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JEE Main (2024)

MEMORY BASED PAPER SOLUTION

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CHEMISTRY

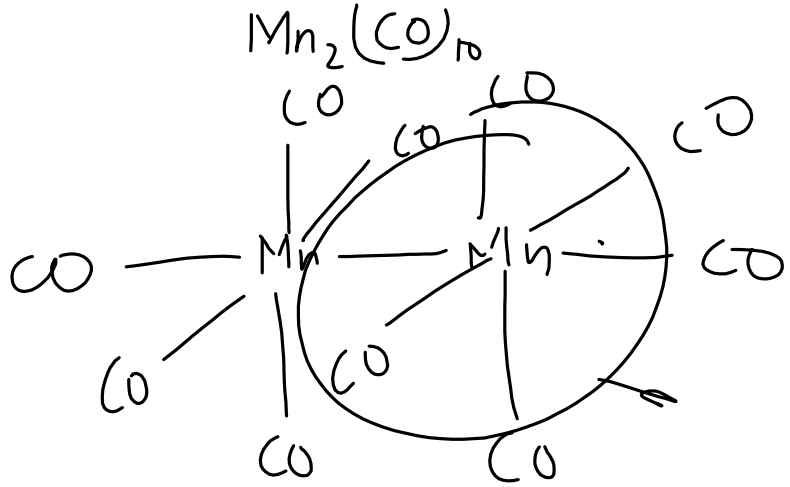
Q. Geometry of Decacarbonyl dimanganese (0) is :

(1) Octahedral

(2) Square planar

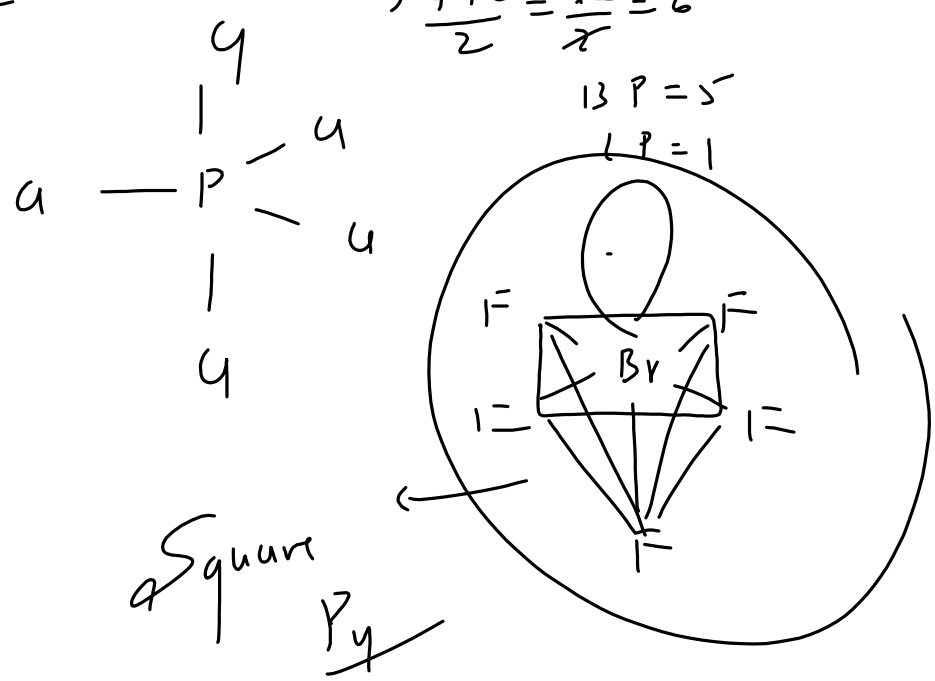
(3) Trigonal bipyramidal

(4) Square pyramidal



Q. Which of the following species has square pyramidal geometry ?

(1) PCl_5 (2) BrF_5 (3) PF_5 (4) $[Ni(CN)_4]^{2-}$



Q. **Statement-1 :** H_2Te is more acidic than H_2S.

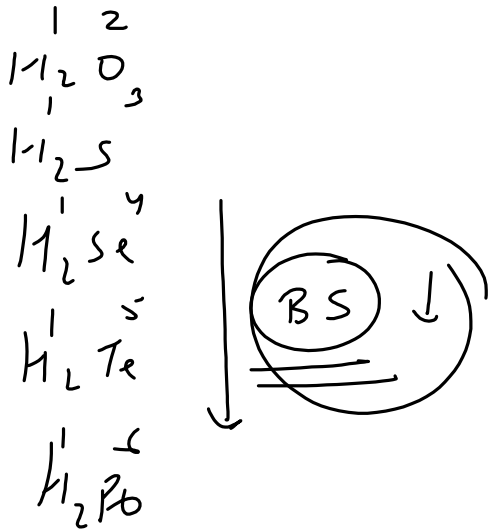
Statement-2 : H_2Te has less bond strength than H_2S.

(1) Statement-1 and Statement-2 are correct.

(2) Statement-1 and Statement-2 are incorrect.

(3) Statement-1 is correct and Statement-2 is incorrect.

(4) Statement-1 is incorrect and Statement-2 is correct.



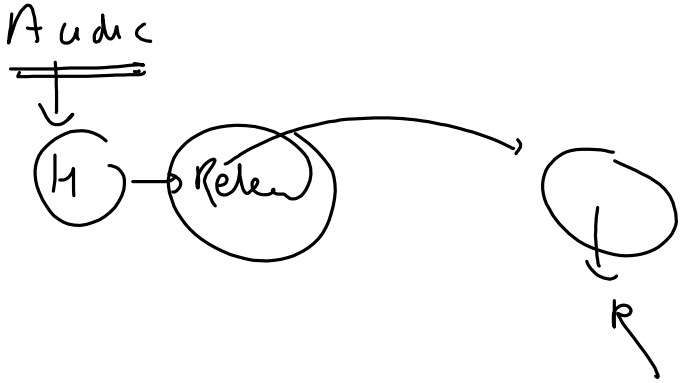
Q. Among the following correct statement is :

(1) Stability of hydrides order: $NH_3 < PH_3 < AsH_3 < SbH_3 < BiH_3$

(2) Reducing strength order: $NH_3 < PH_3 < AsH_3 < SbH_3 < BiH_3$

(3) NH_3 is strongest reducing agent while BiH_3 is mild reducing agent

(4) Basicity of hydrides: $NH_3 < PH_3 < AsH_3 < SbH_3 < BiH_3$



Q. Given standard electrode potential of BrO_4^-, IO_4^- and ClO_4^- are 1.85 V, 1.65 V and 1.20 V respectively then select order of their oxidizing power :

(1) $ClO_4^- < BrO_4^- < IO_4^-$

(2) $IO_4^- < BrO_4^- < ClO_4^-$

(3) $ClO_4^- < IO_4^- < BrO_4^-$

(4) $BrO_4^- < ClO_4^- < IO_4^-$

Red^n

R P ↑

Oxidising Power ↑

Q. **Statement-1:** Since fluorine is more electronegative than nitrogen, the resultant dipole moment of NH_3 is greater than that of NF_3.

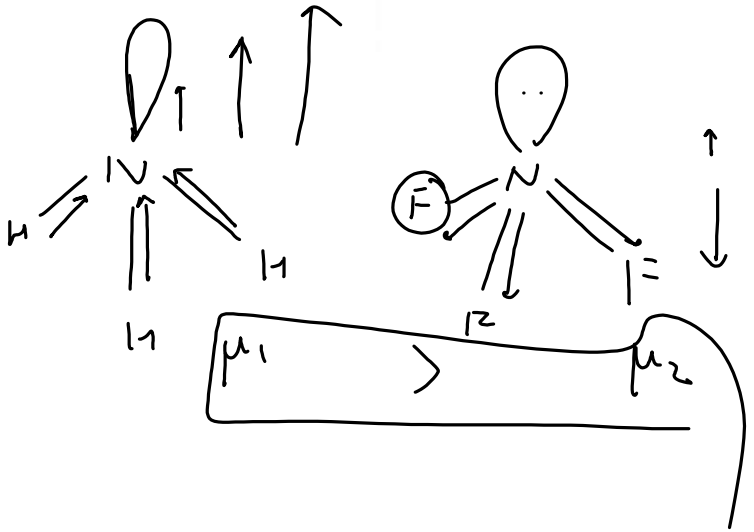
Statement-2: In case of NH_3 the orbital dipole due to lone pair is in the same direction as the resultant dipole moment of N-H bonds, whereas in NF_3 the orbital dipole is in the direction opposite to the resultant dipole moment of three N-F bonds.

(1) Statement I and Statement II are correct.

(2) Statement I is correct and Statement II is incorrect

(3) Statement I is incorrect and Statement II is correct

(4) Statement I and Statement II are incorrect



Q. In a mixture of B & C, A is added. Given moles of A, B & C are respectively n_A, n_B & n_C then determine mole fraction of C.

(1) $\frac{n_C}{n_A + n_B + n_C}$ (2) $\frac{n_C}{n_A . n_B + n_C}$ (3) $\frac{n_C}{n_A . n_C + n_B}$ (4) $\frac{n_C}{n_A + n_B}$

$\frac{n_C}{n_A + n_B + n_C}$

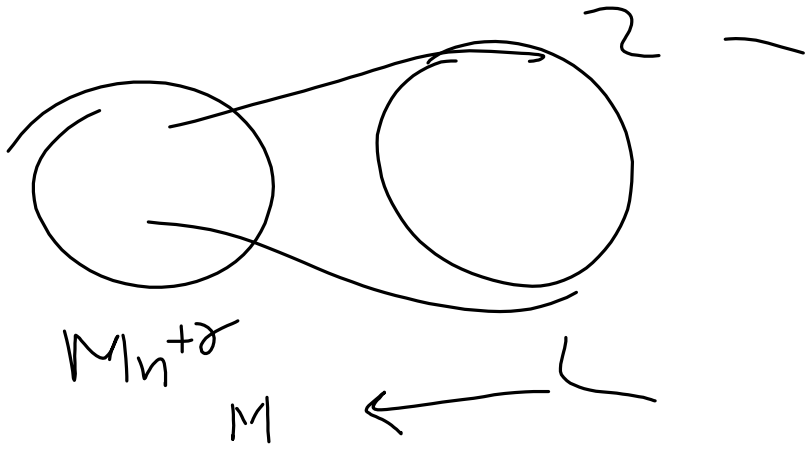
Q. The colour of $KMnO_4$ and $K_2Cr_2O_7$ is due to

(1) d-d transition

(2) Metal to ligand charge transfer

(3) Ligand to metal charge transfer

(4) F-Center



Q. $MnO_2 + KOH + O_2 \xrightarrow{\Delta} [X]$

$[X] \xrightarrow[\text{Process}]{\text{Electrolytic}} [Y]$

Select correct option

	[X]	[Y]
(1)	MnO_4^-	MnO_4^{-2}
(2)	MnO_4^{-2}	MnO_4^-
(3)	Mn_2O_3	Mn
(4)	Mn_2O_7	MnO_4^-

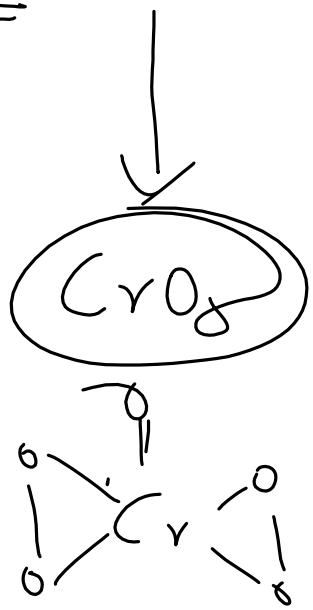
Q. $CrO_2Cl_2 + NaOH \longrightarrow [X]$

$[X] + HCl + H_2O_2 \longrightarrow [Y]$

Select correct option

	[X]	[Y]
(1)	Na_2CrO_4	CrO_5
(2)	$Na_2Cr_2O_7$	Cr_2O_3
(3)	CrO_5	Na_2CrO_4
(4)	Cr_2O_3	$Na_2Cr_2O_7$

