CHEMISTRY

SECTION - A

Multiple Choice Questions: This section contains 20 multiple choice questions. Each question has 4 choices (1), (2), (3) and (4), out of which **ONLY ONE** is correct.

Choose the correct answer:

1. Which of the following has minimum boiling point?

(1) Na (2) K

(3) Rb (4) Cs

Answer (4)

Sol. Cs has minimum boiling point as boiling point of alkali metals decreases down the group.

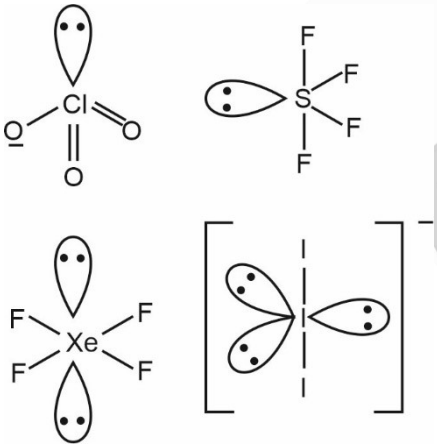
2. Which of the following has maximum number of l.p. at central atom?

(1) ClO_3^- (2) SF_4

(3) XeF_4 (4) I_3^-

Answer (4)

Sol.



From the structures of the given species, it can be clearly seen that I_3^- has maximum number of lone pairs at central atom

3. **Statement-1:** Sulphides are converted into oxide first.

Statement-2: Because oxides can be reduced easily.

(1) Only 1st is correct (2) Only 2nd is correct

(3) Both are correct (4) Both are incorrect

Answer (3)

Sol. Sulphide ores are roasted for conversion to oxides before reduction. Oxides can be easily reduced as compared to sulphides.

4. Red ppt. by Benedict solution is

(1) Glucose

(2) RNA

(3) DNA

(4) Sucrose

Answer (1)

Sol. Benedict solution oxidises aldoses and ketoses to gluconic acid and itself gets reduced to red ppt. of Cu_2O.

Glucose + Benedict solution $\rightarrow$

Gluconic acid + $\underset{\text{(Red)}}{Cu_2O\downarrow}$

DNA, RNA and Sucrose do not react with Benedict solution.

5. $\left[Fe(H_2O)_6\right]^{+3}$, $\left[Fe(CN)_6\right]^{-3}$ magnetic spin only magnetic moment is respectively

(1) 8.87 and 6.92 (2) 5.98 and 1.732

(3) 6.92 and 6.92 (4) 3.87 and 1.732

Answer (2)

Sol. Both complexes have d^5 configuration

$\left[Fe(H_2O)_6\right]^{+3} \rightarrow$ 5 unpaired electrons

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

$\left[Fe(CN)_6\right]^{-3} \rightarrow$ 1 unpaired electron

$\mu = \sqrt{3}$ B. M.

6. **Statement 1 :** Nylon-6 is made by Caprolactum

Statement 2 : LDP is made by $TiCl_4$ & $Al(Et)_3$

(1) Only 1st is correct (2) Only 2nd is correct

(3) Both are correct (4) Both are incorrect

Answer (1)

Sol. $TiCl_4 + Al(Et)_3$ is used as a catalyst in preparation HDP

7. Consider the following change :

$$[NiBr_2Cl_2]^{2-} \longrightarrow [PtCl_2Br_2]^{2-}$$

During the above change, which of the following properties does not change?

(1) Geometrical isomerism

(2) Structure

(3) Optical activity

(4) Splitting energy

Answer (3)

Sol. $[NiBr_2Cl_2]^{2-} \longrightarrow$ This complex species is tetrahedral as $Br^{\ominus}$ & $Cl^{\ominus}$ are weak field ligands.

$[PtBr_2Cl_2]^{2-} \longrightarrow$ As Pt belongs to 5d series, this complex species is square planar.

Splitting energy will be different as central atom is different.

Both the complex species are optically inactive.

$[NiBr_2Cl_2]^{2-}$, being tetrahedral does not show G.I.

$[PtBr_2Cl_2]^{2-}$ shows two G.I.

