11 P Register No.

First Revision Examination- 2025

Time : 3.00 Hrs. 20.1.2025 **+1 CHEMISTRY** Marks : 70

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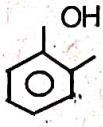
PART – I

Answer Key

I. Choose the correct answer 15 x 1 = 15

1. Gram equivalent mass of sulphuric acid
a) $94geq^{-1}$ (b) $49geq^{-1}$ c) $84geq^{-1}$ d) $48geq^{-1}$ I Volume PageNo:9

2. Atomic number of UnUnoctium
a) 109 b) 110 (c) 118 d) 120 I Volume PageNo:76

3. Example for inter molecular hydrogen bond
a) HF b) H_2O c)  (d) both a and b I Volume PageNo:114

4. Molecular formula of sylvite a) NaCℓ (b) KCℓ c) LiCℓ d) RbCℓ I Volume PageNo:126

5. Gas constant at 273.15K
a) $8.414JK^{-1}mol^{-1}$ b) $8.214JK^{-1}mol^{-1}$ (c) $8.314JK^{-1}mol^{-1}$ d) none of these I Volume PageNo:166

6. State function are
a) PVT and R b) P, V, T and (c) P, V, T and n d) P, V, T and Nm I Volume PageNo:190

7. $H_2 + I_2 \rightleftharpoons 2HI$, Kp and Kc Relation is
a) Kp > Kc b) Kp < Kc (c) Kp = Kc d) Kp x Kc II Volume PageNo:7

8. IUPAC name for $CH_3 - \overset{\overset{4}{|}}{\underset{\underset{O}{||}}{C}} - \overset{\overset{2}{|}}{CH_2} - COOH$
a) 2 - oxobutanoic acid (b) 3 - oxobutanoic acid c) 4 - oxobutanoic acid d) none of these

9. Relative stability of carbocation
(a) $^{\oplus}C(CH_3)_3 > {}^{\oplus}CH(CH_3)_2$ b) $^{\oplus}CH(CH_3)_2 > {}^{\oplus}C(CH_3)_3$ c) $CH_3\,{}^{\oplus}CH_2 > CH_3 - {}^{\oplus}CH - CH_3$ II Volume PageNo:164
d) none of these

10. Stone leprosy observed on a) $BaCl_2$ b) $MgSO_4$ c) none of these (d) $CaCO_3$ II volume PageNo:264

11. The name $C_2F_4Cl_2$ is _____.
a) Freon – 112 b) Freon – 113 (c) Freon – 114 d) Freon – 115

12. Which of the following is aliphatic saturated hydrocarbon
(a) C_8H_{18} b) C_9H_{18} c) C_8H_{14} d) All

13. –I effect is shown by
a) -Cℓ b) -Br c) $-CH_3$ (d) both (a) and (b)

14. Nitrogen detection in an organic compound is carried out by Lassaigne's test. The blue colour formed is due to the formation of
a) $Fe_3[Fe(CN)_6]_2$ (b) $Fe_4[Fe(CN)_6]_3$ c) $Fe_4[Fe(CN)_6]_2$ d) $Fe_3[Fe(CN)_6]_3$

15.  is
(a) Aromatic compound b) Non aromatic c) both (a) and (b) d) none of these

1mark:
1.b 2.c 3.d 4.b 5.c 6.c 7.c 8.b 9.a 10.d 11.c 12.a 13.d 14.b 15.a

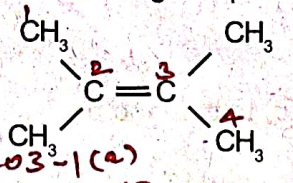
BB-4 Int-11 15

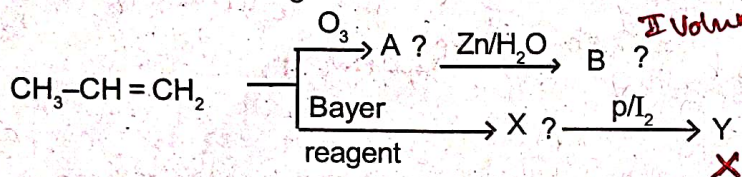
II. Answer any six questions. Q. No. 24 is compulsory 6 x 2 = 12

