

## JEE-Main-23-01-2025 (Memory Based)

## [MORNING SHIFT]

## