

JEE-Main-26-07-2022-Shift-1 (Memory Based)

Chemistry

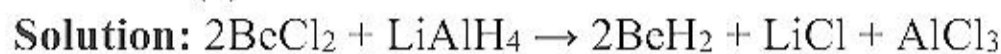
Question: The product formed in the given reaction



Options:

- (a) H_2
- (b) BeH_2
- (c) Both (a) and (b)
- (d) None of the above

Answer: (b)



Question: Which of the following can help in preventing decomposition of H_2O_2 ?

Options:

- (a) Formaldehyde
- (b) Formic acid
- (c) Ethanol
- (d) Urea

Answer: (d)

Solution: In the presence of metal surfaces or traces of alkali (present in glass containers), the reaction is catalysed. It is, therefore, stored in wax-lined glass or plastic vessels in dark. Urea can be added as a stabiliser.

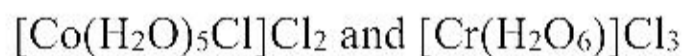
Question: Difference in spin magnetic moment of $[\text{Co}(\text{H}_2\text{O})_5\text{Cl}]\text{Cl}_2$ and $[\text{Cr}(\text{H}_2\text{O})_6]\text{Cl}_3$

Options:

- (a) 1 BM
- (b) 0 BM
- (c) 2 BM
- (d) 3 BM

Answer: (a)

Solution:



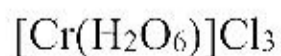
Co is in +3 oxidation state

It means valence shell configuration is $3d^6$ and high spin complex



$n = 4$

$$\mu = \sqrt{4(4+2)} = \sqrt{24} \text{ B M} = 4.89 \text{ BM}$$



Cr^{3+} has valence shell configuration $3d^3$



$$n = 3$$

$$\mu = \sqrt{n(n+2)} = \sqrt{3(3+2)} = \sqrt{15} \text{ B M} = 3.87 \text{ BM}$$

Difference between spin magnetic moment = $4.89 - 3.87 \approx 1 \text{ BM}$

Question: Find the order of the reaction if concentration changes from 0.5 to 1 and half life changes from 100 s to 50 s

Options:

- (a) Zero order
- (b) First order
- (c) Second Order
- (d) None of these

Answer: (c)

Solution:

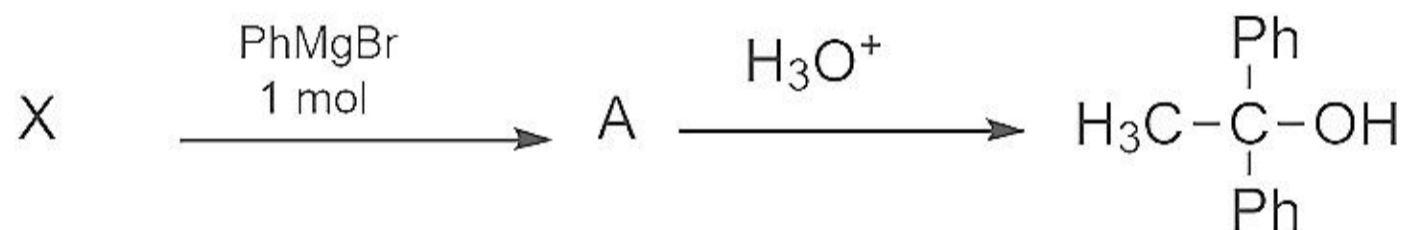
$$t_{1/2} \propto \frac{1}{[A_0]^{n-1}}$$

$$\frac{(t_{1/2})_1}{(t_{1/2})_2} = \frac{[A_0]_2^{n-1}}{[A_0]_1^{n-1}} = \left[\frac{[A_0]_2}{[A_0]_1} \right]^{n-1}$$

$$\frac{100}{50} = \left(\frac{1}{0.5} \right)^{n-1} \Rightarrow 2 = (2)^{n-1}$$

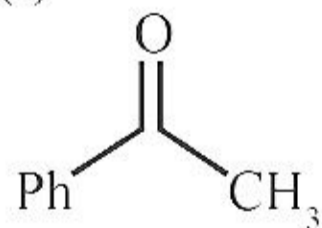
$$\Rightarrow n = 2 \text{ (Second order)}$$

Question: Identify 'X'



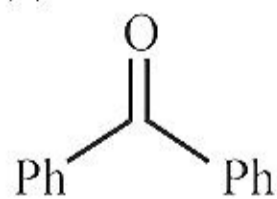
Options:

(a)

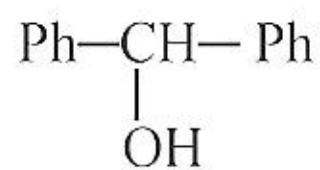


(b) PhCH₂OH

(c)

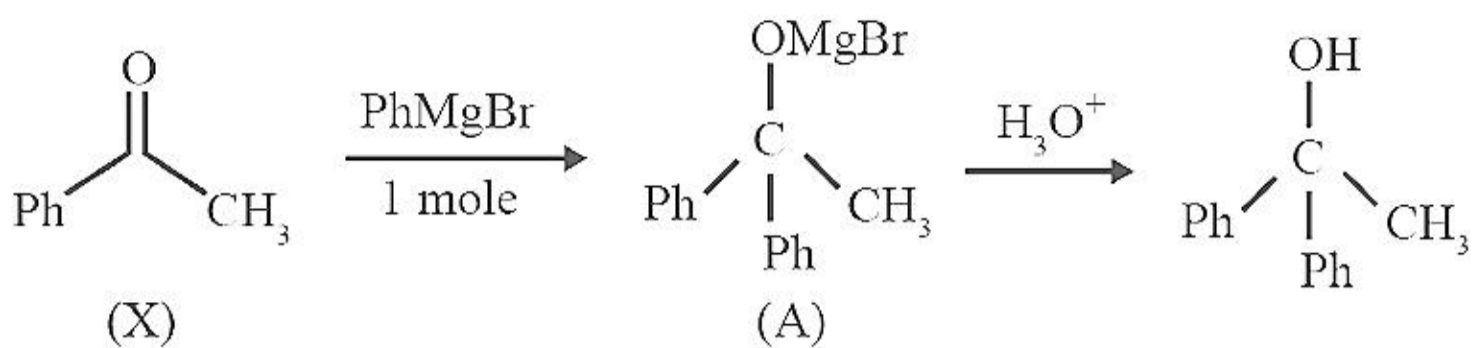


(d)

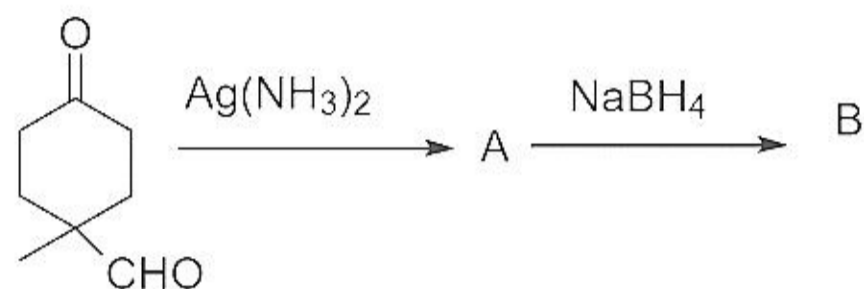


Answer: (a)

Solution:

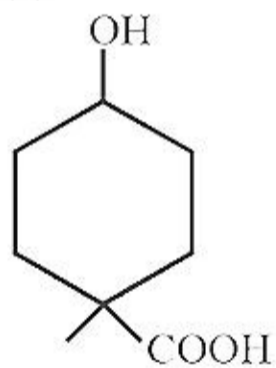


Question: Identify the product B

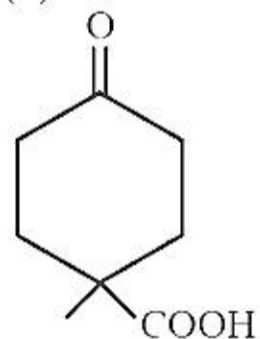


Options:

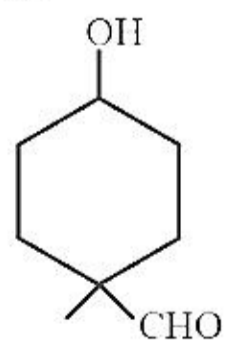
(a)