$Na_2CrO_4 + HCl + H_2O_2$



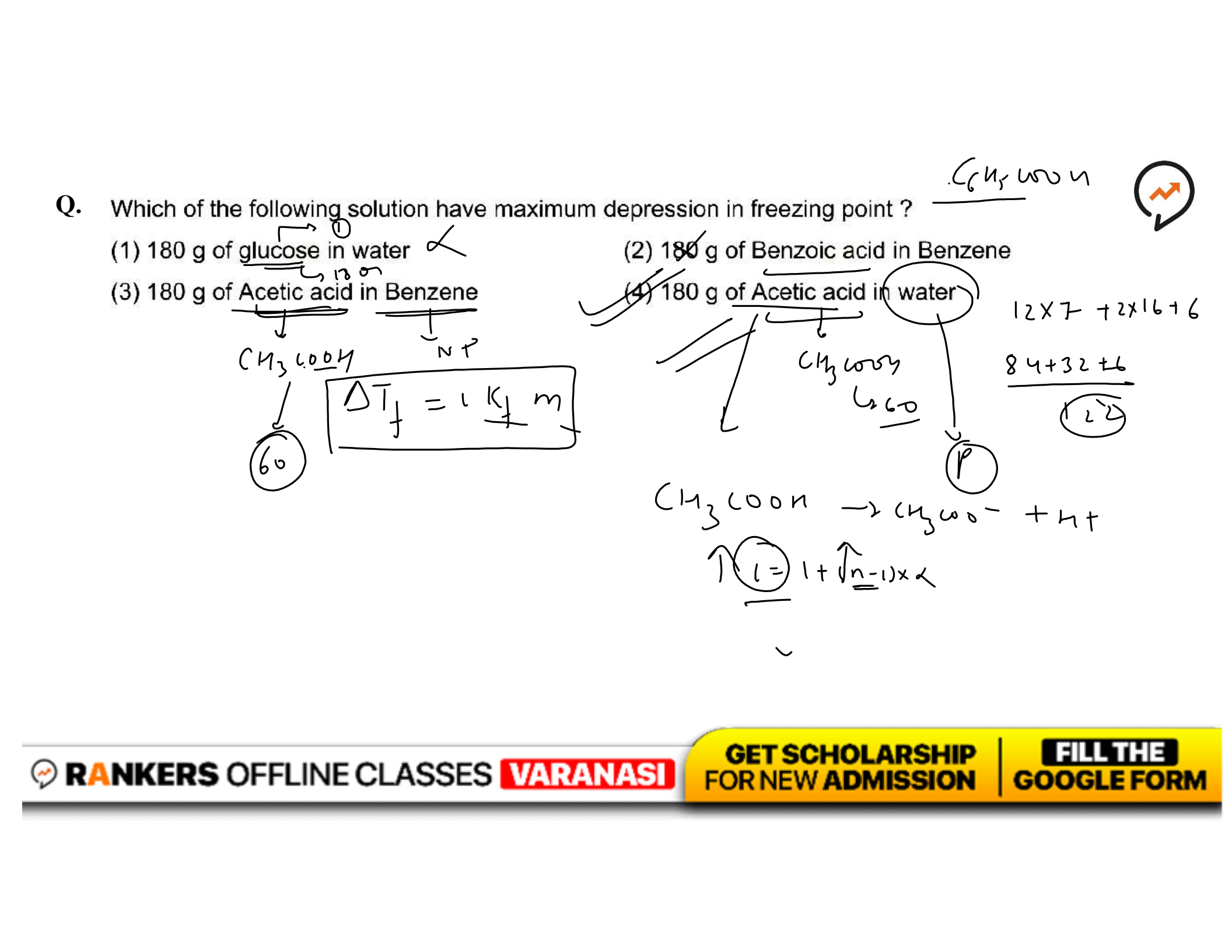
Q. Which of the following solution have maximum depression in freezing point ?

