

# JEE (Main) CHEMISTRY SOLVED PAPER

**2023**  
11<sup>th</sup> April Shift 2

## Section A

- The magnetic moment is measured in Bohr Magneton (BM). Spin only magnetic moment of Fe in  $[\text{Fe}(\text{H}_2\text{O})_6]^{3+}$  and  $[\text{Fe}(\text{CN})_6]^{3-}$  complexes respectively is:
  - 3.87 B. M. and 1.732 B.M.
  - 6.92 B.M. in both
  - 5.92 B.M. and 1.732 B.M.
  - 4.89 B.M. and 6.92 B.M.
- Which one of the following pairs is an example of polar molecular solids?
  - $\text{SO}_2(\text{s}), \text{CO}_2(\text{s})$
  - $\text{SO}_2(\text{s}), \text{NH}_2(\text{s})$
  - $\text{MgO}(\text{s}), \text{SO}_2(\text{s})$
  - $\text{HCl}(\text{s}), \text{AlN}(\text{s})$
- Match List I with List II

List I Complex	List II Colour
(A) $\text{Mg}(\text{NH}_4)\text{PO}_4$	I. Brown
(B) $\text{K}_3[\text{Co}(\text{NO}_2)_6]$	II. White
(C) $\text{MnO}(\text{OH})_2$	III. Yellow
(D) $\text{Fe}_4[\text{Fe}(\text{CN})_6]_3$	IV. blue

Choose the correct answer from the options given below:

- A–II, B–III, C–IV, D–I
  - A–II, B–IV, C–I, D–III
  - A–III, B–IV, C–II, D–I
  - A–II, B–III, C–I, D–IV
- A solution is prepared by adding 2 g of "X" to 1 mole of water. Mass percent of "X" in the solution is
    - 5%
    - 20%
    - 2%
    - 10%
  - If  $\text{Ni}^{2+}$  is replaced by  $\text{Pt}^{2+}$  in the complex  $[\text{NiCl}_2\text{Br}_2]^{2-}$ , which of the following properties are expected to get changed?
    - Geometry
    - Geometrical isomerism
    - Optical isomerism
    - Magnetic properties
    - A, B and C
    - A and D
    - B and C
    - A, B and D
  - Given below are two statements:
 

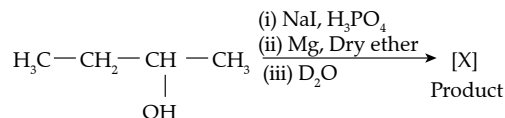
**Statement I:** In the metallurgy process, sulphide ore is converted to oxide before reduction.

**Statement II:** Oxide ores in general are easier to reduce.

In the light of the above statements, choose the most appropriate answer from the options given below:

    - Both Statement I and Statement II are correct
    - Statement I is correct but Statement II is incorrect
    - Statement I is incorrect but Statement II is correct
    - Both Statement I and Statement II are incorrect

7.



Product [X] formed in the above reaction is:

- $\text{H}_3\text{C}-\text{CH}_2-\underset{\text{D}}{\text{CH}}-\text{CH}_3$
- $\text{H}_3\text{C}-\text{CH}_2-\text{CH}=\text{CH}_2$
- $\text{H}_3\text{C}-\text{CH}=\text{CH}-\text{CH}_3$
- $\text{H}_3\text{C}-\text{CH}_2-\underset{\text{OH}}{\text{C}}-\text{CH}_3$

8. Given below are two statements:

**Statement I:** Ethene at 333 to 343 K and 6-7 atm pressure in the presence of  $\text{Al}(\text{Et})_3$  and  $\text{TiCl}_4$  undergoes addition polymerization to give LDP.

**Statement II:** Caprolactam at 533-543 K in  $\text{H}_2\text{O}$  through step growth polymerizes to give Nylon 6.

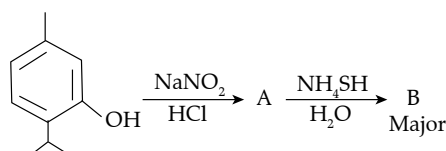
In the light of the above statements, choose the correct answer from the options given below:

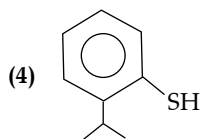
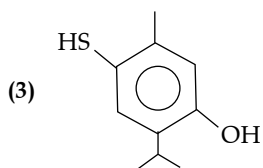
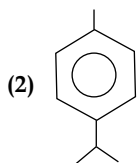
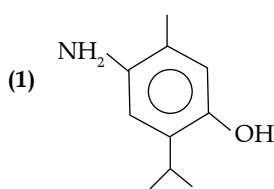
- Statement I is true but Statement II is false
  - Both Statement I and Statement II are true
  - Statement I is false but Statement II is true
  - Both Statement I and Statement II are false
- For a chemical reaction  $\text{A} + \text{B} \rightarrow \text{Product}$ , the order is 1 with respect to A and B.

Rate $\text{Mol L}^{-1} \text{S}^{-1}$	[A] $\text{Mol L}^{-1}$	[B] $\text{Mol L}^{-1}$
0.10	20	0.5
0.40	X	0.5
0.80	40	Y

What is the value of x and y?

- 80 and 2
  - 40 and 4
  - 80 and 4
  - 160 and 4
- Which of the following compounds is an example of Freon?
    - $\text{C}_2\text{F}_4$
    - $\text{C}_2\text{HF}_3$
    - $\text{CF}_2\text{Cl}_2$
    - $\text{C}_2\text{H}_2\text{F}_2$
  - Compound 'B' is





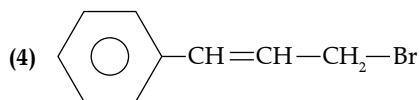
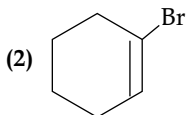
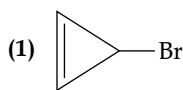
12. Given below are two statements, one is labelled as Assertion A and the other is labelled as Reason R.

**Assertion A:** can be subjected to Wolff-Kishner reduction to give

**Reason R:** Wolff-Kishner reduction is used to convert into  $\text{>CH}_2$ .

In the light of the above statements, choose the correct answer from the options given below:

- (1) Both A and R are true and R is the correct explanation of A  
 (2) A is true but R is false  
 (3) Both A and R are true but R is NOT the correct explanation of A  
 (4) A is false but R is true
13. Given below are two statements, one is labelled as Assertion A and the other is labelled as Reason R.  
**Assertion A:**  $[\text{CoCl}(\text{NH}_3)_5]^{2+}$  absorbs at lower wavelength of light with respect to  $[\text{CoCl}(\text{NH}_3)_5(\text{H}_2\text{O})]^{3+}$   
**Reason R:** It is because the wavelength of the light absorbed depends on the oxidation state of the metal ion.  
 In the light of the above statements, choose the correct answer from the options given below:  
 (1) Both A and R are true but R is NOT the correct explanation of A  
 (2) A is true but R is false  
 (3) Both A and R are true and R is the correct explanation of A  
 (4) A is false but R is true
14. Compound from the following that will not produce precipitate on reaction with  $\text{AgNO}_3$  is



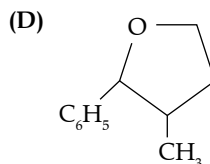
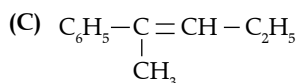
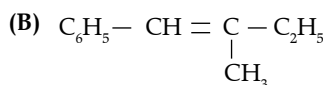
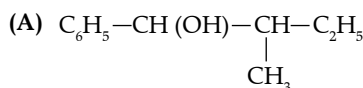
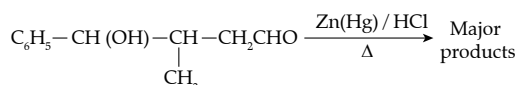
15. Given below are two statements, one is labelled as Assertion A and the other is labelled as Reason R.

**Assertion A:** A solution of the product obtained by heating a mole of glycine with a mole of chlorine in presence of red phosphorous generates chiral carbon atom.