8. $A \xrightarrow{K} B$

Follows first order kinetics w.r.t. A and B, Both

i.e. $r = K[A]^1[B]^1$

r	[A]	[B]
20	0.1	0.5
(X)	0.4	0.5
40	(0.8)	(Y)

Find out "K" and "Y"

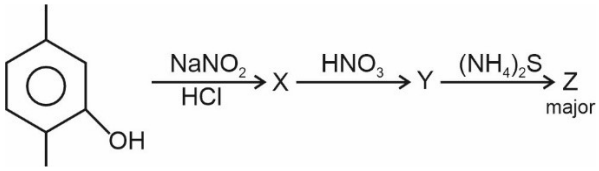
(1) 80, 2 (2) 80, 1

(3) 80, 0.125 (4) 40, 0.125

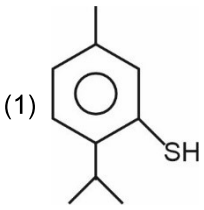
Answer (3)

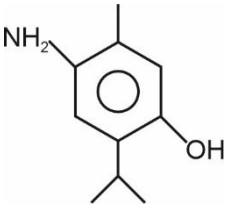
Sol. [A] : 4 times $\Rightarrow$ rate 4 times

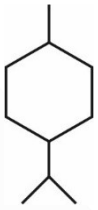
$\Rightarrow$ X = 80

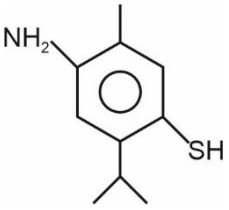
9. 

Compound Z is

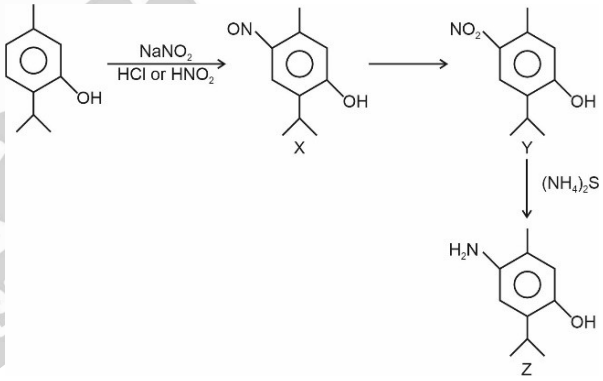
(1) 

(2) 

(3) 

(4) 

Answer (2)

Sol. 

10. What is the chemical formula of freon gas?

(1) $C_2Cl_2F_4$ (2) $C_2F_2H_4$

(3) CHF_3 (4) CCl_2F_2

Answer (4)

Sol. The chemical formula of freon gas is CCl_2F_2.

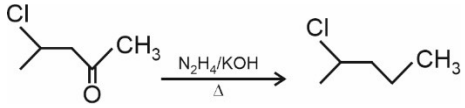
11. 2 gm of x is present in 1 mole of H_2O. Find the mass % of x.

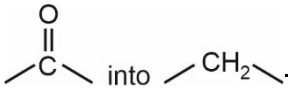
(1) 10% (2) 20%

(3) 5% (4) 7%

Answer (1)

Sol. Mass % of x = $\frac{2}{20} \times 100 = 10$

12. **Assertion:** 

Reason: Wolf Kirshner reduction is used for reduction of  into .

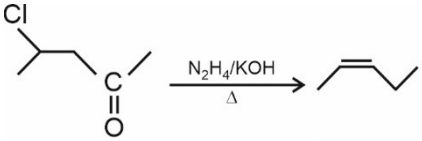
(1) Assertion and Reason both are correct and Reason is correct explanation of Assertion

(2) Assertion and Reason both are correct but the Reason is not correct explanation of Assertion

(3) Assertion and Reason both are incorrect

(4) Assertion is incorrect and reason is correct statement

Answer (4)

Sol. 

Because heating in the presence of base results in elimination

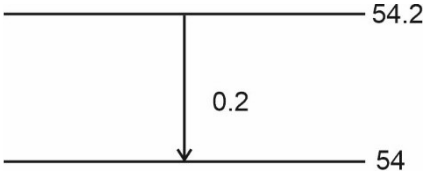
13. Glucose is added in 100 gm of water. Lowering in vapor pressure is 0.2 mm Hg. Vapour pressure of pure water is 54.2 mm Hg. Then weight of glucose is

(1) 3.70 gm (2) 4.92 gm

(3) 6.73 gm (4) 8.74 gm

Answer (1)

Sol.

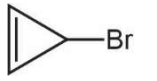
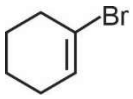


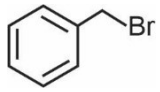
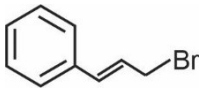
$$\frac{0.2}{54} = \frac{n_{glucose}}{(100/18)}$$

$$n_{glucose}\,\frac{0.2}{54} = \frac{100}{18}$$

Mass of glucose = $\frac{0.2}{54} \times \frac{100}{18} \times 180 = 3.70$ gm

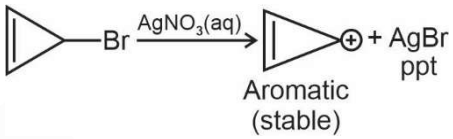
14. Which of the following will not give precipitate with $AgNO_3$(aq.)

