 \text{ g}$$

1

10. (i) O

1

(ii) +3

1

11. . Due to extra stability of fulfilled orbital Be –  $2S^2$ , Mg –  $3S^2$  , they have no tendency to gain electron  
2

OR

$H_2$  gas when taken in a discharge tube undergoes dissociation & for no of H atom with 1 e<sup>-</sup> in its Valence shell which are excite to  $n = 2,3,4$  for a short while & they revert to various level they form spectral lines.  
2

12(i) -2,-1,0,+1,+2  
1

(ii) One  
1

13.  $CO + H_2O \rightarrow CO_2 + H_2$   
1

LiH &  $NH_3$

$\frac{1}{2} + \frac{1}{2}$

14. smaller ion due to high charge density tend to undergo hydration. Hydration Inc the mass & the effective size also increases & thus it follow this Order.  
2

15. (i) flame of Bunsen Burner excites the e<sup>-</sup> from lower to higher energy & while

coming back they give a complementary colour.

(ii) small size high electronegativity

1+1

16. (i) Acid & it gives  $H^+$  ion

$\frac{1}{2} + \frac{1}{2}$

(ii) due to absence of d-orbital.  
1

17. It is attributed to presence of ten elements in the first transition series which has e- in the d Orbital & due to lesser screening effect which cant counter effective number charge size is smaller.

2

18. The branch of chemistry that emphasizes on the process and product that reduces & eliminate the use and generation of toxic & hazardous Substance is called green Chemistry.

2

19. . work function =  $2.13 \times 1.6020 \times 10^{-19} \text{J} = 3.14 \times 10^{-19} \text{J}$

1

energy of photon =  $h \nu = \frac{6.626 \times 10^{-34} \times 10^8}{4 \times 10^{-7}} = 4.97 \times 10^{-19} \text{J}$

or 3.10 e. v.

K.E of Emission =  $E_{\text{photon}} - w : 4.97 \times 10^{-19} = 1.56 \times 10^{-19} \text{J}$  or

1

$3.10 - 2.13 = .97 \text{ev}$

K.E =  $\frac{1}{2} m v^2$  or  $v = \sqrt{2 \times 1.56 \times 10^{-19}}$

1

$9.1 \times 10^{-31}$

20. (i) because these are highly volatile

1

(ii) It's volume will become zero which is not possible

1

(iii) Dispersion forces

1

21. . Multiply Equation

(ii) by 6 , Multiply (iii) by 3 Add & Subtract Equation (i) From it (1 for each step)

$\Delta H = 49.4 \text{KJ}$

22. (i) Negative

1

(ii) Standard free energy change is negative due to increase in Entropy  
1

(iii) Adiabatic Wall  
1

23. Oxidation half reaction  
1

Reduction half reaction  
1

Final Equation  $2 \text{Cr}(\text{OH})_3 + 4\text{OH}^- + \text{IO}_3^- \rightarrow 2\text{CrO}_4^{2-} + \text{I}^- + 5\text{H}_2\text{O}$   
1

24(i)  $\text{Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O} \rightarrow \text{Na}_2\text{B}_4\text{O}_7 \rightarrow \text{NaBO}_2 + \text{B}_2\text{O}_3$   
1

(ii)  $\text{SiO}_2 + 4\text{HF} \rightarrow \text{SiF}_4 + 2\text{H}_2\text{O}$   
1

(iii)  $\text{PbO}_2$  is a Amphoteric Oxide  
1

25. (i)  $\text{CH}_3\text{CHO}$  &  $\text{HCHO}$  are formed.  
1

(ii) Toluene is formed  
1

(iii) Ethene is formed  
1

26. Resonating structure of benzaldehyde  
2

meta directing influence  
1

27. (i) Bond line notation.

1

(ii) cis-dichloro but-2en

1

(iii) (ii) if N & S are also present in S. E. they will form

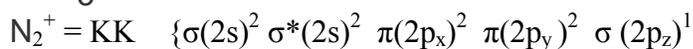


1



28. . Diagram

3



$$\text{Bond order} = \text{Nb} - \text{Na} / 2$$

$$= (7-2) / 2 = 2.5$$

2

OR

(i)  $\text{SP}^3 - \text{SP}^2$

1

(ii) Electron donor Equation  $\text{NH}_3$

1

(iii) Lone. Pair in water  $\text{L-P-LP} > \text{B.P. LP}$

1

(iv) Be -H Bond although polar , Dipole moment, Vector quantity cancels each other.

1

(v) 11 Sigma 4  $\pi$  bonds.

1

29. . (i)  $0.3 \times \frac{1}{40} = .0375 \text{mol L}^{-1}$

$$40 \times .2$$

1

$$\text{pOH} = -\log[3.75 \times 10^{-2}]$$

$$= 1.426$$

1

$$\text{pH} = 14 - 1.426 = 12.574$$

1

(ii) Methyl Orange / Red

1

(iii) Greater amount of Product as  $K_c$  is Larger.

1

OR

(i) Reaction will move in forward direction.

1

(ii)  $[Ag^+] = [Cl^-] = S$ ,  $K_{sp} = S^2$

$$S = \sqrt{K_{sp}} = \sqrt{2.8 \times 10^{-10}} = 1.673 \times 10^{-5} \text{ mol L}^{-1}$$

1+1

(iii)  $K_c = 0.4 \times 0.4 / 0.6 \times 0.6$

1

$$= 2.25$$

1

30. (i)  $C_2H_2$  -----red hot tube/ heat----- $\rightarrow$   $C_6H_6$

1

(ii) The thermal decomposition of higher hydrocarbon into lower hydrocarbon is called cracking.

1

(iii) Due to delocalization of pi electron.

1

(iv) Functional isomerism.

1

(v) Vanderwall forces decrease on branching.

1

OR

(a) Correct conversions

3

(b) Correct reason

2