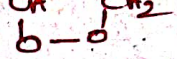
16. What do you understand by the term mole? F-4-2
17. State pauli exclusion principle. F-19-6
18. Explain diagonal relationship. F-39-17
19. What are the uses of heavy water. F-52-10
20. Write the uses of sodium bicarbonate. F-68-5
21. Name the different methods of liquefication of gas. F-86-11

22. State the third law of thermodynamics. F-97-18
23. Define Le – chatelier principle. F-121-6
24. $CH_3CH_2OH \xrightarrow[430\text{-}440K]{Con\ H_2SO_4} A \xrightarrow[Benzoyl\ peroxide]{HBr} B$ A → $CH_2=CH_2$ B → CH_3CH_2Br

III. Answer any six questions. Q. No. 33 is compulsory 6 x 3 = 18

25. State term isotonic solution? F-136-4
26. What is Hybridisation? F-155-1 (2)
27. Write the IUPAC name for the following compound
    i) $CH_3-\underset{\underset{CH_3}{|}}{CH}-CH_3$ ii) 
    (i) 2-methyl propane (ii) 2,3-dimethyl but-2-ene
28. What is Resonance? F-203-1 (a)
29. Write Birch Reduction. F-226-13
30. Write short notes on Friedelcrafts's reaction. F-225-6
31. Differentiate BOD and COD. F-261-15 (i)
32. Give structure and uses of DDT F-252-47, F-245-24
33. Complete the following



II Volume Page No: 198 Find A, B, X and Y.
A → 
B → $HCHO + CH_3CHO$
X → $CH_3-\underset{OH}{CH}-\underset{OH}{CH_2}$
Y → $CH_3-\underset{I}{CH}-\underset{I}{CH_2}$

IV. Answer all the questions. 5 x 5 = 25

34. a) Derive ionic radius using pauling method. F-44-1
    (OR)
    b) Difference between ortho and parahydrogen. F-54-1
35. a) Discuss the similarities between Lithium and Magnesium. F-74-2
    (OR)
    b) Explain the characteristics of internal energy F-103-3
37. a) Derive Kc and Kp for synthesis of Ammonia. F-125-1
    (OR)
    b) Explain the MO diagram for NO II Volume Page No: 101
37. a) Explain structure of Benzene. F-231-7
    (OR)
    b) What do you man by conformation? Explain about staggered conformation in ethane. F-228-1-a
38. a) Balance the following equation by oxidation number method and ionic method.
    $FeSO_4 + KMnO_4 + H_2SO_4 \rightarrow Fe_2(SO_4)_3 + MnSO_4 + K_2SO_4 + H_2O$ I Volume Page No: 25, 26.
    (OR)
    b) (i) 0.284g of an organic substance gave 0.287g Agcl in a carius method for the estimation of halogen.
    Find the percentage of chlorine in the compound (3mark) II Volume Page No: 143

(ii) $CH_3CH_2Br \xrightarrow{alco\ KOH} (A) \xrightarrow{Cl_2/CCl_4} B \xrightarrow{NaNH_2} C$ F-214-2

Identify A, B and C (2 marks) A → $CH_2=CH_2$ B → $CH_2(Cl)-CH_2(Cl)$ C → $CH\equiv CH$

20.1.25 I Revision Exam - Jan - 2025

(Tiruppur district) +1 EM Answer Key Chemistry

1 marks: Part-I

15 × 1 = 15

1. b) 49 geq^{-1}
2. c) 118
3. d) both a and b
4. b) KCl
5. c) 8.314 $JK^{-1}mol^{-1}$
6. c) P, V, T and n
7. c) $K_P = K_C$
8. b) 3-oxobutanoic acid
9. a) $^{\oplus}C(CH_3)_3 > ^{\oplus}CH(CH_3)_2$
10. d) $CaCO_3$
11. c) Freon - 114
12. a) C_8H_{18}
13. d) both (a) and (b)
14. b) $Fe_4[Fe(CN)_6]_2$
15. a) Aromatic Compound

2 Marks: Part-II

6 × 2 = 12

16. **Mole:**

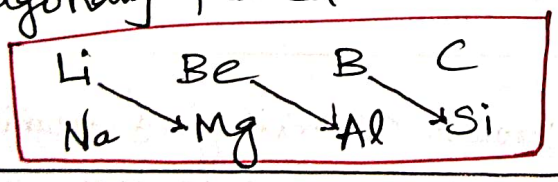
One mole is the amount of substance of a system, which contains as many elementary particles as there are atoms in 12g of Carbon-12 isotope.

17. **Pauli exclusion principle:**

No two e⁻s in an atom can have the same set of values of all 4 quantum numbers.

18. **Diagonal relationship:**

The similarity in properties existing between the diagonally placed elements is called diagonal relationship.



19. **Uses of Heavy Water:**

* It is used as moderator in nuclear reactors.
* It is used as a tracer to study organic reaction mechanisms and mechanism of metabolic reactions.
* It is also used as a coolant in nuclear reactors.

20. Uses of Sodium bicarbonate:

* Primarily used as an ingredient in backing.
* It is also used in fire extinguishers.
* It is a mild antiseptic for skin infections.

21. The different methods of liquefication of gas:

* Linde's method, Claude's process, Adiabatic process.

22. Third law of thermodynamics:

The entropy of pure crystalline substance at a absolute zero is zero.

$\lim_{T \to 0} S = 0$ for a perfectly ordered crystalline state.

23. Le-Chatelier principle:

"If a system at equilibrium is disturbed, then the system shifts itself in a direction that nullifies the effect of that disturbance"

24. [Compulsory] :-

$CH_3CH_2OH \xrightarrow[430-440K]{Conc.H_2SO_4} \underset{(A)}{CH_2=CH_2} \xrightarrow[Benzoyl\ Peroxide]{HBr} \underset{(B)}{CH_3CH_2Br}$

Ans: A ⇒ Ethylene, B ⇒ Bromo Ethane

Part-III

3 Marks: 6×3 = 18

25. Isotonic solution:

Two solutions having same osmotic pressure at a given temperature.

26. Hybridisation:

Hybridisation is the process of mixing of atomic orbitals of the same atom with comparable energy to form equal number of new equivalent orbitals with same energy.

27. (i) 2-methyl propane / (ii) 2,3-dimethyl but-2-ene.

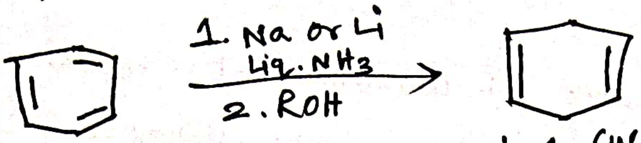
28. Resonance:

Certain organic compounds can be represented by more than one structure and they differ only in the position of bonding

and lone pair. lone pair of e⁻s. Such structures are called resonance structures and this phenomenon is called Resonance.

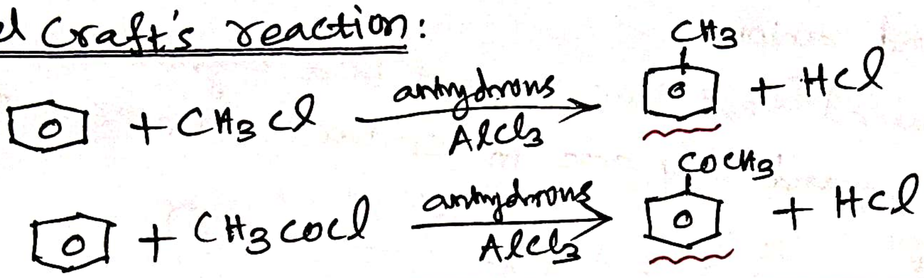
29. **Birch reduction:**

Benzene can be reduced to 1,4-Cyclohexadiene by treatment with Na or Li in a mixture of liquid NH_3 and ROH



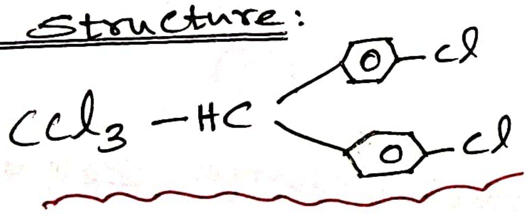
1,4-cyclohexadiene

30. **Fridel Craft's reaction:**



31. BOD	COD
1. The total amount of oxygen in milligrams consumed by microorganisms in decomposing the waste in one litre of H_2O at 20°c for a period of 5days.	The amount of oxygen required by the organic matter in a sample of H_2O for its oxidation by a strong oxidising agent like $K_2Cr_2O_7$ in acid medium for a period of 2hrs.
2. Expressed in ppm	Expressed in mg/L.

32. **DDT: Structure:**

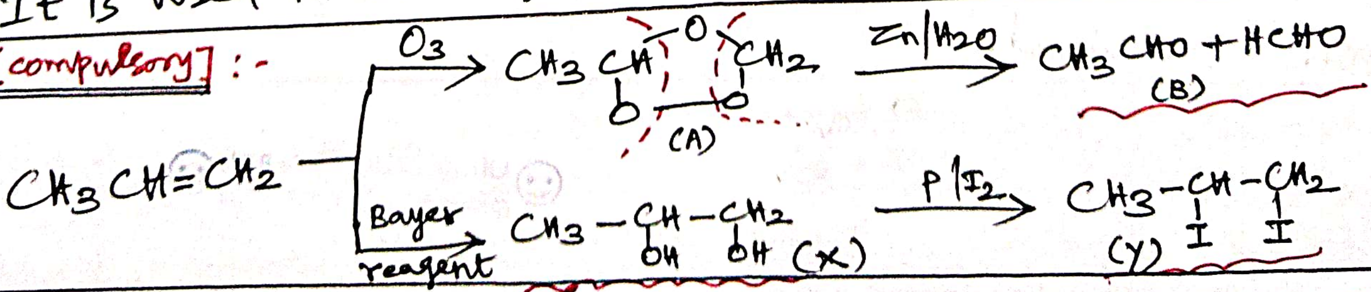


→ p, p'- dichloro diphenyl trichloro ethane

Uses:

1. DDT is used to control certain insects which carries diseases like malaria and yellow fever.
2. It is used in farms to control some agricultural pests.
3. It is used in building construction as pest control.

33. [compulsory] :-



Ans: A → $CH_3-CH\overset{O}{\diagdown\diagup}CH_2$ → Propene ozonide ; B → CH_3CHO + HCHO (Ethanal, Methanal)

X → $CH_3-\underset{OH}{CH}-\underset{OH}{CH_2}$ → Propane 1,2-diol ; Y → $CH_3-\underset{I}{CH}-\underset{I}{CH_2}$ (1,2-diiodo Propane)

5 Marks: Part-IV 5×5=25

34. a) **Pauling Method:**

Ionic radius of uni-univalent crystal can be calculated using Pauling's method from the inter ionic distance between the nuclei of the cation and anion.

1. Pauling assumed that ions present in a crystal lattice are perfect spheres and they are in contact with each other

therefore, $d_{C^+,A^-} = r_{C^+} + r_{A^-}$ ——— (1)

Where, d ⇒ distance between the centre of the nucleus of C^+ cation and anion A^-

r_{C^+}, r_{A^-} ⇒ the radius of the cation and anion respectively

2. Pauling also assumed that the radius of the ion having noble gas electronic configuration is inversely proportional to the effective nuclear charge felt at periphery of the ion.

$$r_{C^+} \propto \frac{1}{(Z_{eff})_{C^+}} \quad \text{——— (2)}$$

$$r_{A^-} \propto \frac{1}{(Z_{eff})_{A^-}} \quad \text{——— (3)}$$

Where, Z_{eff} = effective nuclear charge $Z_{eff} = Z - S$

equ $(\frac{2}{3})$ $$\frac{r_{C^+}}{r_{A^-}} = \frac{(Z_{eff})_{A^-}}{(Z_{eff})_{C^+}} \quad \text{——— (4)}$$

on solving equ (1) and (4) the values of r_{C^+} and r_{A^-} can be obtained.