(b)



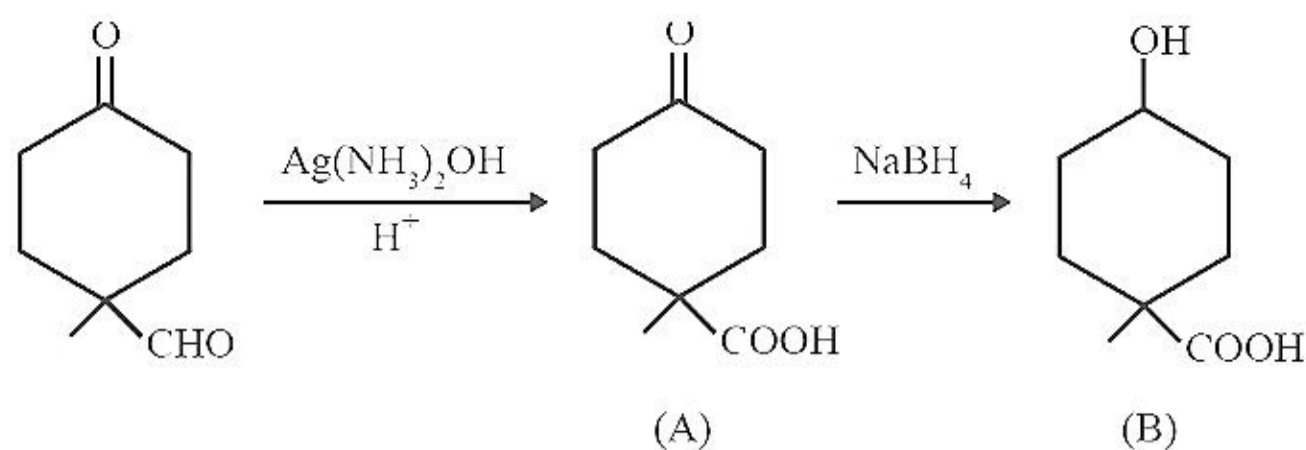
(c)



(d) None of these

Answer: (a)

Solution:



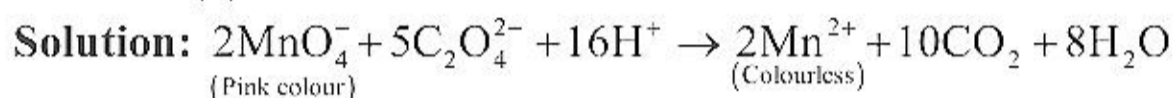
Question: Assertion: Dark purple colour of KMnO_4 in titration with Oxalic acid in acidic medium disappears

Reason: Change in oxidation number of Mn from 7 to 2

Options:

- (a) Both assertion and reason are true, reason is correct explanation of assertion
- (b) Both assertion and reason are true, but reason is not a correct explanation of the assertion.
- (c) Assertion is true, but reason is false.
- (d) Assertion is false, but reason is true

Answer: (a)



Question: A mixture of hydrogen and oxygen contains 40% by mass hydrogen at total pressure 2.2 bar then partial pressure will be

Options:

- (a) 2.01 bar
- (b) 3.81 bar
- (c) 5.2 bar
- (d) 1.2 bar

Answer: (a)

Solution:

% by mass = 40% hydrogen

% by mass = 60% oxygen

Let total weight = 100 g

So, amount of H_2 = 40 g

$$\text{Moles of } \text{H}_2 = \frac{40}{2} = 20 \text{ mol}$$

$$\text{Amount of } \text{O}_2 = \frac{60}{32} = 1.8 \text{ mol}$$

$$X_{\text{H}_2} = \frac{20}{20+1.8} = 0.9$$

$$P_{\text{H}_2} = P_T \times X_{\text{H}_2}$$

$$P_{\text{H}_2} = 2.2 \times 0.9 = 2.01 \text{ bar}$$

Question: Match the column Reaction Catalyst

Reaction	Catalyst
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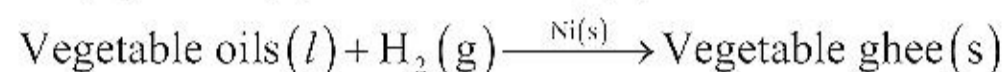
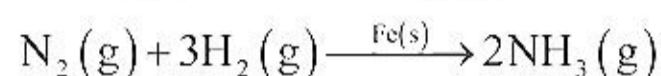
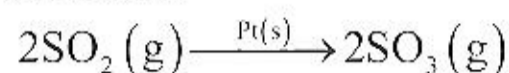
(A) Hydrogenation of oils	(i) Pt
(B) $N_2 + 3H_2 \rightarrow 2NH_3$	(ii) Fe
(C) $SO_2 + O_2 \rightarrow SO_3$	(iii) Ni
(D) Contact process	(iv) V_2O_5

Options:

- (a) A \rightarrow (ii); B \rightarrow (i); C \rightarrow (iii); D \rightarrow (iv)
 (b) A \rightarrow (iii); B \rightarrow (ii); C \rightarrow (i); D \rightarrow (iv)
 (c) A \rightarrow (i); B \rightarrow (iii); C \rightarrow (iv); D \rightarrow (ii)
 (d) A \rightarrow (iv); B \rightarrow (ii); C \rightarrow (i); D \rightarrow (iii)

Answer: (b)

Solution:



Contact process for the manufacture of sulphuric acid require V_2O_5 catalyst

Question: Match the following.

Compounds	Shape
(A) PCl_5	(i) Square Pyramidal
(B) O_3	(ii) Trigonal Bipyramidal
(C) BrF_5	(iii) Bent shape

Options:

- (a) A \rightarrow (i); B \rightarrow (ii); C \rightarrow (iii)
 (b) A \rightarrow (ii); B \rightarrow (iii); C \rightarrow (i)
 (c) A \rightarrow (i); B \rightarrow (iii); C \rightarrow (ii)
 (d) A \rightarrow (iii); B \rightarrow (ii); C \rightarrow (i)

Answer: (b)

Solution:

(A) $PCl_5 \Rightarrow$ Trigonal Bipyramidal

(B) $O_3 \Rightarrow$ Bent shape

(C) $BrF_5 \Rightarrow$ Square Pyramidal

Question: Liquation refining is based on

Options:

- (a) Low melting point
 (b) High melting point
 (c) Less soluble impurities
 (d) More soluble impurities

Answer: (a)

Solution: Liquation is used for the refining of metals having low melting point and are associated with high melting impurities. For example, Pb, Sn, Sb, Bi and Hg.

Question: If stearic acid and polyethylene glycol reacts then which of the following soap/detergent will be formed?

Options:

- (a) Cationic Detergent
- (b) Soap
- (c) Anionic detergent
- (d) Non Ionic Detergent

Answer: (d)

Solution: If sodium stearate and polyethylene glycol reacts, then non-ionic detergents are formed

Question: $\text{Cl}^\bullet + \text{CH}_4$ in atmosphere gives

Options:

- (a) $\dot{\text{C}}\text{H}_3$
- (b) Cl_2
- (c) HOCl
- (d) None of these

Answer: (a)

Solution: $\dot{\text{Cl}}(\text{g}) + \text{CH}_4(\text{g}) \rightarrow \dot{\text{C}}\text{H}_3(\text{g}) + \text{HCl}(\text{g})$

