JEE-Mains-11-04-2023 [Memory Based] [Evening Shift]

Chemistry

Question: Which alkali metal has the lowest melting Point?
Options:
(a) Li
(b) Na
(c) Cs
(d) K
Answer: (c)
Solution:

	Melting point
Li	454
Na	371
K	336
Rb	312
Cs	302 (Lowest melting point)

Question: Number of correct statements about modern adsorption theory
Options:
(a) Diffusion of reactants to the surface of the catalyst.
(b) Adsorption of reactant molecules on the surface of the catalyst.
(c) Desorption of reaction products from the catalyst surface, and thereby, making the surface available again for more reaction to occur.
(d) All of these
Answer: (d)
Solution: All options are correct.

Question: 2g of X is dissolved in 1 mol of water. Find mass percentage of X in the solution.
Options:
(a) 10%
(b) 20%
(c) 30%
(d) 40%
Answer: (a)

Solution: The mass % of solute in solution is $= \dfrac{\text{Mass of solute}}{\text{Mass of soluter}} \times 100$

mass % $= \dfrac{2}{20} \times 100 = 10\%$
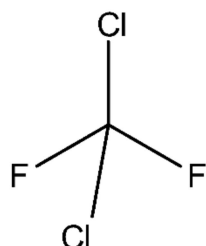
Question: Chemical Formula of Freons
Options:
(a) C_2F_4
(b) CCl_2F_2
(c) $C_2H_2F_2$
(d) $C_2H_2Cl_2$
Answer: (b)
Solution:

Question: Statement-1: Low density polymer is formed by polymerisation of ethene in the presence of triethylaluminium and titanium tetrachloride (Ziegler-Natta catalyst) at a temperature of 333 K to 343 K and under a pressure of 6-7 atmospheres.

Statement-2: Nylon 6 is obtained by heating caprolactum with water at 500K.

Options:
(a) Both statements I and II are correct
(b) Both statements I and II incorrect
(c) Statement I is correct and II is incorrect
(d) Statement I is incorrect and II is correct
Answer: (d)
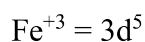**Solution:** Statement-1 is incorrect, statement-2 is correct.

Question: Magnetic moment $[Fe(CN)_6]^{3-}$ and $[Fe(H_2o)_6]^{3+}$ respectively are :
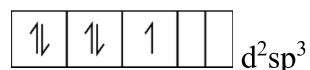**Options:**
(a) 2.92 and 3.73
(b) 1.12 and 4.71
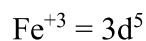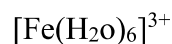(c) 1.73 and 5.92
(d) 5.92 and 1.73
Answer: (c)
Solution:

$[Fe(CN)_6]^{3-}$

$Fe^{+3} = 3d^5$

S.F.L is present so passing will take place

| ⇅ | ⇅ | ↑ | | | | d^2sp^3

1 unpaired electron

$= \sqrt{1(1+2)}$ B.M

$= \sqrt{3}$ B.M = 1.73 B.M

$[Fe(H_2o)_6]^{3+}$

$Fe^{+3} = 3d^5$

W.F.L is present so passing will not take place

| 1 | 1 | 1 | 1 | 1 | sp^3d^2
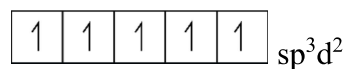
5 unpaired electrons

$= \sqrt{5(5+2)}$ B.M

= 5.92 B.M

Question: $P_4 + 8SOCl_2 \rightarrow 4A +2 B + x SO_2$.
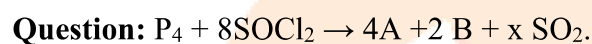
Sum of A, B, x are

Options:
(a) 4
(b) 6
(c) 8
(d) 10
Answer: (d)
Solution: $P_4 + 8SOCl_2 \rightarrow 4PCl_3 +4SO_2 + 2S_2Cl_2$
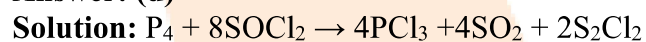
$4 + 4 + 2 = 10$

Question: Number of intensive properties are :
E_{cell}, Molarity, Gibbs free energy, Molar mass, Mole, Molar heat capacity?
Options:
(a) 2
(b) 4
(c) 3
(d) 5
Answer: (b)
Solution:

E_{cell}, Molarity, Molar heat capacity

Molar mass, Intensive properties

Question: Which species has maximum number of lone pairs on central atoms?
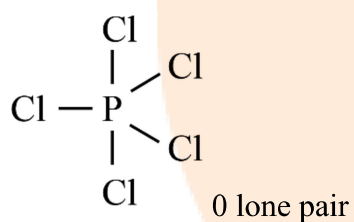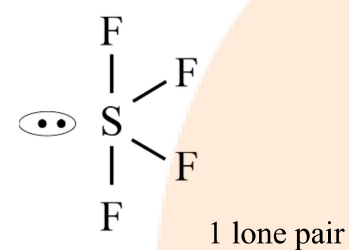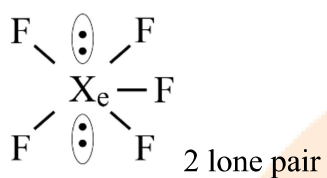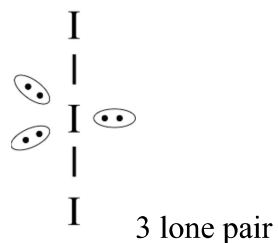**Options:**
(a) I_3^-

(b) XeF_4
(c) SF_4
(d) PCl_5
Answer: (a)
Solution:

3 lone pair

2 lone pair

1 lone pair

0 lone pair

Question: How many of them will not reacts with benedict's solution?
Sucrose, Glucose, maltose, lactose, amylose, deoxyribose, ribose
Options:
(a) 2
(b) 3
(c) 4
(d) 1
Answer: (a)
Solution: Sucrose, amylose

Not react with Benedict's solution

Question: In $Mg(NO_3)_2.xH_2O$ and $Ba(NO_3)_2 .yH_2O$, find x + y.
Options:
(a) 6
(b) 7

(c) 8
(d) 12
Answer: (a)
Solution:

$Mg(NO_3)_2 . 6H_2O$

$Ba(NO_3)_2 . O$
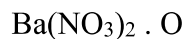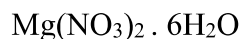
$6 + 0 = 6$

Magnesium nitrate crystallises with six molecules of water, whereas barium nitrate crystallises as the anhydrous salt. This again shows a decreasing tendency to form hydrates.
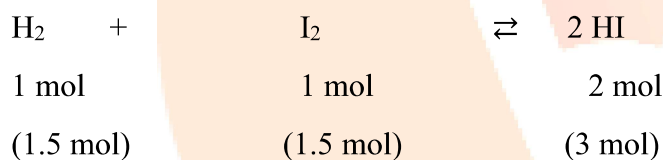
Question: $H_2 + I_2 \rightleftharpoons 2\,HI$
Initial concentration of H_2 and I_2 each 4.5 mole. Find the equilibrium constant when 3 mole of HI is formed at equilibrium.
Options:
(a) 1
(b) 2
(c) 3
(d) 4
Answer: (a)
Solution:

H_2	$+$	I_2	$\rightleftharpoons$	$2\,HI$
1 mol		1 mol		2 mol
(1.5 mol)		(1.5 mol)		(3 mol)

$$k_C = \frac{[HI]^2}{[H_2][I_2]} = \frac{[3]^2}{[3][3]} = 1$$

Question: Which of the following property will change when Ni in $[NiCl_2Br_2]^{2-}$ is changed by Pt.
I. Hybridisation II. Magnetic moment
Options:
(a) Hybridisation,
(b) Magnetic moment
(c) Both
(d) None
Answer: (c)
Solution: $[NiCl_2Br_2]^{2-} = Ni^{+2}$ WFL is attached so no pairing will take place

⇅	⇅	⇅	↑	↑								

sp^3 paramagnetic n = 2

$\sqrt{2(4)}$ $\sqrt{8}$ B M

= 2.82 B.M

$[PtCl_2Br2]^{2-}$

In case of pt all ligand work as S.F.L

Then pairing will take place

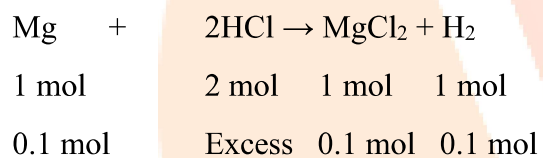| ⇅	⇅	⇅	⇅	
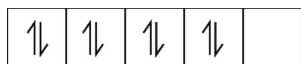
Hybridization = dsp^2

Magnitude moment = 0

Question: 2.4 g of Mg reacts with excess of HCl. Then find the Volume of H_2 formed at STP.
Options:
(a) 1.14 L
(b) 2.24 L
(c) 5.14 L
(d) 6.14 L
Answer: (b)
Solution:

Mg + 2HCl → $MgCl_2 + H_2$

1 mol   2 mol   1 mol   1 mol

0.1 mol   Excess   0.1 mol 0.1 mol

$0.1 = \dfrac{V}{22.4}$

V = 2.24 Let