(OR)

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Govt.Model Hr.Sec.School,
Mulanur,Tiruppur-638 106.

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34.b) Ortho hydrogen	Para hydrogen
1. Both the nuclei rotates in the same direction	Both the nuclei rotates in the opposite direction
2. 75%. at room temperature	25%. at room temperature.
3. It is more stable	It is less stable
4. It has a net magnetic moment	It has zero magnetic moment
5. Melting point → 13.95K Boiling point → 20.39K	Melting point → 13.83K Boiling point → 20.26K

35. a) Similarities between Li & Mg :-

* Both Li & Mg are harder than other elements in the respective groups.
* Li & Mg react slowly with H_2O. Their oxides and hydroxides are much less soluble and their hydroxides decompose on heating
* They donot give any super oxides and only oxides, Li_2O, MgO.
* The Carbonates of li & Mg decompose upon heating to form their respective oxides and CO_2.
* Li & Mg donot form bicarbonates.

(OR)

35. b) Characteristics of internal energy :-

1. Internal energy of a system is an extensive property.
2. It is a state function.
3. The change in internal energy of a system is expressed as $\Delta U = U_f - U_i$
4. In a cyclic process there is no internal energy change. $\Delta U_{cyclic} = 0$.
5. If the internal energy of the system in the final state (U_f) is less than the internal energy of the system in its initial state (U_i) then $\Delta U = -ve$. i.e, $U_f < U_i$, $\Delta U = -ve$.
6. If the internal energy of the system in the final state (U_f) is greater than the internal energy of the system in its intial state (U_i) then $\Delta U = +ve$ i.e, $U_f > U_i$, $\Delta U = +ve$

36. a) **K_p, K_c for Synthesis of NH_3 :-**

$$N_2 + 3H_2 \rightleftharpoons 2NH_3$$

$\Delta ng \Rightarrow n_p - n_r = 2-4$

$\Delta ng = -2$

	N_2	H_2	NH_3
Initial number of moles	a	b	0
Number of moles reacted	x	3x	0
Number of moles at equilibrium	a-x	b-3x	2x
Active mass	$\frac{a-x}{V}$	$\frac{b-3x}{V}$	$\frac{2x}{V}$
Total number of moles (n)	a-x+b-3x+2x $\Rightarrow$ (a+b-2x)		

Applying law of mass Action To find K_c :-

$$K_c = \frac{[NH_3]^2}{[N_2][H_2]^3} = \frac{\left(\frac{2x}{V}\right)^2}{\left(\frac{a-x}{V}\right)\left(\frac{b-3x}{V}\right)^3} = \frac{4x^2}{V^2} \times \frac{V^4}{(a-x)(b-3x)^3}$$

$$\boxed{K_c = \frac{4x^2V^2}{(a-x)(b-3x)^3}}$$

To find K_p :- $K_p = K_c (RT)^{\Delta ng}$

$$K_p = K_c (RT)^{-2}$$

$$K_p = \frac{4x^2V^2}{(a-x)(b-3x)^3} (RT)^{-2}$$

$$= \frac{4x^2V^2}{(a-x)(b-3x)^3} \left(\frac{PV}{n}\right)^{-2}$$

$$= \frac{4x^2V^2}{(a-x)(b-3x)^3} \left(\frac{n}{PV}\right)^{2}$$

$$K_p = \frac{4x^2V^2}{(a-x)(b-3x)^3} \left(\frac{a+b-2x}{PV}\right)^2$$

$$\boxed{K_p = \frac{4x^2(a+b-2x)^2}{(a-x)(b-3x)^3 P^2}}$$

(OR)

36. b) **MO diagram of NO :-**

$_7N \rightarrow 1s^2 2s^2 2p^3$

$_8O \rightarrow 1s^2 2s^2 2p^4$

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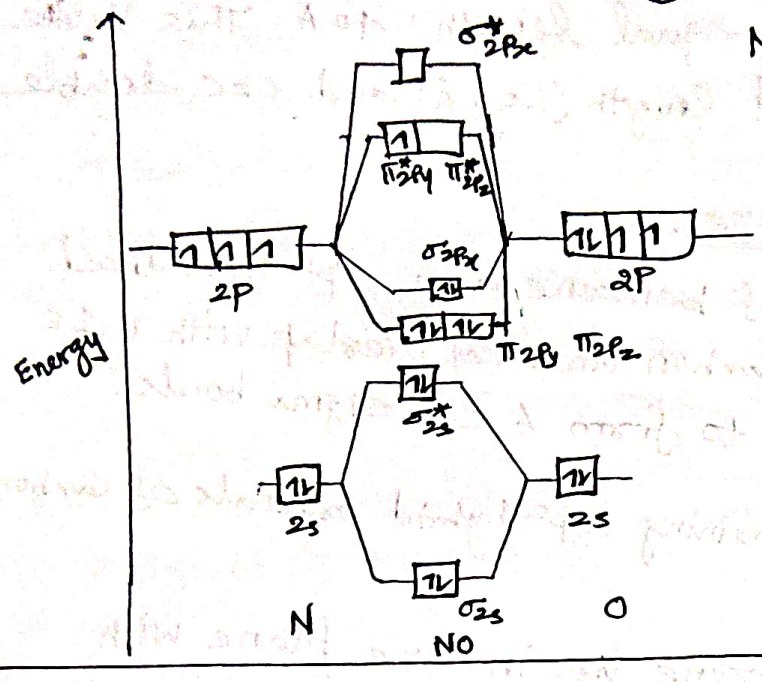


NO : $\sigma_{1s}^2 \sigma_{1s}^{*2} \sigma_{2s}^2 \sigma_{2s}^{*2} \pi_{2P_y}^2 = \pi_{2P_z}^2 \sigma_{2P_x}^2 \pi_{2P_y}^{*1}$

Bond order $\rightarrow \frac{N_b - N_a}{2} = \frac{10-5}{2} = 2.5$

Magnetic Property : Molecule has 1 unpaired electron. Hence, it is Paramagnetic.

37. a) Structure Of Benzene:

1. Molecular Formula: The molecular formula of Benzene is C_6H_6. This indicates that benzene is a highly unsaturated compound.

2. Straight Chain Structure not possible: Benzene could be constructed as a straight chain (or) ring compound. but it not feasible since it does not show the properties of alkenes (or) alkynes.

Benzene $\xrightarrow[\text{KMnO}_4 \text{ (PINK) Colour}]{\text{acidified}}$ no decolouration

Benzene $\xrightarrow[\text{(Red Colour)}]{CCl_4 / Br_2}$ no decolouration

3. Evidence of Cyclic Structure:

Benzene reacts with bromine in the Presence of $AlCl_3$ to form mono bromo benzene. Formation of only one monobromo compound indicates that all the 6 hydrogen atoms in benzene were identical. This is possible only if it has a cyclic structure of 6 carbons each containing one H.

4. Benzene $\xrightarrow{3H_2/Ni}$ cyclohexane: This confirms cyclic structure of benzene and the presence of 3 C=C - bond.

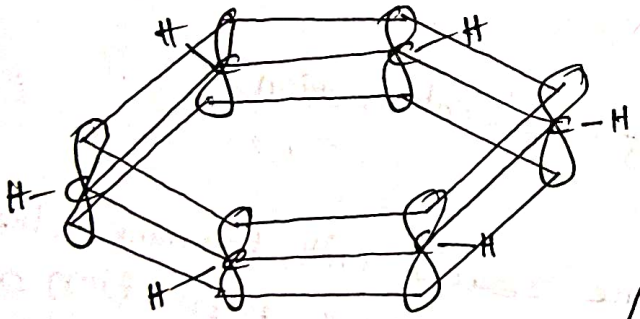
5. Spectroscopic measurements: Benzene is planar and all of its

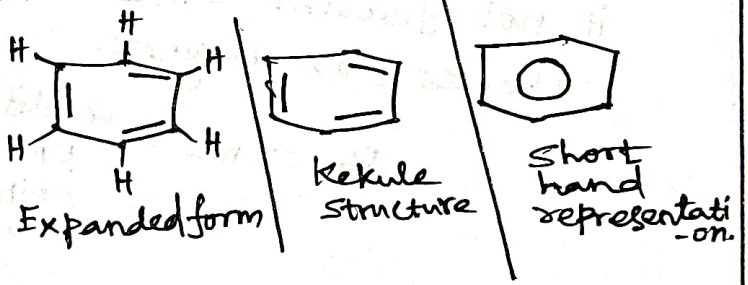
Carbon-Carbon bonds are of equal length 1.40 Å. This Value lies between C-C single bond length (1.54 Å) and C=C double bond length (1.34 Å).