Question: Phenol + Br_2 (in CCl_4) \rightarrow Product

Phenol + Br_2 (in water) \rightarrow Product

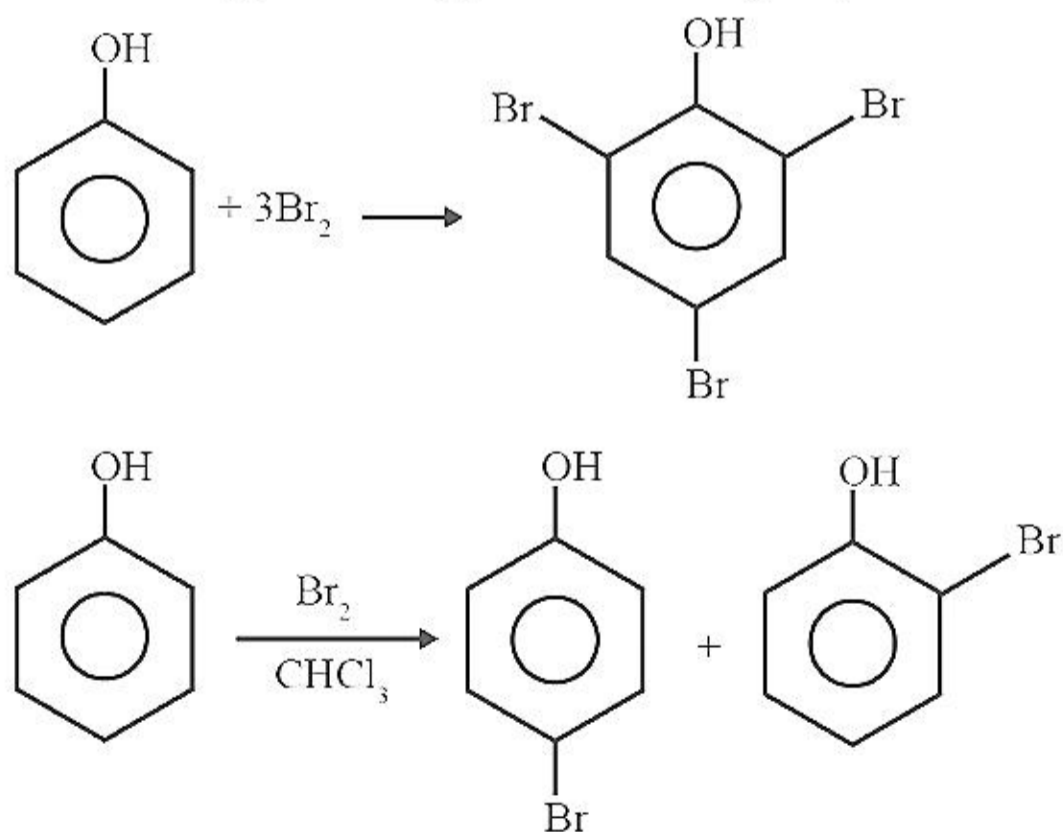
The difference in two products due to

Options:

- (a) Polarity of solvent
- (b) Electronegativity
- (c) High activating effect of OH group
- (d) Both (a) and (c)

Answer: (d)

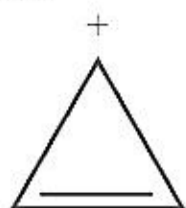
Solution: In case of phenol, polarization of bromine takes place even in the absence of Lewis acid due to high activating effect of $-\text{OH}$ group attached to benzene



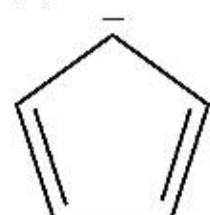
Question: Which of the following is not an aromatic compound?

Options:

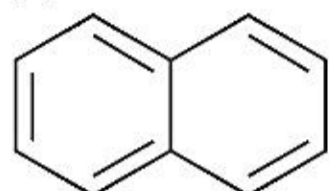
(a)



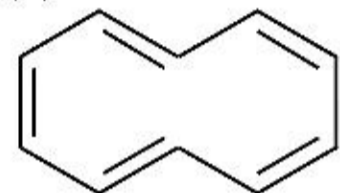
(b)



(c)



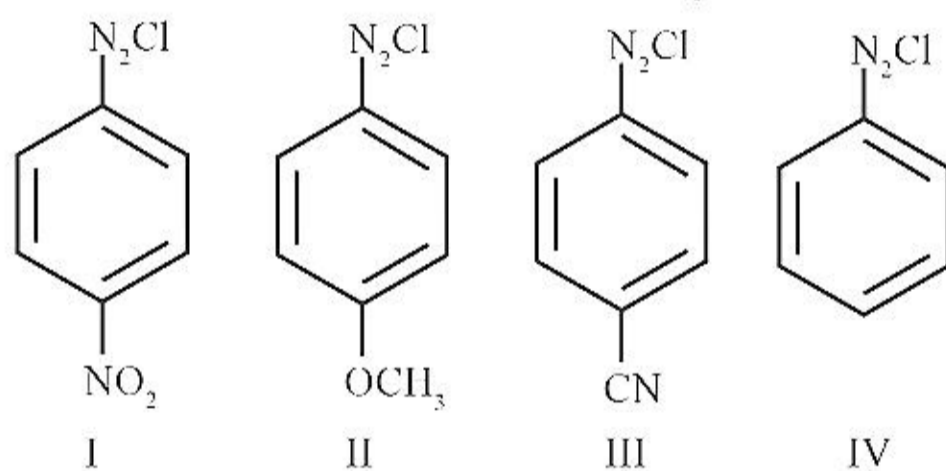
(d)



