# 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 $NH_3$.

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

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.

   $Na\underline{B}H_4$

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
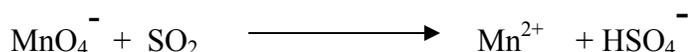         chemically ( Give equations).


Q 13. Complete the following reactions.
        (a) $CH_3-CH=CH_2 + H_2O \xrightarrow{\quad HgSO_4 /H+ \quad}$    ?

        ( b) $CH_3-CH_2-Br + Na \xrightarrow{\quad Ether \quad}$    ?

Q 14. Explain Why ?
        (a) Pb (IV) is less stable than Pb (II).
        (b) $BCl_3$ Molecule has Zero dipole moment.

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

        $MnO_4^- + SO_2 \longrightarrow Mn^{2+} + HSO_4^-$

Q 16. What is the maximum number of emission lines obtained when the exited 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) $O_2$, (ii) $O_2^{2-}$

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 $Co^{+3}$. & 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 preassure. The enthalpies of formation of $CO_2$, $H_2O$ &
        $C_2H_4$ are -393.5,-241.8  & +52.4 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 $H_2SO_4$ .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 $NH_3$ molecule using VSEPR theory.

                                        .
Q 26.  Density of a gas is found to be 5.46 g/dm$^3$ at 27°C at 2 bar pressure . calculate the density at STP.
                                    OR
    (a)  Explain the physical significance of van dar waals parameter also give their units.
    (b)  In terms of Charle's law explain why  -273°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) $P^H$
                (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 Kp for the given equilibrium? reaction
                        2HI (g)      ↔ $H_2$ (g)   +   $I_2$ (g)
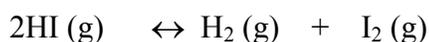
                                OR

    (a)  What are the application of equilibrium constant.
    (b)  Write expression for Kc for the reaction
         $CaCO_{3 (s)}$ ↔ $CaO_{(s)}$  + $CO_{2(g)}$
    (c)  Discuss the effect of catalyst  & addition of inert gas at constant pressure for the reaction

        $2SO_2$ (g)  + $O_2$ (g)   ↔  $2SO_3$ (g)
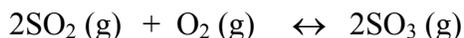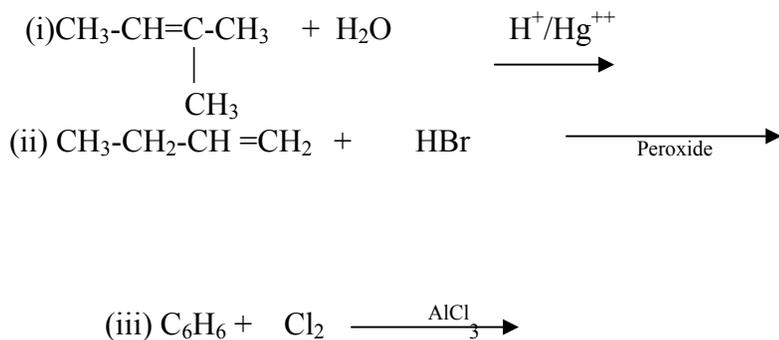
    Q29 (a) Write the IUPAC names of the product obtained by the ozonolysis of following compounds
                (i) Hex-2-ene            (ii) 2-Ethyl but –1-ene

(b) Why is Wurtz reactionnot preferred for alkanes containing odd number of carbon aatoms ? Illustrate your answer by taking one example

OR

(a) Complete the following equations

(i) $CH_3-CH=C-CH_3 \ + \ H_2O \qquad \xrightarrow{H^+/Hg^{++}}$
$\qquad\qquad |$
$\qquad\qquad CH_3$

(ii) $CH_3-CH_2-CH=CH_2 \ + \qquad HBr \qquad \xrightarrow{\text{Peroxide}}$
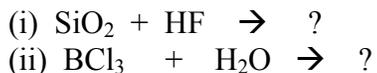
(iii) $C_6H_6 + \quad Cl_2 \qquad \xrightarrow{AlCl_3}$

(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. $AlCl_3$ used as catalyst
(iii) Boron is unable to form $BF_6^-$ ion explain

(b) Complete the following equation.

