JEE-Main-30-01-2024 (Memory Based) [EVENING SHIFT]

Chemistry

Question: Why $KMnO_4$ shows colour ?
Options:
(a) Due to d-d transition
(b) Due to metal to ligand charge transfer
(c) Due to ligand to metal charge transfer
(d) Due to F - center
Answer: (c)
Solution: The transition of a nonbonding 2p oxygen electron to the vacant molecular orbital of a tetrahedral complex causes the lowest energy Ligand to Metal charge transfer.

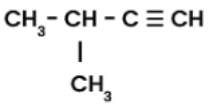
Question: C is added to solution of A and B, find mole fraction of C
Options:
(a) $n_c / (n_A + n_B + n_c)$
(b) $n_c / (n_A - n_B + n_c)$
(c) $n_c / (n_A - n_c + n_B)$
(d) $n_c / (n_A + n_B)$
Answer: (a)
Solution:

$$\text{Mole fraction} = \frac{\text{moles of one component}}{\text{Total moles of all component}}$$

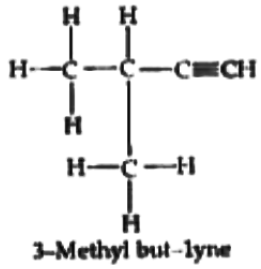
$\therefore$ Sum of mole fractions of all components in solution is always one.

$$i.e., x_A + x_B + x_C = \frac{n_A}{n_A + n_B + n_C} + \frac{n_B}{n_A + n_B + n_C} + \frac{n_C}{n_A + n_B + n_C} = 1$$

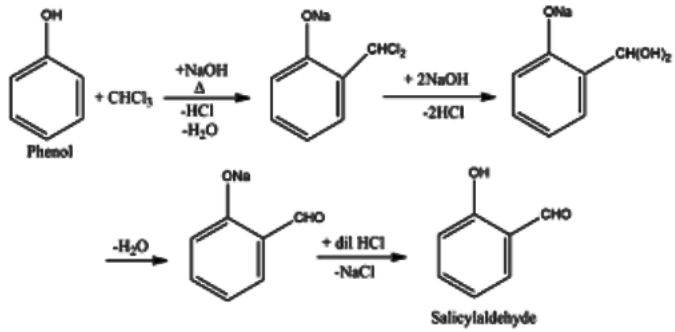
Question: IUPAC name of compound:



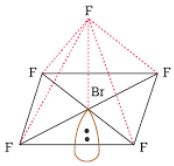
Options:
(a) 2-Methylbutyne
(b) 3-Methylbut-1-yne
(c) 2-Methylbutene
(d) 3-Mehtylbutane
Answer: (b)
Solution:

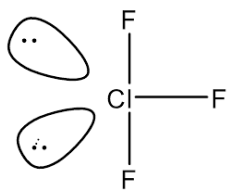


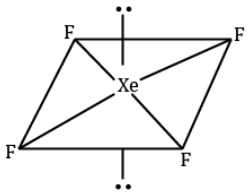
Question: Which reagent on reacting with phenol gives salicylaldehyde ?
Options:
(a) CO_2 , NaOH
(b) $CHCl_3$, NaOH
(c) CCl_4 , NaOH
(d) H_2O, H^+
Answer: (b)
Solution:

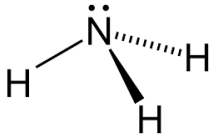


Question: Which of the following has a square pyramidal shape ?
Options:
(a) ClF_3
(b) BrF_5
(c) XeF_4
(d) NH_3
Answer: (b)
Solution:









Question: Statement I: NH_3 has lower dipole moment than NF_3

Statement II: In NF_3 flow of electron is in same direction.

Options:

(a) Both statement I and statement II are false

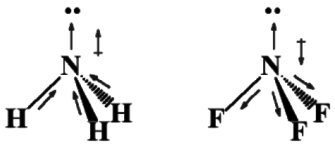
(b) Statement I is true but statement II is false

(c) Statement I is false but statement II is true

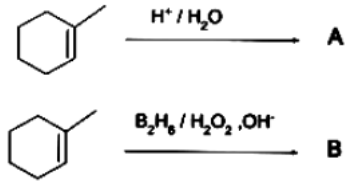
(d) Both statement I and statement II are true

Answer: (a)

Solution:

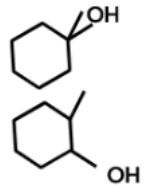


Question: Identify A and B

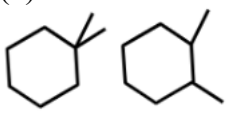


Options:

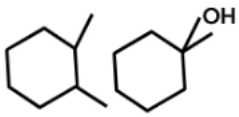
(a)



(b)



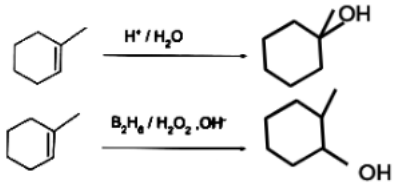
(c)



(d) None of the above

Answer: (a)

Solution:



Question: What happens when phenol is treated with chloroform in presence of NaOH at 343 K followed by hydrolysis ?

Options:

(a) Salicylic Acid

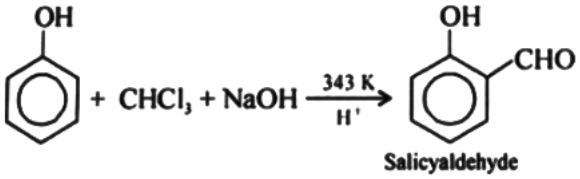
(b) Salicylaldehyde

(c) Benzaldehyde

(d) Benzoic acid

Answer: (c)

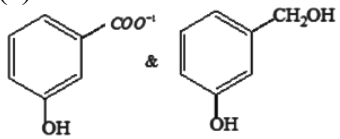
Solution:



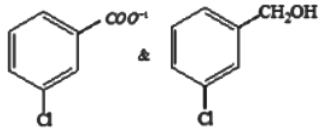
Question: When m - chlorobenzaldehyde is treated with 50% KOH solution, the product(s) obtained is

Options:

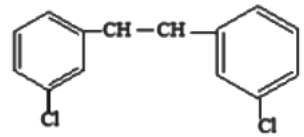
(a)



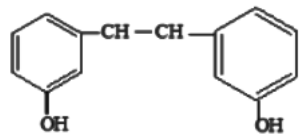
(b)



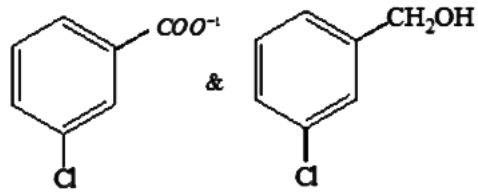
(c)



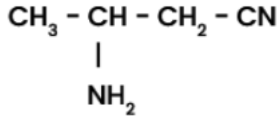
(d)



Answer: (b)
Solution:

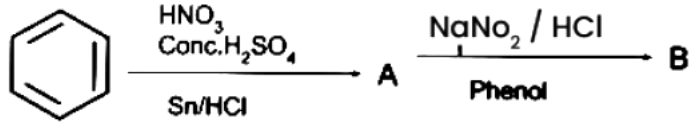


Question: Correct IUPAC name the given compound is :

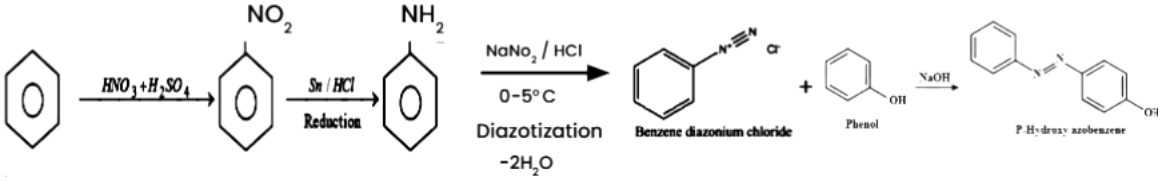


Options:
(a) 3- aminobutanenitrile
(b) 3- amino cyano butane
(c) 2- aminobutanenitrile
(d) 1- aminobutanenitrile
Answer: (a)

Question: Find B

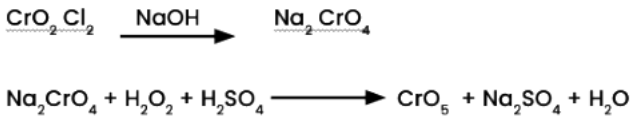


Options:
(a) p-hydroxy azobenzene
(b) o-hydroxy azobenzene
(c) m-hydroxy azobenzene
(d) Azodye
Answer: (a)
Solution:



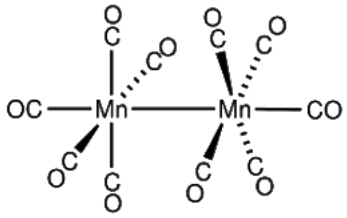
Question: In the given reaction A and B respectively are
$CrO_2Cl_2 + NaOH \rightarrow A + NaCl + H_2O$
$H_2SO_4 + A + H_2O_2 \rightarrow B$
Options:
(a) Na_2CrO_4, and CrO_5
(b) CrO_5 and Na_2CrO_3
(c) Na_2CrO_4 and CrO_3

(d) $Na_2 Cr_2 O_7$ and Na_2CrO_4
Answer: (a)
Solution:



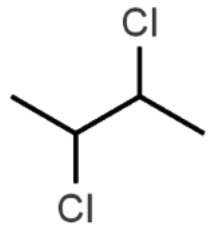
Question: _____ is based on the difference in the solubility of different components of a mixture with a solvent.
Options:
(a) Filtration
(b) Sublimation
(c) Crystallization
(d) Chromatography
Answer: (d)

Question: What is the structure of $Mn_2 (CO)_{10}$?
Options:
(a) Two square pyramidal units joined by bridging CO ligands
(b) Two square pyramidal units joined by Mn-Mn Bond
(c) Two tetrahedral units joined by Mn-Mn Bond
(d) Two square planer units joined by Mn-Mn Bond
Answer: (b)
Solution:

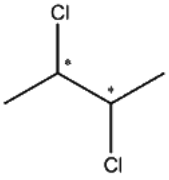


Question: Statement I: H_2 Te is more acidic than H_25
Statement II: H_2 Te has more BDE than H_25
Options:
(a) Statement I and II both are correct
(b) Statement I and II both are incorrect
(c) Statement I is incorrect and Statement II is correct
(d) Statement I is correct and Statement II is incorrect
Answer: (d)
Solution: The bond dissociation enthalpy of H_2 Te is lower than that of H_2 S, and H_2 Te is more acidic

Question: Total optically active compound will show by these compound



Solution:



2, 3 - Dichlorobutane

Number of d and l isomers = $2^{n-1} = 2^{2-1} = 2$
Number of meso forms = $2^{n/2-1} = 2^{2/2-1} = 1$
Total number of stereoisomers = 2 + 1 = 3.

Question: Number of spectral lines in the $He^{+}$for transition from n = 5 to n = 1
Solution:

$$\frac{\Delta n(\Delta n+1)}{2} \Rightarrow \frac{4(5)}{2} \Rightarrow 10$$