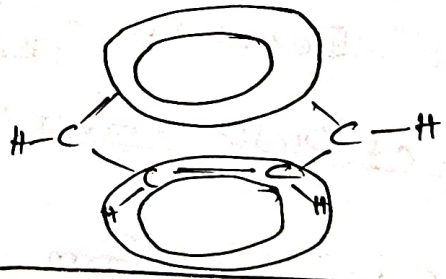
6. Molecular orbital structure:

1. All the six Carbon atoms of benzene are sp^2 hybridized. 6 sp^2 hybrid orbitals of Carbon linearly overlap with 6-1s Orbitals of hydrogen atoms to form 6 C-H sigma bonds.
2. Overlap between the remaining sp^2 hybrid orbitals of Carbon forms 6-C-C σ bonds.
3. All the σ bonds in benzene lie in one plane with bond angle 120°. Each Carbon atom in benzene possess an unhybridised p-orbital Containing one e⁻.
4. The lateral overlap of their p-orbital produces 3-π bond. The 6 electrons of the p-orbitals covers all the 6 Carbon atoms and are said to be delocalised. Due to delocalization strong π-bond is formed which makes the molecule Stable.

7. Representation of Benzene:







(OR)

37. b) Conformation:

The readily inter convertible three dimensional arrangement of a molecule.

Staggered Conformation of ethane:-

* In this conformation, the hydrogens of both the Carbon atoms are far apart from each other.

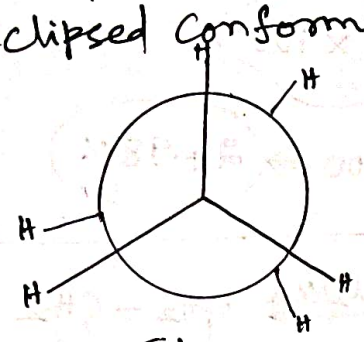
* The repulsion between the atoms is minimum and it is the most Stable conformer.

* The infinite numbers of possible intermediate conformations between the two extreme conformations are referred as skew conformations.

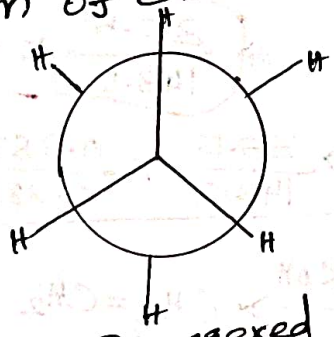
* The Stabilities of various conformations of ethane are

Staggered > Skew > Eclipsed.

* The potential Energy difference between Staggered and Eclipsed conformation of ethane is around 12.5 KJ/mol.