(i) $SiO_2 + HF \ \rightarrow \ ?$
(ii) $BCl_3 \ + \ H_2O \ \rightarrow \ ?$

OR

(a) Write equation to justify amphoteric nature of Aluminium.
(b) Give reasons :
(i) Conc $HNO_3$ can be stored in Aluminium container
(ii) Ionization enthalpy decreases from carbon to silicon.
(iii) $BCl_3$ Has Zero Dipole moment

_____K.Singh__

# Sample Question Paper (I)
## Marking scheme XI
### CHEMISTRY

| 1 | 3s | 1 |
|---|---|---|
| 2 | $Nm^{-1}$ | 1 |
| 3 | Physical and chemical properties of elements are the periodic function of their atomic number. | 1 |
| 4 | 2,Methyl-propan-2ol | 1 |
| 5 | $NH_4^+$ & $NH_2^-$ | 1 |
| 6 | $\Delta G^0 = -RT \ln K$ | 1 |
| 7 | Pent-2-en | 1 |
| 8 | +3 | 1 |
| 9 | It is the Enthalpy change when One electron is added to isolated gaseous neutral atom.<br>Both refer to the tendency of the atom of an element to attract electron but electron gain enthalpy is the tendency of an atom to accept an additional electron to form negative ion while electro negativity is the tendency of an atom to attract the shared pair of electron towards itself in a covalent bond. | 1+1 |
| 10 | 1) Size of the atom<br>2) Screening effect | 1+1 |
| 11 | Entropy is the measure of randomness of the system<br>The enthalpy of combustion of a substance is defined as the heat change when one mole of substance is completely oxidized in air<br><div align="center">**OR**</div><br>The total amount of heat absorbed or evolved in a reaction is same wheather the reaction takes place in one step or in number of steps.<br><br>When carbon burns to form carbon dioxide directly in one step 393.5 kj mol$^{-1}$ of heat produced.<br>$C + O_2 \rightarrow CO_2$   $\Delta H = -393.5$ kj mol$^{-1}$ k<br>While<br>(i) $C + \frac{1}{2} O_2 \rightarrow CO$   $\Delta H = -110.5$ kj mol$^{-1}$ k<br>(ii) $CO + \frac{1}{2} O_2 \rightarrow CO_2$   $\Delta H = -283.0$ kj mol$^{-1}$ k<br>sum of (i) & (ii) is same (-393.5 kj mol$^{-1}$ k) when the reaction takes place directly in one step | 1+1<br><br><br><br>1<br><br><br>1 |

| | | |
|---|---|---|
| 12 | Be does not react with water even at high temperature <br> $Mg + H_2O \rightarrow MgO + H_2$ <br><br> BeO is amphoteric while oxide of other alkaline earth metal are basic in nature <br> $BeO + 2HCl \rightarrow BeCl_2 + H_2O$ <br> $BeO + 2NaOH \rightarrow Na_2BeO_2 + H_2O$ | 1 <br><br><br><br> 1 |
| 13 | (i) $CH_3\text{-}CH(OH)CH_3$ <br><br> (ii) $CH_3\text{-}CH_2\text{-} CH_2\text{-}CH_3 + NaBr$ | 1+1 |
| 14 | Correct reasons (i) Due to inert pair effect <br> (ii) trigonal planner structure ( sp2 hybridization ) | 1+1 |
| 15 | $MnO_4^- + 8H^+ + 5e^- \rightarrow Mn^{2+} + 4H_2O$ ) x2 <br><br> $SO_2 + 2H_2O \rightarrow HSO_4^- + 3H^+ + 2e^-$ ) x5 <br> ……………………………………………………… <br> $2MnO_4^- + 5 SO_2 + 2H_2O + H^+ \rightarrow 2Mn^{2+} + 5 HSO_4^-$ | ½ <br><br> ½ <br><br><br> 1 |
| 16 | No. of lines when electron from nth shell drops to ground state = n(n-1) /2 <br> = 6(6-1) /2 = 15 <br> 6→5   5→4   4→3   3→2   2→1 <br> 6→4   5→3   4→2   3→1 <br> 6→3   5→2   4→1 <br> 6→2   5→1 <br> 6→1 <br> 5 Lines   4 Lines   3 Lines   2 Lines   1 Lines   = 15 Lines | 1 <br><br> 1 |
| 17 | $O_2 = KK \quad \{\sigma(2s)^2 \ \sigma^*(2s)^2 \ \sigma (2p_z)^2 \ \pi(2p_x)^2 \ \pi(2p_y)^2 \quad \pi^*(2p_x)^1$ <br> $\pi^*(2p_y)^1 \}$ <br><br> Bond Order = 2    Paramagnetic <br><br> $O_2^{2-} = KK \quad \{\sigma(2s)^2 \ \sigma^*(2s)^2 \ \sigma (2p_z)^2 \ \pi(2p_x)^2 \ \pi(2p_y)^2 \quad \pi^*(2p_x)^2$ <br> $\pi^*(2p_y)^2 \}$ <br><br> Bond Order = 1    Diamagnetic <br><br> $O_2$ is more stable than $O_2^{2-}$ because its bond order is more | ½ <br><br><br> ½ <br><br><br> ½ <br><br><br> ½ |
| 18 | (i) Due to low I.E | 1+1 |

| | | |
|---|---|---|
| | (ii) Due to solubility of pott. Bicarbonate | |
| 19 | (i) $M = W_B \times 1000 / M_B \times$ vol. of solution<br>$= 2.52 \times 1000 / 126 \times 250$<br>$= 0.08$ M<br>(ii) (a) $3.29 \times 10^3$ (b) 0.0326 | 1 + 1<br><br><br>½ + ½ |
| 20 | (i) No two electrons in an atom can have same value for all four quantum numbers<br>(ii) Electronic configuration $= [Ar] 3d^6$<br>no. of unpaired electron -4 | 1<br><br>1 + 1 |
| 21 | (i) $C_{(s)} + O_{2(g)} \rightarrow CO_{2 (g)}$ $\Delta H = -393.5$ kj mol$^{-1}$<br>(ii) $H_{2 (g)} + ½ O_{2(g)} \rightarrow H_2O_{(g)}$ $\Delta H = -241.8$ kj mol$^{-1}$<br>(iii) $C_{(s)} + H_{2 (g)} \rightarrow$ $C_2H_{4(g)}$ $\Delta H = +52.3$ kj mol$^{-1}$<br><br>Our aim is<br>$C_2H_{4(g)} + 3O_{2(g)} \rightarrow 2 CO_{2 (g)} + 2H_2O_{(g)}$ $\Delta H = ?$<br><br>2 x eq (i) +2 x eq (ii) – eq (iii) gives<br><br>$C_2H_{4(g)} + 3O_{2(g)} \rightarrow 2 CO_{2 (g)} + 2H_2O_{(g)}$<br>$\Delta H = 2(-393.5) + 2(-241.8) -52.3$<br>$= 1322.9$ kj / mol | 1<br><br><br><br><br>1<br><br><br><br>1 |
| 22 | (a) Because it combines with hemoglobin to form oxy-hemoglobin while $CO_2$ does'nt<br>(b) Due to high level of the oxides of sulphur and nitrogen so the monuments slowly eaten away and marble gets lustreless<br>(c) Methyl iso cyanide & Biochemical oxygen demand | 1<br><br>1<br><br><br>½ + ½ |
| 23 | (i)Electrophiles are the positively charged or electron deficient species<br><br>$AlCl_3$ $NO_2^+$<br>(ii) compounds having same molecular formula but differ in the position of functional group.<br><br><br>$CH_3$-CH(OH)-$CH_3$ & $CH_3$-$CH_2$-$CH_2$-OH | 1½<br><br><br><br>1½ |