(1) 180 g of glucose in water

(2) 180 g of Benzoic acid in Benzene

(3) 180 g of Acetic acid in Benzene

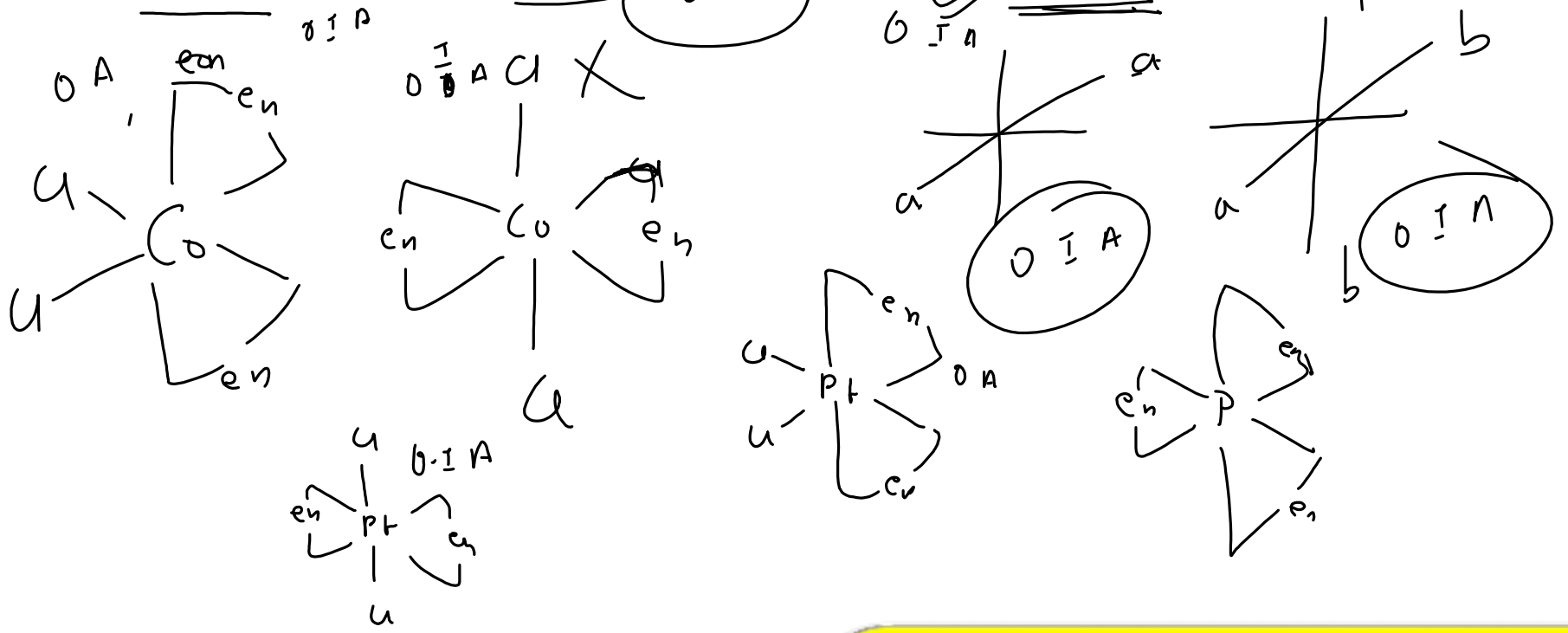
(4) 180 g of Acetic acid in water



Q. Among the following how many are optical active

(i) cis $[Co(en)_2Cl_2]$ (ii) trans $[Co(en)_2Cl_2]$ (iii) cis $[Pt(en)_2Cl_2]^{+2}$

(iv) trans $[Pt(en)_2Cl_2]^{+2}$ (v) $[Pt(en)_3]^{+4}$ (vi) $[Pt(en)Cl_4]$



Q. In He^+ ion an electron Jumps from 5^{th} excited state to 1^{st} excited state, then total number of spectral lines formed are (10).

$n = 6$ $\quad$ $n = 2$

$$TSL = \frac{(n_2 - n_1)(n_2 - n_1 + 1)}{2}$$

$$= \frac{(6-2)(6-2+1)}{2}$$

$$= \frac{{}^{2}4 \times 5}{\cancel{2}} = 10 \rightarrow TSL$$

Q. Using following reaction

(i) $2\,Fe_{(s)} + \frac{3}{2}\,O_2(g) \longrightarrow Fe_2O_{3(s)}$ $\quad \Delta H°_{rxn} = -822$ KJ\mole.

(ii) $C_{(s)} + \frac{1}{2}\,O_{2(g)} \longrightarrow CO_{(g)}$ $\quad \Delta H°_{rxn} = -110$ KJ/Mole.

The value of $\Delta H°_{rxn}$ for reaction $Fe_2O_{3(s)} + 3C_{(s)} \longrightarrow 2Fe_{(s)} + 3CO$ is _____ KJ [Nearest integer]

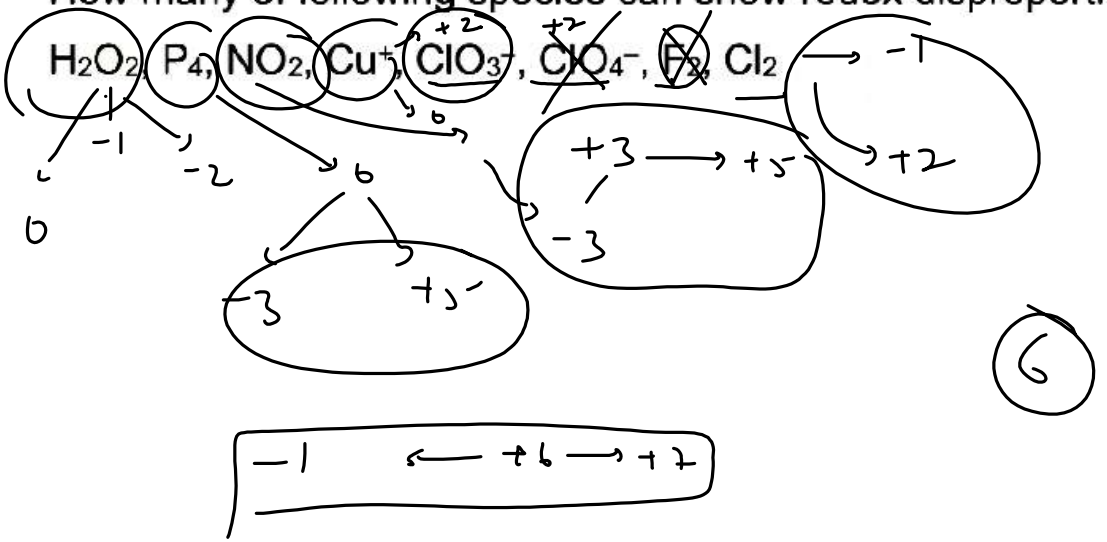
$Fe_2O_3 \longrightarrow 2Fe + \frac{3}{2}O_2 \quad | \Delta H = +822 \text{ KJ/mol}$

$3C + \frac{3}{2}O_2 \longrightarrow 3CO \quad | \Delta H = -330$

$Fe_2O_3 + 3C \longrightarrow 2Fe + 3CO \quad | \quad 492 \text{ KJ/mol}$

Q. How many of following species can show redox disproportion reaction.

H_2O_2, P_4, NO_2, Cu^+, ClO_3^-, ClO_4^-, F_2, Cl_2



Q. How many of the following can show flame colour test ?

Be, Mg, Sr, Ba, Li, Cu

→ 4

Q. In buffer solution of benzoic acid (a) and sodium benzoate (s) pH of solution is 4.5. then ratio of moles of salt to moles of acid is ___2___ [Nearest Integer]

[Give pKa (Benzoic acid) = 4.5 and log2 = 0.3]

→ acidic Buffer

↳ 4.2

$$\Rightarrow \quad pH = pK_a + \log\left(\frac{s}{a}\right)$$

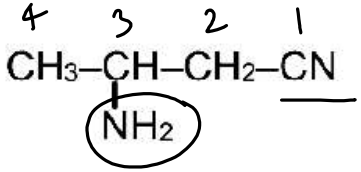
$$\Rightarrow \quad 4.5 = 4.2 + \log\left(\frac{s}{a}\right)$$

$$\Rightarrow \quad 0.3 = \log\left(\frac{s}{a}\right)$$

$$\Rightarrow \quad \log 2 = \log\left(\frac{s}{a}\right)$$

$$\left(\frac{s}{a}\right) = 2$$

$$\frac{n_s}{n_a} = 2$$

Q. IUPAC name of  is :

(1) 3-Aminobutanenitrile
(2) 3-Aminobutanecarbonitrile
(3) 2-Amino-1-cyanopropane
(4) 3-Aminebutanenitrile

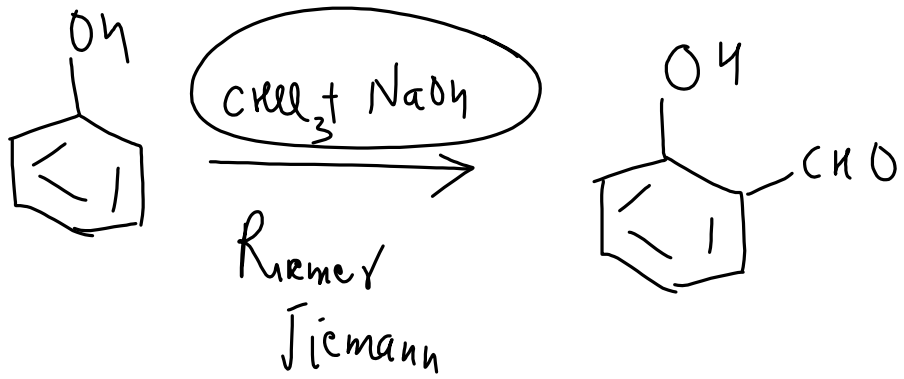
Q. Which reagent on reaction with phenol give salicyldehyde :

(1) CO_2, NaOH

(2) $CHCl_3$, NaOH

(3) CCl_4, NaOH

(4) H_2O, H^+



Q. The correct order of stability for given carbocations is :

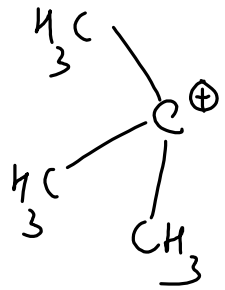
(I) $(CH_3)_3C^+$, (II) $(CH_3)_2CH^+$, (III) $CH_3CH_2^+$, (IV) CH_3^+

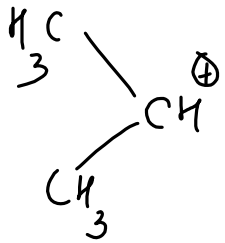
(1) II > I > III > IV

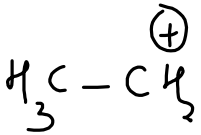
(2) I > II > III > IV

(3) IV > III > II > I

(4) I > II > IV > III





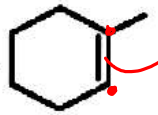


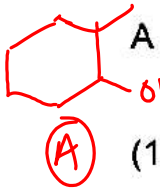
α-H = 9

α-H = 6,

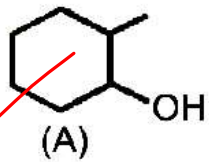
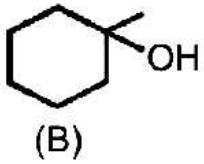
$\alpha = 3$,