**Reason R:** A molecule with 2 chiral carbons is always optically active.

In the light of the above statements, choose the correct answer from the options given below:

- (1) A is false but R is true  
 (2) Both A and R are true but R is NOT the correct explanation of A  
 (3) A is true but R is false  
 (4) Both A and R are true and R is the correct explanation of A
16. Alkali metal from the following with least melting point is:  
 (1) K (2) Cs (3) Rb (4) Na
17. Which hydride among the following is less stable?  
 (1) HF (2)  $\text{NH}_3$  (3)  $\text{BeH}_2$  (4) LiH
18. The major product formed in the following reaction is



Choose the correct answer from the options given below:

- (1) C only (2) A only (3) B only (4) D only
19. One mole of  $\text{P}_4$  reacts with 8 moles  $\text{SOCl}_2$  to give 4 moles of A, x mole of  $\text{SO}_2$  and 2 moles of B. A, B and x respectively are  
 (1)  $\text{POCl}_3$ ,  $\text{S}_2\text{Cl}_2$  and 4 (2)  $\text{POCl}_3$ ,  $\text{S}_2\text{Cl}_2$  and 2  
 (3)  $\text{PCl}_3$ ,  $\text{S}_2\text{Cl}_2$  and 4 (4)  $\text{PCl}_3$ ,  $\text{S}_2\text{Cl}_2$  and 2
20. What weight of glucose must be dissolved in 100 g of water to lower the vapour pressure by 0.20 mmHg?  
 (Assume dilute solution is being formed)  
 Given: Vapour pressure of pure water is 54.2 mmHg at room temperature. Molar mass of glucose is  $180 \text{ g mol}^{-1}$   
 (1) 2.59 g (2) 3.59 g (3) 3.69 g (4) 4.69 g

**Section B**

21. The total number of intensive properties from the following is \_\_\_\_\_ new line volume, molar heat capacity, Molarity,  $E^\ominus$  cell, Gibbs free energy change, Molar mass, Mole
22. The volume of hydrogen liberated at STP by treating 2.4 g of magnesium with excess of hydrochloric acid is \_\_\_\_\_  $\times 10^{-2}$  L  
Given: Molar volume of gas is 22.4 L at STP. Molar mass of magnesium is  $24 \text{ g mol}^{-1}$
23. The number of correct statements about modern adsorption theory of heterogeneous catalysis from the following is  
(A) The catalyst is diffused over the surface of reactants.  
(B) Reactants are adsorbed on the surface of the catalyst.  
(C) Occurrence of chemical reaction on the catalyst's surface through formation of an intermediate.  
(D) It is a combination of intermediate compound formation theory and the old adsorption theory.  
(E) It explains the action of the catalyst as well as those of catalytic promoters and poisons.
24. The number of correct statements from the following is  
(A) For 1s orbital, the probability density is maximum at the nucleus  
(B) For 2s orbital, the probability density first increases to maximum and then decreases sharply to zero.  
(C) Boundary surface diagrams of the orbitals enclose a region of 100% probability of finding the electron.
- (D) p and d-orbitals have 1 and 2 angular nodes respectively  
(E) Probability density of p-orbital is zero at the nucleus
25. The number of correct statements from the following is \_\_\_\_\_  
(A)  $E_{\text{cell}}$  is an intensive parameter  
(B) A negative  $E^\ominus$  means that the redox couple is a stronger reducing agent than the  $\text{H}^+/\text{H}_2$  couple.  
(C) The amount of electricity required for oxidation or reduction depends on the stoichiometry of the electrode reaction.  
(D) The amount of chemical reaction which occurs at any electrode during electrolysis by a current is proportional to the quantity of electricity passed through the electrolyte.
26.  $\text{Mg}(\text{NO}_3)_2 \cdot \text{XH}_2\text{O}$  and  $\text{Ba}(\text{NO}_3)_2 \cdot \text{YH}_2\text{O}$ , represent formula of the crystalline forms of nitrate salts. Sum of X and Y is \_\_\_\_\_
27. The number of possible isomeric products formed when 3-chloro-1-butene reacts with HCl through carbocation formation is \_\_\_\_\_
28. 4.5 moles each of hydrogen and iodine is heated in a sealed ten litre vessel. At equilibrium, 3 moles of HI were found. The equilibrium constant for  
$$\text{H}_2(\text{g}) + \text{I}_2(\text{g}) \rightleftharpoons 2\text{HI}(\text{g})$$
 is
29. Number of compounds from the following which will not produce orange red precipitate with Benedict solution is \_\_\_\_\_  
Glucose, maltose, sucrose, ribose, 2-deoxyribose, amylose, lactose
30. The maximum number of lone pairs of electrons on the central atom from the following species is \_\_\_\_\_  
 $\text{ClO}_3^-$ ,  $\text{XeF}_4$ ,  $\text{SF}_4$  and  $\text{I}_3^-$