| 24 | To determine the volume of $H_2SO_4$ used | 1+1+1 |
|----|----|----|
| | Volume of acid taken = 100 mL of M/10 $H_2SO_4$ = 10 mL of 1M | |
| | $\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad$ $H_2SO_4$ | |
| | Volume of alkali used for neutralization of excess acid ≡≡ 160 mL of | |
| | M/10 NaOH = 16 mL of1M NaOH | |
| | Now 1 mole of acid neutralizes 2 mole of NaOH | |
| | So 16 ml of NaOH ≡ 8 mL of $H_2SO_4$ | |
| | Volume of acid used by ammonia = 10 – 8 = 2 mL | |
| | To determine the percentage of nitrogen | |
| | 1 mole of $H_2SO_4$ neutralizes 2 mole of $NH_3$ | |
| | 2 mL of 1M of $H_2SO_4$ ≡ 4 mL of 1M $NH_3$ | |
| | but 1000 mL of 1M $NH_3$ contain Nitrogen = 14 g | |
| | Then 4 mL of 1M $NH_3$ 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 $N_2$ = (0.056 / 0.5) x100 = 11.2 % | |
| | | |
| | Alternate Method: | |
| | $\qquad\qquad$ 1.4 x Molarity of acid x basicity of acid x vol of acid used | |
| | % of $N_2$ = ------------------------------------------------------------------------ | |
| | $\qquad\qquad\qquad\qquad\qquad\qquad$ Mass of substance taken | |
| | | |
| | $\qquad\qquad$ 1.4 x 1 x 2 x 2mL | |
| | % of $N_2$ = ------------------------- $\qquad$ = 11.2 % | |
| | $\qquad\qquad\qquad$ 0.50 g | |
| | | |
| 25 | $\qquad\qquad\qquad$ (i) Low ionization energy of metal | 1½ |
| | $\qquad\qquad\qquad$ (ii) High electron gain enthalpy of non metal | |
| | $\qquad\qquad\qquad$ (iii) High Lattice enthalpy | |
| | | |
| | $\qquad\qquad$ Shape of ammonia molecule is Pyramidal hybridization is | |
| | sp3, Bond angle is $107^0$ | 1½ |
| 26 | (a) d =MP/RT | |
| | $\qquad$ At STP Preassure is 1bar and temp is equal to 273K | 1 |
| | | |
| | $\qquad$ $d_1/d_2$ = $P_1T_2/P_2T_1$ | 1 |
| | $\qquad$ $d_2$ = 5.46 x 300 x 1 bar / 273 x 2 bar | |
| | $\qquad\qquad$ = 3 gm/ dm3 | 1 |
| | | |
| | $\qquad\qquad\qquad\qquad$ **OR** | 1 |
| | $\qquad$ (a) $\qquad$ vander wall parameter a is the measure of | |