(1)  (2) 

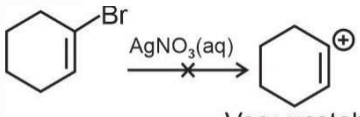
(3)  (4) 

Answer (2)

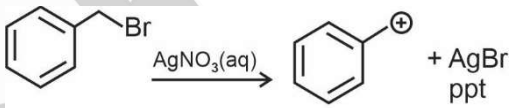
Sol. Compounds which result in the formation of stable carbocation intermediate will give precipitate with aq. $AgNO_3$



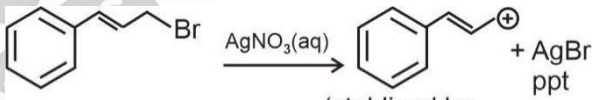
Aromatic (stable)



Very unstable



Benzylic carbocation (stablized by resonance)



(stablized by resonance)

15. Least stable Hydride is

(1) HF (2) LiH

(3) BeH_2 (4) NaH

Answer (3)

Sol. BeH_2 is least stable as it has significant covalent character and is an electron-deficient hydride.

16. Find the root mean square velocity for Nitrogen gas at 27°C (in m/sec)

(1) 426 (2) 517

(3) 327 (4) 646

Answer (2)

Sol. $v = \frac{\sqrt{3RT}}{M} = \sqrt{\frac{3 \times 8.314 \times 300}{28 \times 10^{-3}}}$

$= 516.95$

$\simeq 517$ m/sec

17. **Assertion (A) :** Glycine react with Cl_2 in the presence of red P to give optically active compound

Reason (R) : Compound containing two chiral centres is always optically active

(1) Both (A) & (R) are correct & (R) is the correct explanation of (A)

(2) Both (A) & (R) are correct & (R) is not the correct explanation of (A)

(3) (A) is correct, (R) is incorrect statement

(4) (A) & (R), both are incorrect

Answer (3)

Sol. $H_2N-CH_2-COOH \xrightarrow[Cl_2]{RedP} H_2N-\underset{\underset{Cl}{|}}{\overset{*}{C}}H-COOH$

Contain chiral centre

18.

19.

20.

SECTION - B

Numerical Value Type Questions: This section contains 10 questions. In Section B, attempt any five questions out of 10. The answer to each question is a **NUMERICAL VALUE.** For each question, enter the correct numerical value (in decimal notation, truncated/rounded-off to the second decimal place; e.g., 06.25, 07.00, –00.33, –00.30, 30.27, –27.30) using the mouse and the on-screen virtual numeric keypad in the place designated to enter the answer.

21. How many of the following are intrinsic properties?

Gibbs free energy, E°_{cell}, Volume, Molarity

Answer (02.00)

Sol. E°_{cell} and molarity are intrinsic properties. But Gibb's Free Energy and Volume are extrinsic properties.

22. 2-Chloro-1-butene $\xrightarrow{HCl}$ Number of Isomeric product possible are?

(excluding rearranged products)

Answer (03.00)

Sol. $C=\overset{\overset{Cl}{|}}{C}-C-C \xrightarrow{HCl}$

(i) $C-\overset{\overset{Cl}{|}}{\underset{\underset{Cl}{|}}{C}}-C-C$ (2)

(ii) $C-\overset{\overset{Cl}{|}}{\underset{\underset{Cl}{|}}{C}}-C-C$ (1)

Total 3 Isomers

23. When 2 gm magnesium reasts with excess of HCl and H_2 gas is produced then the volume of H_2 gas produced is ____ × 10^{-2} liter at STP? (Nearest Integer)

Answer (187)

Sol. $Mg + 2HCl \rightarrow MgCl_2 + H_2(g)$

$\frac{2}{24}$ $\frac{2}{24} \times 22.4$

$= 1.87$ L

$\simeq 187 \times 10^{-2}$ L

24. $P_4 + SOCl_2 \longrightarrow 4PCl_3 + x\ SO_2 + y\ S_2Cl_2$

x + y is _____

Answer (6)

Sol. $P_4 + 8SOCl_2 \longrightarrow 4PCl_3 + 4SO_2 + 2S_2Cl_2$

x = 4

y = 2

x + y = 6

25.

26.

27.

28.

29.

30.