**Answer Key**

Q. No.	Answer	Topic name	Chapter name
1	(3)	Magnetic Moment of Coordination Compounds	Coordination Chemistry
2	(2)	Dipole Moment of Molecule	Chemical Bonding
3	(4)	Colour of Coordination Compounds	Coordination Chemistry
4	(4)	Percentage Composition of Substance	Some Basic Concepts of Chemistry
5	(4)	Mixed Concept in Coordination Compounds	Coordination Chemistry
6	(1)	Reduction of Metal Sulphide	Metallurgy
7	(1)	Conversion of Alcohol Into Halo Alkane	Alcohol Phenol and Ether
8	(3)	Formation of Polymer	Polymer
9	(1)	Calculation of Concentration of the Reactant	Chemical Kinetics
10	(3)	Chloro Fluoro Carbon Compound	Halo Alkane and Halo Arenes
11	(1)	Electrophilic Aromatic Substitution Followed By Reduction	Aromatic Hydrocarbons
12	(4)	Wolf Kishner Reduction	Aldehyde and Ketones
13	(2)	Colour of Compound Co-ordination	Co-ordination Compound
14	(2)	Formation of Carbocation During the Reaction	General Organic Chemistry
15	(3)	Hvz Reaction and Chirality Concept	Carboxylic Acid
16	(2)	Melting Point of s Block Metals	s Block

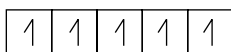
17	(3)	Metal Hydrides and their Properties	Hydrogen
18	(3)	Reduction of Carbonyl Compounds	Aldehyde and Ketones
19	(3)	Formation of P Block Compounds	p Block
20	(3)	Relative Lowering of Vapour Pressure	Liquid Solution
21	[4]	Intensive and Extensive Property	Thermodynamics
22	[224]	Stoichiometry Relationship	Some Basic Concepts of Chemistry
23	[3]	Modern Adsorption Theory	Surface Chemistry
24	[3]	Radial Probability Function	Structure of Atom
25	[4]	Standard Reduction Potential and Faraday Law	Electro Chemistry
26	[6]	Molecular Formula of Salt	Chemical Bonding
27	[4]	Calculation of Number of Isomers	Isomerism
28	[1]	Calculation of Equilibrium Constant	Equilibrium
29	[3]	Benedict Test for an Aldehyde	Biomolecules
30	[3]	Lone Pair and Bond Pair	Chemical Bonding

## Solutions

### Section A

#### 1. Option (3) is correct.

For  $[\text{Fe}(\text{H}_2\text{O})_6]^{3+}$  complex  
 Central atom is Fe while  $\text{H}_2\text{O}$  is ligand  
 The electronic configuration of  
 $\text{Fe}:[\text{Ar}] 3d^6 4s^2$  ( $z = 26$ )  
 In the given complex, oxidation state of Fe =  
 $\text{Fe}^{3+}:[\text{Ar}]3d^5$

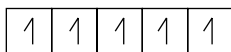


Here  $\text{H}_2\text{O}$  is a weak ligand and the value of  $\Delta_0 < \text{Pairing energy}$   $\therefore$  Pairing of  $e^-$  does not take place. So number of unpaired  $e^-$  is 5

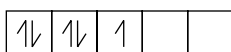
$$\text{The value of } \mu = \sqrt{n(n+2)} = \sqrt{5(5+2)}$$

$$\mu = \sqrt{35} = 5.92 \text{ B.M}$$

For  $[\text{Fe}(\text{CN})_6]^{3-}$  complex  
 Central atom is Fe while  $\text{CN}^-$  is ligand  
 The electronic configuration Fe:  $[\text{Ar}]3d^6 4s^2$   
 In the given complex, oxidation state of Fe = +3  
 $\text{Fe}^{3+}:[\text{Ar}]3d^5$



Here  $\text{CN}^-$  is a strong ligand and the value of  $\Delta_0 > \text{pairing energy}$   $\therefore$  it pair the unpaired electron.  
 $\text{Fe}^{3+}$



So, number of unpaired  $e^- = 1$

$$\text{The value of } \mu = \sqrt{n(n+2)} = \sqrt{1(1+2)}$$

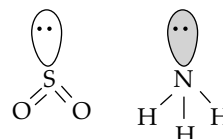
$$\mu = \sqrt{3} = 1.732 \text{ M}$$

So the correct answer is option (3).