| | | |
|---|---|---|
| | intermolecular forces while b is the measure of effective size of gaseous molecules | |
| | Unit of a = bar lt$^3$ mol$^{-2}$<br>Unit of b = lt mol$^{-1}$ | ½ + ½ |
| | (b) volume of the gas will be zero which is not possible | 1 |
| 27 | (i) Temporary and permanent hardness is due to presence of bicarbonates chlorides and sulphates of Ca & Mg<br>(ii) Ion exchange resins are giant organic molecules of high molecular masses .These are of two types<br>Cation exchange resin & Anion exchange resin | 1 |
| | $2R\text{-}COO^-H^+ + CaCl_2 \rightarrow (RCOO)_2Ca + 2H^+ + 2Cl^-$ | 1 |
| | $R\text{-}NH_3^+\text{-}OH^- + Cl^- \rightarrow R\text{-}NH_3^+\text{-}Cl^- + OH^-$ | 1 |
| | $H^+ + OH^- \rightarrow H2O$ | |
| 28 | | 1 |
| | (a)  (i) Suppression of degree of dissociation of weak electrolyte in presence of similar type of ion is called common ion effect | 1 |
| | (ii)Negative logarithm of Hydrogen ion concentration is called P$^H$ | 1 |
| | (iii) Equilibrium in which reactants and products are in two or more than two phases | |
| | (b)<br>           2HI (g)    $\leftrightarrow$    H$_2$ (g)  +    I$_2$ (g)<br>Initial preassure   0.2 atm        0 atm        0 atm<br>At Equilibrium    0.04 atm      0.16/2 atm    0.16/2 atm<br>                                = 0.08 atm    = 0.08 atm | ½ |
| | $Kp = P(H_2) \times P(I_2) / P^2(HI)$<br>    = 0.08 x0.08 / (0.04)$^2$<br>  Kp  = 4.0 | ½<br>1 |
| | **OR**<br>Applications of equilibrium constant<br>    (i)    predicting the extent of reactions<br>    (ii)   predicting direction of reactions<br>    if Q = K the reaction is in equilibrium<br>    Q > K reaction will proceed in backward direction<br>    Q < K reaction will proceed in forward direction | 1+1 |
| | (b) Kc = ( CO$_2$ )g | 1 |
| | (c) (i)No effect of catalyst | |

| | | |
|---|---|---|
| | (ii) equilibrium will shift towards backward direction | 1+1 |
| 29 | (a)<br>(i) Ethanal & Butanal<br>(ii)Pentan-2-one & methanal<br>(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 therefor e gives mixture of three alkane.<br>$CH_3$-Br + Br-$CH_2$-$CH_3$ → $CH_3$--$CH_2$-$CH_3$<br>$CH_3$-Br + Br -$CH_3$ → $CH_3$ -$CH_3$<br>$CH_3$-$CH_2$-Br + Br-$CH_2$-$CH_3$ → $CH_3$-$CH_2$-$CH_2$-$CH_3$<br><br>**OR**<br><br>  (a) (i) $CH_3$-$CH_2$C(OH)-$CH_3$<br>                         \|<br>                     $CH_3$<br>    (ii) $CH_3$-$CH_2$- $CH_2$ - $CH_2$Br<br>    (iii)<br><br>    (b) (i) it should have a single cyclic cloud of delocalized pi electrons above and below the plane of the molecule<br>       (ii) It should be planner<br>       (iii) it should have 2,6,10,14 pi electrons | 1<br>1<br><br>3<br><br><br><br><br><br>1<br><br>1<br><br><br>1<br><br><br><br>2 |
| 30 |     (a) (i) Because its +3 oxidation state is more stable<br>     $Ga^+$ → Ga + $Ga^{+3}$<br>      (ii) It is a lewis acid<br>      (iii) Due to absence of d orbital<br>    (b) (i) $H_2SiF_6$<br>      (ii) $H_3BO_3$ + 3HCl<br><br>                **OR**<br>  (a) 2Al + 6HCl → 2$Al^{3+}$ + 6$Cl^-$ + 3 $H_2$<br>     Al + 2NaOH → $Na_2AlO_2$ + $H_2$<br><br>  (b) (i) It forms aluminium oxide on the surface so Al become passive<br>      (ii) Due to increase in Size<br>      (iii) due to trigonal planner geometry | 1+1+1<br><br><br><br>1+1<br><br><br><br><br>1+1<br><br><br>1+1+1 |

# 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 30words.
   (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 $CO_2$ 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.  $C_aCO_3$ reacts with aq Hcl to give $Cacl_2$ & $co_2$ according to reaction

(i) $CaCO_3$ (s) + 2Hcl(aq)-> $CaCl_2$(aq)+$CO_2$(g) + $h2O$(l)

(ii) What mass of $CaCO_3$ 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 $O \cdot O^{-1}$ & $O^{-2.}$

(ii) Calculate the Oxidation state and covalent of Al in $[Al(H_2O)_5 Cl]^{+2}$

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 $H_2^+$ 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 $Li^+<Na^+<Rb^+ <Cs^+$.Why?