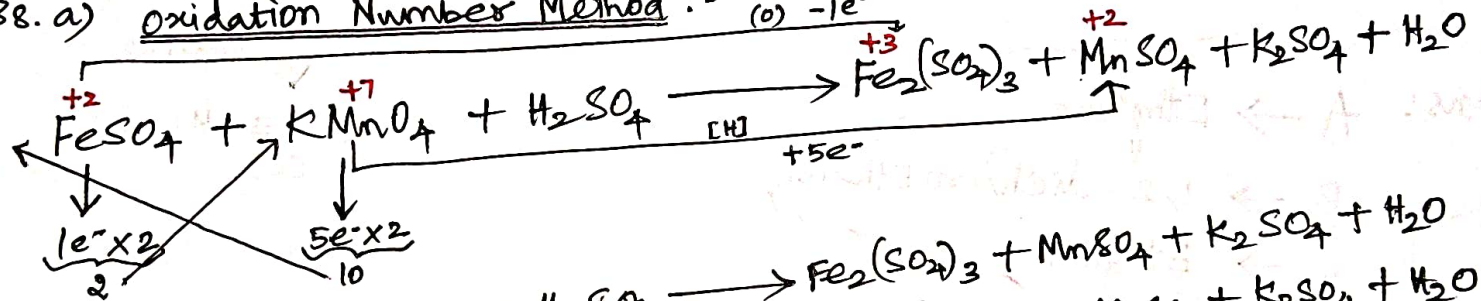
Skew



Staggered

⇒ Newman Projection formula for Ethane.

38. a) Oxidation Number Method :-



$10\ FeSO_4 + 2\ KMnO_4 + H_2SO_4 \longrightarrow Fe_2(SO_4)_3 + MnSO_4 + K_2SO_4 + H_2O$

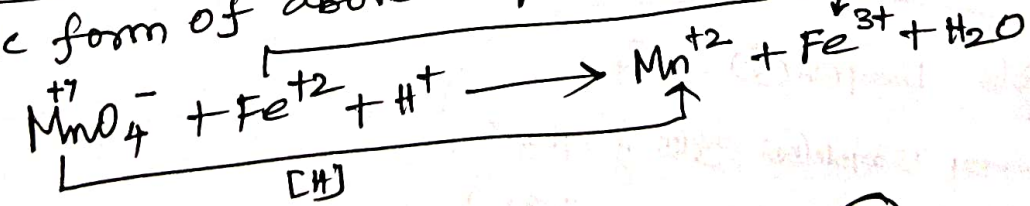
$10\ FeSO_4 + 2\ KMnO_4 + H_2SO_4 \longrightarrow 5\ Fe_2(SO_4)_3 + 2\ MnSO_4 + K_2SO_4 + H_2O$

$10\ FeSO_4 + 2\ KMnO_4 + 8\ H_2SO_4 \longrightarrow 5\ Fe_2(SO_4)_3 + 2\ MnSO_4 + K_2SO_4 + H_2O$

$\underline{10}\ FeSO_4 + \underline{2}\ KMnO_4 + \underline{8}\ H_2SO_4 \longrightarrow \underline{5}\ Fe_2(SO_4)_3 + \underline{2}\ MnSO_4 + K_2SO_4 + \underline{8}\ H_2O$

Ionic Method:

Ionic form of above equation,



The 2 Half reactions,

$Fe^{+2} \longrightarrow Fe^{3+} + 1e^-$ — (1)

$MnO_4^- + 5e^- \longrightarrow Mn^{+2}$ — (2)

$MnO_4^- + 5e^- \longrightarrow Mn^{+2} + 4H_2O$ — (3)

 (10)

Equate the both half reactions

① × 5 ⇒ $5Fe^{+2} \longrightarrow 5Fe^{3+} + 5e^-$ ——— ④

③ × 1 ⇒ $MnO_4^- + 5e^- + 8H^+ \longrightarrow Mn^{+2} + 4H_2O$ ——— ⑤

$$5Fe^{+2} + MnO_4^- + 8H^+ \longrightarrow 5Fe^{+3} + Mn^{+2} + 4H_2O$$ ——— ⑥

(OR)

38. b) (i) Weight of the organic substance $W = 0.284\,g$

Weight of AgCl is $a \Rightarrow 0.287\,g$

% of chlorine is $\Rightarrow \dfrac{35.5}{143.5} \times \dfrac{a}{W} \times 100$

$$\Rightarrow \frac{35.5}{143.5} \times \frac{0.287}{0.284} \times 100 \Rightarrow 24.98\,\%$$

38. b) (ii) $CH_3CH_2Br \xrightarrow{alc.\,KOH} \underset{(A)}{CH_2=CH_2} \xrightarrow{Cl_2/CCl_4} \underset{(B)}{CH_2Cl-CH_2Cl}$

$(B) \xrightarrow{NaNH_2} \underset{(C)}{CH\equiv CH}$

Ans: A → Ethylene

B → 1,2-dichloro Ethane

C → Ethyne

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