#### 2. Option (2) is correct.

Both  $\text{SO}_2$  and  $\text{NH}_3$  are polar molecules because they contain electron pair and due to the presence

of electron pair the net dipole moment is not equal to zero.



#### 3. Option (4) is correct.

##### List (I)

##### Complex

- A.  $\text{Mg}(\text{NH}_4)\text{PO}_4$   
 B.  $\text{K}_3[\text{Co}(\text{NO}_2)_6]$   
 C.  $\text{MnO}(\text{OH})_2$   
 D.  $\text{Fe}_4[\text{Fe}(\text{CN})_6]$

##### List (II)

##### Color

- II. White  
 III. Yellow  
 I. Brown  
 IV. Blue

#### 4. Option (4) is correct.

Given mass of solute (X) = 2 gm  
 Mass of solvent ( $\text{H}_2\text{O}$ ) = 1 mole = 18 gm  
 Mass of solution = mass of solute + mass of solvent  
 $= 2 + 18 = 20 \text{ gm}$

$$W = \frac{\text{mass of solute}}{\text{mass of solution}} \times 100 = \frac{2}{20} \times 100 = 10\%$$

#### 5. Option (4) is correct.

If  $\text{Ni}^{2+}$  is replaced by  $\text{Pt}^{2+}$  in the complex  $[\text{NiCl}_2\text{Br}_2]^{2-}$ , following properties are expected to get changed-

A. Geometry of the complex gets changed when  $\text{Ni}^{2+}$  is replaced by  $\text{Pt}^{2+}$ .

$[\text{NiCl}_2\text{Br}_2]^{2-}$  is tetrahedral in shape while  $[\text{PtCl}_2\text{Br}_2]^{2-}$  is square planar in shape.

Because Pt belongs to 5d series while Ni belongs to 3d series.

B. Similarly geometrical isomerism is also observed when  $\text{Ni}^{2+}$  is get replaced by  $\text{Pt}^{2+}$  because  $[\text{NiCl}_2\text{Br}_2]^{2-}$  is tetrahedral

Which do not show geometrical isomerism while  $[\text{PtCl}_2\text{Br}_2]^{2-}$  is square planar which show geometrical isomerism.

C. Both  $[\text{NiCl}_2\text{Br}_2]^{2-}$  and  $[\text{PtCl}_2\text{Br}_2]^{2-}$  do not show optical isomerism.

D. Here in  $[\text{NiCl}_2\text{Br}_2]^{2-}$ , Nickel is present in  $\text{Ni}^{+2}$  state and the configuration of  $\text{Ni}^{2+}$  is  $3d^8$  in which 2 unpaired  $e^-$  are present

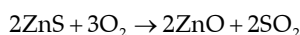
$\therefore$  It is paramagnetic in nature.

While in  $[\text{PtCl}_2\text{Br}_2]^{2-}$ , Platinum is present in  $\text{Pt}^{+2}$  state & the configuration of  $\text{Pt}^{2+}$  is  $3d^8$  in which 2 unpaired  $e^-$  are present which get paired up by the ligand and it do not contain any unpaired  $e^-$

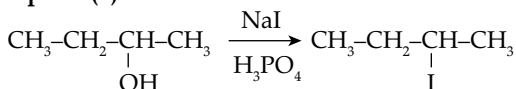
$\therefore$  it is diamagnetic in nature.

**6. Option (1) is correct.**

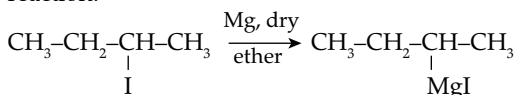
A metal oxide is generally less stable than the metal sulphide  $\therefore$  reduction of metal oxide is much easier than the reduction of metal sulphide



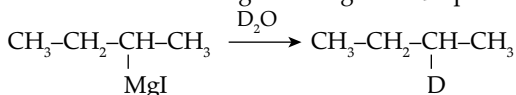
**7. Option (1) is correct.**



Here the replacement of  $-\text{OH}$  group takes place via  $-\text{I}$  group through nucleophilic substitution reaction.