15. Explain:

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

(ii) Why Beryllium shows anamolous behavior.

16.(i) B(OH)3 is acid or base & why?

(ii)Aluminium forms $[AlF_6]^{3-}$ While Boron does not form $[BF_6]^{3-}$ 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 wane length 4 x10$^{-7}$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

(1ev = 1.6020 x 10$^{-19}$ 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 O K?

(c) Which type of intermolecular forces exist between two non polar molecules?

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

$C_6H_6(e) + 15/2O_2(g) \rightarrow 6CO_2(g) + 3H_2O(e)$ $\Delta_rH^\circ$=-3266KJ

$C(s)+O_2(g) \rightarrow CO_2(g)$ $\Delta_rH^\circ$ = -393.5 KJ

$H_2(g + \frac{1}{2} O_2(g) \rightarrow H_2O(l)$ $\Delta_rH^\circ$ = -286KJ.
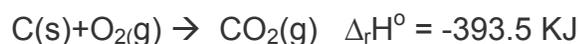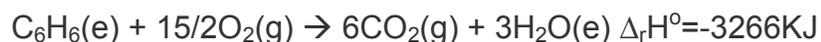
22.(i) Predict the sign of Entropy Change for $I_2(g) \rightarrow I_2(s)$

(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.

$Cr(OH)_3 + IO_3^- \rightarrow I^- + CrO_4^{-2}$
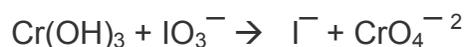
24. (a) What happens when?

(i) Borax is heated

(ii) Silicon dioxide is treated with Hydrogen fluoride

(b) Identify $PbO_2$ as Acidic, basic or amphoteric.

25. What happens when?

(i) Propene Undergoes Ozonlysis

(ii) Benzene is alkylated in presence of anhy $AlCl_3$

(iii)Ethyl alcohol is heated in presence of $H_2 SO_4$ at 443k.

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

27. (i) Give bond line notation of Hexan1,6 dial.

(ii) Out of cis and trans 2,3 dichloro but-2en 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 $N_2^+$

OR

(a) name the hybrid Orbitals used by carbon atom in the following molecule $CH_3$-CHO.

(b) What are Lewis Bases. Give example

(c) Bond Angle of water is less than Ammonia Why?

(d) $BeH_2$ has a Zero dipole moment although Be-H Bond is polar?

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

$CH_3$- CH =C=CH-C≡CH
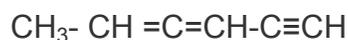
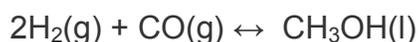29. Calculate the $P^H$ of 0.3 g of NaOH in 200ml of Solution.

(ii) Which Indicator will be more suitable for the acid – base titration of? $NH_4OH$ & $HNO_3$.

(iii) Predict in the reaction what will be Present in the greater amount (Reactant or Product) at Equilibrium.
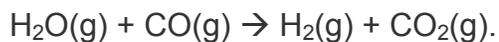
$Cl_2(g)$ + 2NO(g) → 2NOCl(g)   Kc = $3.7x10^8$.