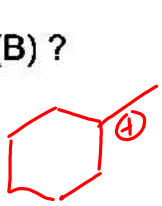
$\alpha = 0$

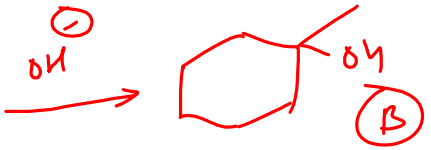
Q. (A) $\xleftarrow[H_2O_2 / OH^-]{BH_3 / THF}$  $\xrightarrow{H^+ / H_2O}$ (B) ?

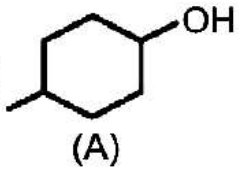
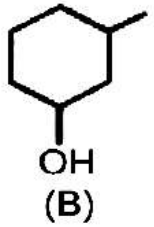


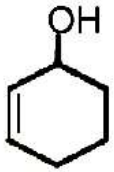
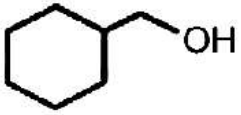
A & B are respectively

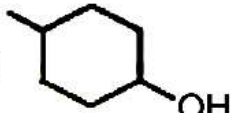
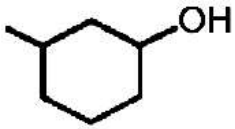
(1)  (A)  (B)



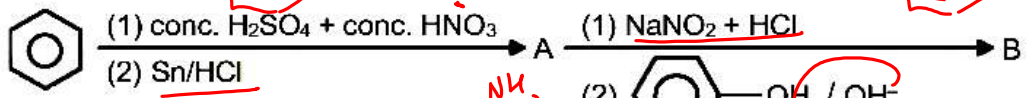


(2)  (A)  (B)

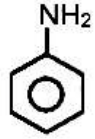
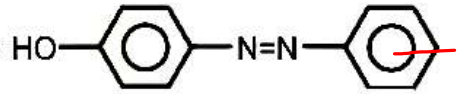
(3)  (A)  (B)

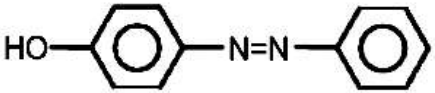
(4)  (A)  (B)

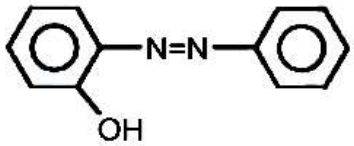
Q.

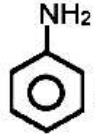
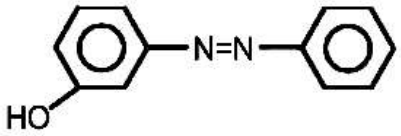


What is A and B

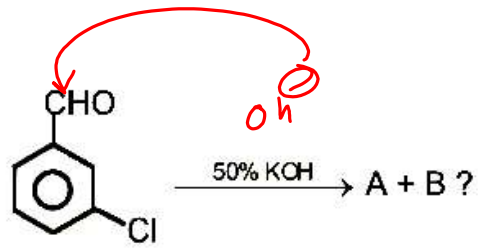
(1) A =  ; B = 

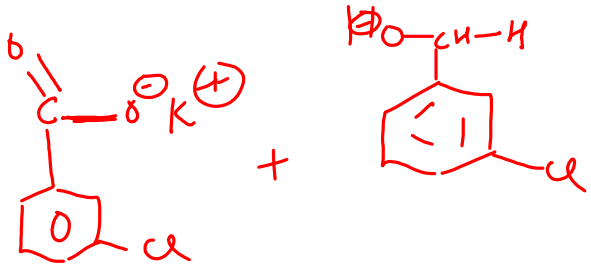
(2) A =  ; B = 

(3) A =  ; B = 

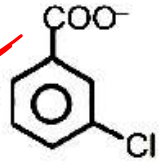
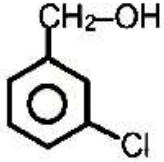
(4) A =  ; B = 

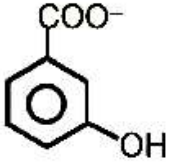
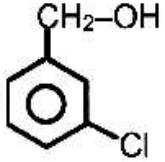
Q.

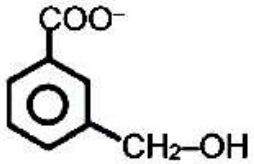
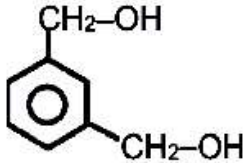


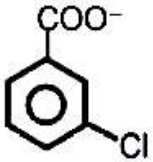
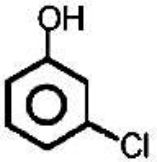


A & B are respectively

(1) A =  ; B = 

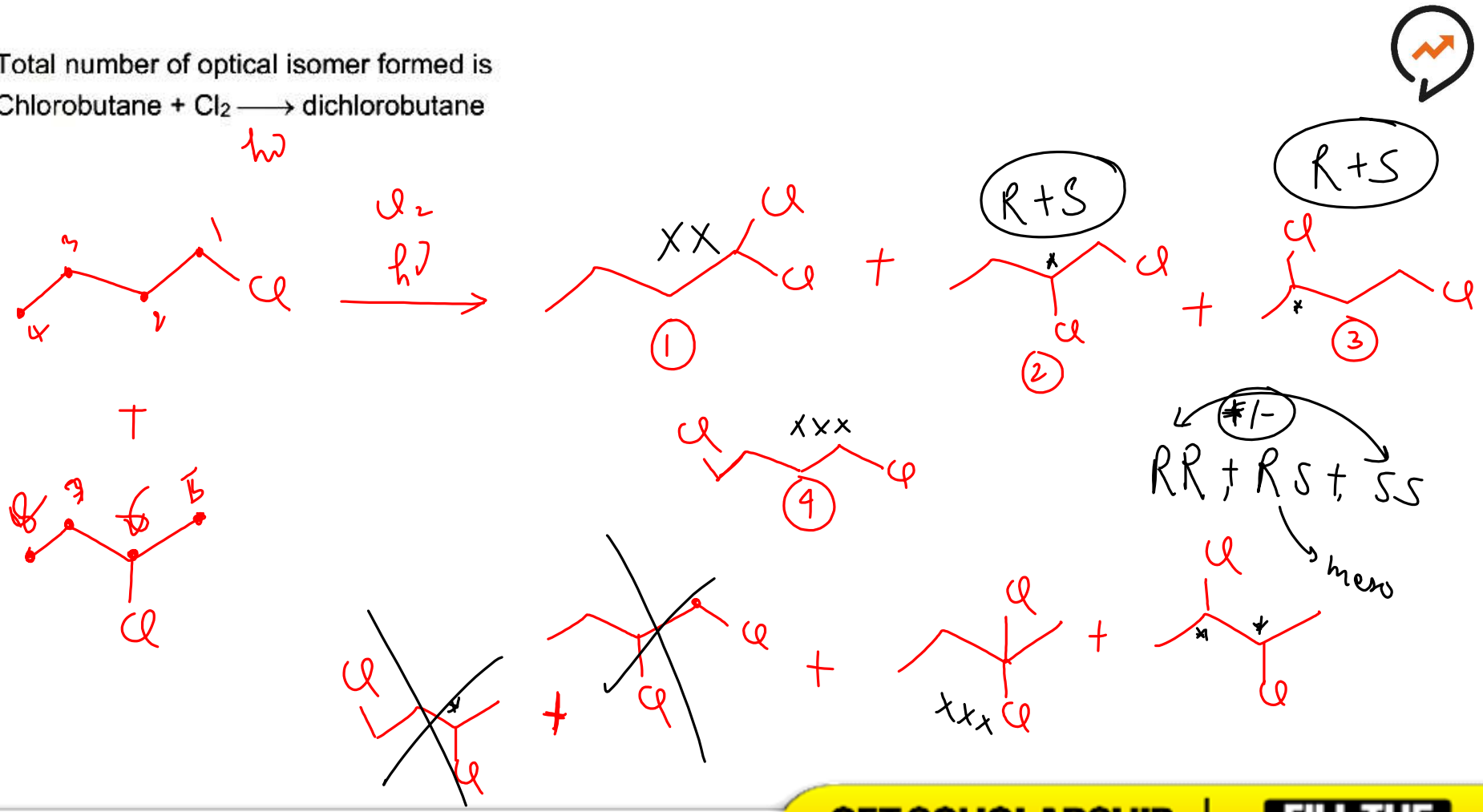
(2) A =  ; B = 

(3) A =  ; B = 

(4) A =  ; B = 

Q. Total number of optical isomer formed is

Chlorobutane + $Cl_2 \xrightarrow{h\nu}$ dichlorobutane



Q. Total number of geometrical isomer possible for given compound is ?