Here formation of Grignard reagent takes place



Here acid-base reaction takes place between Grignard reagent and  $\text{D}_2\text{O}$

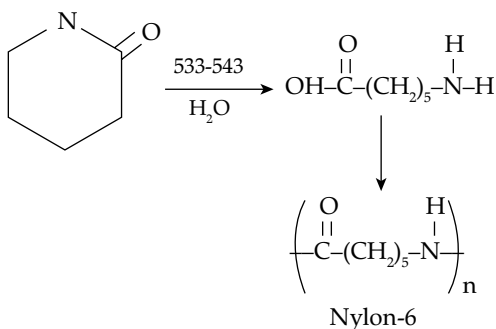
**8. Option (3) is correct.**

Statement I is false

Ethene at 333 to 343k and under a pressure of 6-7 atmosphere in the presence of  $\text{AlEt}_3$  and  $\text{TiCl}_4$  gives high density polythene (HDP) not low density polythene (LDP)

Statement II is true

Caprolactum at 533-543k in  $\text{H}_2\text{O}$  through step growth polymerizes to give Nylon-6



**9. Option (1) is correct.**

Here the rate law expression is-

$$\text{Rate} = k[\text{A}]^1[\text{B}]^1$$

From (1)  $\text{Rate} = 0.10 \text{ mol L}^{-1} \text{ s}^{-1}$

$$[\text{A}] = 20 \text{ mol L}^{-1} \quad [\text{B}] = 0.5 \text{ mol L}^{-1}$$

$$K = \frac{\text{Rate}}{[\text{A}]^1[\text{B}]^1} = \frac{0.10 \text{ mol L}^{-1} \text{ s}^{-1}}{20 \text{ mol L}^{-1} \times 0.5 \text{ mol L}^{-1}}$$

$$K = 0.01 (\text{mol/L})^{-1} \text{ s}^{-1}$$

From (2)

$$\text{Rate} = 0.40 \text{ mol L}^{-1} \text{ s}^{-1}$$

$$[\text{B}] = 0.5 \text{ mol L}^{-1}$$

$$\text{Rate} = K[\text{A}][\text{B}]$$

$$[\text{A}] = \frac{\text{Rate}}{K[\text{B}]} = \frac{0.40 \text{ mol L}^{-1} \text{ s}^{-1}}{0.01 (\text{mol/L})^{-1} \text{ s}^{-1} \times 0.5 \text{ mol L}^{-1}}$$

$$[\text{A}] = 80 \text{ mol L}^{-1}$$

From (3)

$$\text{Rate} = 0.80 \text{ mol L}^{-1} \text{ s}^{-1}$$

$$[\text{A}] = 40 \text{ mol L}^{-1}$$

$$[\text{B}] = \frac{\text{Rate}}{K[\text{A}]} = \frac{0.80 \text{ mol L}^{-1} \text{ s}^{-1}}{0.01 (\text{mol/L})^{-1} \text{ s}^{-1} \times 40 \text{ mol L}^{-1}}$$

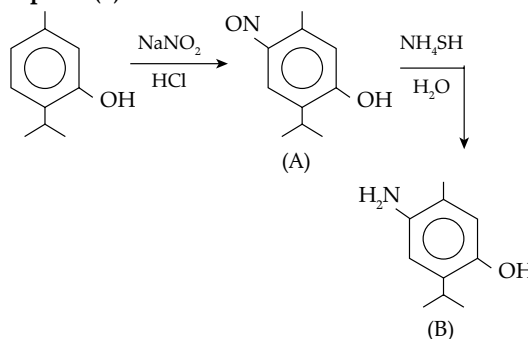
$$[\text{B}] = 2 \text{ mol L}^{-1}$$

**10. Option (3) is correct.**

The Chlorofluorocarbon compounds of methane and ethane are collectively known as Freon.

$\text{CCl}_2\text{F}_2$  is one of the most common freons in industrial use. It is manufactured from tetrachloromethane by Swarts reaction

**11. Option (1) is correct.**

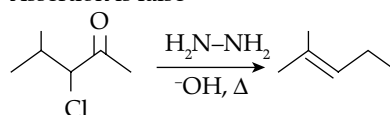


Formation of (A) takes place by electrophilic aromatic substitution reaction.

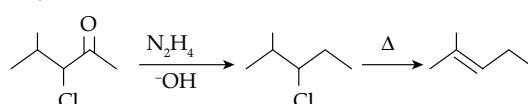
Formation of (B) takes place by reduction of  $-\text{NO}$  into  $-\text{NH}_2$  by the help of  $\text{NH}_4\text{SH}$ .

**12. Option (4) is correct.**

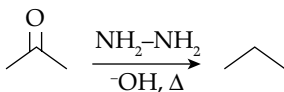
Assertion is false



Here along with the reduction of  $-\overset{\text{O}}{\parallel}{\text{C}}-$  group we obtained alkane which on further reaction gives alkene.



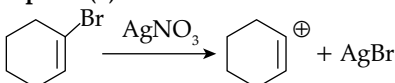
Reason is true



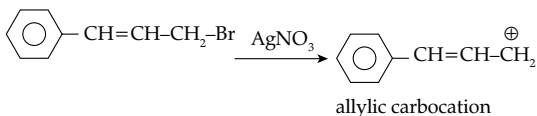
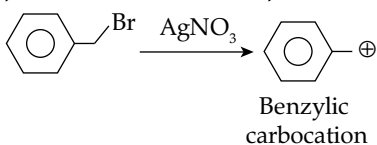
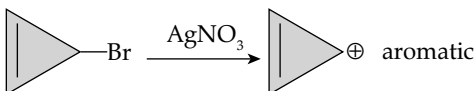
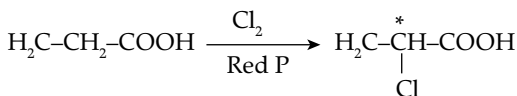
Here Wolff-kishner reduction is observed to obtain alkane

**13. Option (2) is correct.**

The absorption of the light depends on the strength of the ligand field. The ligand with the strong field strength cause greater splitting of the orbitals which requires a light of high frequency (low wavelength) for the transition.

**14. Option (2) is correct.**

The above reaction do not takes place as we obtained unstable vinyl carbocation. While in other case stable carbocation is formed.

**15. Option (3) is correct.**

Here, one mole of glycine with a mole of chlorine in presence of red phosphorus generates a chiral carbon atom.

Reason is false

A molecule with 2 chiral carbon is not always optically active because it may contain POS or COS and become optically inactive.

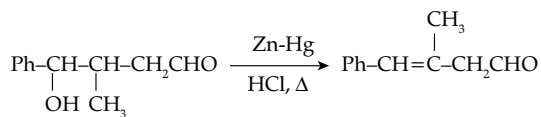
**16. Option (2) is correct.**

Element	M.P
1) K	336K
2) Cs	302K
3) Rb	312K
4) Na	371K

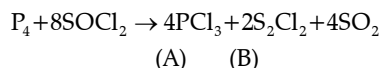
Here in group I, alkali metal the melting point of metal decreases.

**17. Option (3) is correct.**

BeH<sub>2</sub> is an electron deficient hydride in which significant covalent character is observed while LiH is an ionic hydride and NH<sub>3</sub> and Hf are covalent hydride in which inter molecular hydrogen bond are present.

**18. Option (3) is correct.**

Here the reduction of  $\text{-C=O}$  group takes place into  $\text{-CH}_2$  group in the presence of Zn-Hg, HCl. In the given molecule acid sensitive group like -OH is also present which on further reaction in presence of acid gives alkene.

**19. Option (3) is correct.**

The numbers of moles of SO<sub>2</sub> produced = 4

**20. Option (3) is correct.**

$$\frac{P^0 - P_s}{P^0} = \frac{n}{N}$$

from relative lowering of vapour pressure.

Given P<sup>0</sup>-P<sub>s</sub> = 0.20 mm Hg

Vapour pressure of pure water = 54.2 mm Hg

$$\text{Moles of H}_2\text{O (N)} = \frac{100}{18}$$

Moles of glucose = n

$$\frac{0.2}{54.2} = \frac{n}{100/18}$$

$$n = \frac{100 \times 0.2}{54.2 \times 18} = 0.0205 \text{ mole}$$

Mass of glucose = 0.0205 mol × 180 gm/mol = 3.69 gm

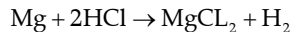
**Section B****21. Correct answer is [4].**

Extensive property in that property which depends on the amount of substance while intensive property is the property which independent on the amount of substance.

Extensive	Intensive
Mole	Molar mass
Volume	Molar heat capacity
Gibbs free energy	Molarity
	E <sup>o</sup> cell

**22. Correct answer is [224].**

The reaction of Mg with HCl produces H<sub>2</sub>.



$$24 \text{ gm} \qquad \qquad \qquad 22.4 \text{ L}$$

24 gm Mg produces 22.4 L H<sub>2</sub>

$$\text{So, } 2.4 \text{ gm Mg produces } \frac{22.4 \text{ L} \times 2.4 \text{ gm}}{24 \text{ gm}} = 2.24 \text{ L}$$

$$\approx 224 \times 10^{-2}$$

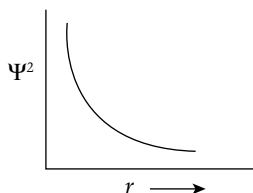
**23. Correct answer is [3].**

According to modern adsorption theory of heterogeneous catalysis, following statement B, C and D are correct.

- B. The adsorption of reactant molecule on the surface of catalyst.
- C Through the formation of intermediate occurrence of chemical reaction takes place on the surface of catalyst.
- D It is the combination of intermediate compound formation theory and old adsorption theory.

24. **Correct answer is [3].**

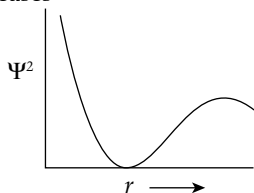
A it is correct statement



$\Psi^2$  represent probability density which is maximum at the nucleus.

B Given statement is incorrect.

For 2S orbital, probability density first decreases & then increases



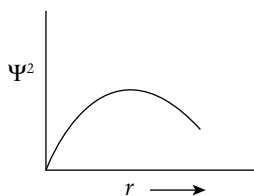
C Given statement is incorrect.

Boundary surface diagram of the orbital encloses a region of 95% probability of finding the electron.

D P-orbital have 1 while d-orbital have 2 angular nodes respectively.

E the density of P-orbital is zero at the nucleus

D and E are correct statement



25. **Correct answer is [4].**

A Correct statement

$E^\circ_{\text{cell}}$  is intensive properties which do not depend upon the quantity of substance.

B Correct statement

If the value of  $E^\circ$  is negative it means the redox couple is a stronger reducing agent than the  $\text{H}^+/\text{H}_2$  couple which have  $E^\circ = 0.0\text{V}$

C&D are correct statements

$w \propto It$

$$w = \frac{Zit}{96500}$$

26. **Correct answer is [6].**

The Formula of salt is

Magnesium nitrate- $\text{Mg}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$

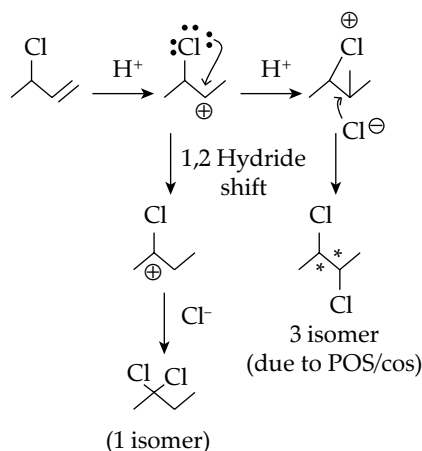
Barium nitrate-  $\text{Ba}(\text{NO}_3)_2$

Here  $x = 6$

$y = 0$

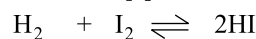
$x + y = 6 + 0 = 6$

27. **Correct answer is [4].**



Total possible product = 3 + 1 = 4 isomer

28. **Correct answer is [1].**



T=0      4.5      4.5      -

          -x      -x      +2x

T=teq    4.5-x    4.5-x    2x

Given

$2x = 3 \text{ mole}$

$x = 1.5 \text{ moles}$

$[\text{H}_2] = [\text{I}_2] = 4.5 - x$

$= 4.5 - 1.5 = 3 \text{ mol}$

$$K_c = \frac{[\text{HI}]^2}{[\text{H}_2][\text{I}_2]} = \frac{(3)^2}{3 \times 3} = 1$$

29. **Correct answer is [3].**

The compound which contain reducing group like -CHO, hemiacetal, hemiketol group can produce orange red precipitate with benedict solution.

Molecule	Benedict test
Glucose	✓
Maltose	✓
Sucrose	✗
Ribose	✓
2-deoxy ribose	✗
Amylose	✗
Lactose	✓

30. **Correct answer is [3].**

The  $\text{I}_3^-$  has three lone pair of electrons.