Or

(a) Describe the effect of removal of $CH_3OH$ on the equilibrium of the reaction

$2H_2(g)$ + CO(g) ↔ $CH_3OH(l)$

(b) Calculate the solubility of AgCl(s) in pure water at $25^{0C}$ :

Ksp AgCl = $2.8 \times 10^{-10}$

(c) One mole of $H_2O$ & one mole of CO are taken in 1L Vessel & is heated to 720K. At Equilibrium 40% water by mass reacts with CO according to Equation.

$$H_2O(g) + CO(g) \rightarrow H_2(g) + CO_2(g).$$

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 electrophillic substitution reactions easily and nucleophillic 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.  $Acc^n$ to Equation 100g $CaCO_3$ react with 73 g HCl Amount of HCl in 25ml of

0.75M = 0.75 x36.5 x 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 x 0.6844/ 73

= 0.938 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– 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$_3$

½ + ½

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- from lower to higher energy & while

coming back they give a complementary  colour.

(ii) small size high electronagativity

1+1

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

½ + ½

(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 = $2.13 \times 1.6020 \times 10^{-19}$ J = $3.14 \times 10^{-19}$ J

1

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

                 or 3.10 e. v.

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

1

3.10 -2.13=.97ev

K.E = $\frac{1}{2}$ m $v^2$ or v = $\sqrt{\dfrac{2 \times 1.56 \times 10^{-19}}{9.1 \times 10^{-31}}}$

1

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 & Substract Equation (i) From it    (1 for each step)

$\Delta H$ = 49.4KJ

22. (i) Negative

1

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

(iii) Adiabatic Wall
1


23. Oxidation half reaction
1

Reduction half reaction
1

Final Equation $2 Cr(OH)_3 + 4OH + IO_3^- \rightarrow 2CrO_4^{-2} + I + 5H_2O$
1


24(i) $Na_2 B_4O_7 .1OH_2O \rightarrow Na_2B_4O_7 \rightarrow NaBO_2 + B_2O_3$
1

(ii) $SiO_2 + 4HF \rightarrow SiF_4 + 2H_2O$
1

(iii) $PbO_2$ is a Amphoteric Oxide
1


25. (i) $CH_3CHO$ & HCHO are formed.
1

(ii) Toluene is formed
1

(iii) Ethene is formed
1


26. Resonating structure of banzaldehyde
2

meta directing influence
1

27. (i) Bond line notation.

    1

    (ii) cis-dichloro but-2en

    1

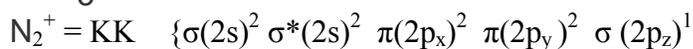    (iii) (ii) if N & S are also present in S. E. they will form

    ( NaCN & $Na_2S$) $NaCN + HNO_3 \rightarrow NaNO_3 + Hcl$

    1

    $Na_2 S + 2HNO_3 \rightarrow 2NaNO_3 + H_2S$ for removal.


28. .        Diagram

        3

    $N_2^+ = KK \quad \{\sigma(2s)^2 \ \sigma^*(2s)^2 \ \pi(2p_x)^2 \ \pi(2p_y)^2 \ \sigma (2p_z)^1$

    Bond order $= Nb - Na /2$

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

        2

                                OR

    (i)  $SP^3 - SP^2$

            1

    (ii)   Electron donor Equation $NH_3$

            1

    (iii) Lone. Pair in water L-P-LP > B.P. LP

            1

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

                        1

    (v)11 Sigma 4 π bonds.

            1


    29. .    (i)  $\underline{0.3 \ X \underline{1}} \quad = .0375mol \ L^{-1}$

             $40 \ X \ .2$

            1

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

              $= 1.426$

            1

             $pH = 14 - 1.426 = 12.574$

            1

(ii) Methyl Orange / Red

1

(iii)Greater amount of Product as Kc is Larger.

1

OR

(i) Reaction will move in forward direction.

1

(ii) $[Ag^+] = [cl] = S$, $Ksp = S^2$

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

1+1

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

1

$= 2.25$

1

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

1

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

1

(iii) Due to delocalization of pi electron.

1

(iv) Functional isomerism.

1

(v) Vanderwall forces decreases on branching.

1

or

(a) Correct conversions

3

(b) Correct reason

2