Answer: (d)

Solution: It doesn't satisfy the condition of an aromatic compound

Question: The correct order of stability



Options:

(a) II > III > I > IV

(b) II > IV > III > I

(c) III > II > I > IV

(d) I > II > IV > III

Answer: (b)

Solution: More is the electron withdrawing group deactivating, the order of stability of diazonium salt decreases on benzene ring.

Question: Borazine is an inorganic benzene like compound formed by 3 equivalent of element X and 6 equivalent of element Y, Identify X and Y

Options:

(a) B_2H_6 , NH_3

(b) B_2H_6 , HN_3

(c) NH_3 , B_2O_3

(d) NH_3 , B_2H_6

Answer: (a)



Question: If wavelength of first line of Lyman series of H spectrum is λ and wavelength difference between second transition of Balmer and third transition of Paschen series of line spectrum of H atom is $x\lambda$. Find the value of x .

Answer: 5.00

Solution:

$$\frac{1}{\lambda} = R \left[\frac{1}{1} - \frac{1}{4} \right] = \frac{3R}{4} \Rightarrow \lambda = \frac{4}{3R}$$

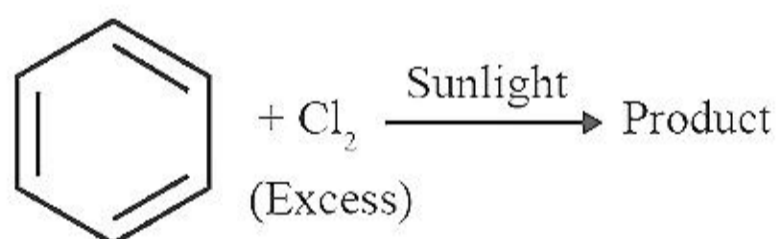
$$\frac{1}{\lambda_1} = R \left[\frac{1}{4} - \frac{1}{16} \right] = \frac{12R}{64} \Rightarrow \lambda_1 = \frac{16}{3R}$$

$$\frac{1}{\lambda_2} = R \left[\frac{1}{9} - \frac{1}{36} \right] = \frac{27R}{9 \times 36} \Rightarrow \lambda_2 = \frac{36}{3R}$$

$$\lambda_2 - \lambda_1 = x\lambda = \frac{36}{3R} - \frac{16}{3R} = \frac{20}{3R}$$

$$\frac{20}{3R} = 5 \times \frac{4}{3R} = x\lambda = x = 5$$

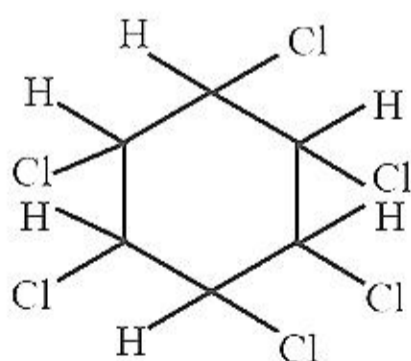
Question:



Number of hydrogen atoms in the product are

Answer: 6.00

Solution:



Question: The velocity of electron is x times the velocity of a neutron. If the wavelength of electron is equal to the wavelength of neutron, find the value of x .

Given: Mass of electron = 9.1×10^{-31} kg.

Mass of neutron = 1.6×10^{-27} kg. (Round off to the nearest integer)

Answer: 1758.00

Solution:

$$V_c = xV_n$$

$$\lambda_c = \lambda_n$$

$$\frac{h}{m_e v_c} = \frac{h}{m_n v_n}$$

$$m_e x v_n = m_n v_n$$

$$x = \frac{m_n}{m_e} = \frac{1.6 \times 10^{-27}}{9.1 \times 10^{-31}} = 0.17582 \times 10^4$$

$$= 1758.2$$

$$x \approx 1758$$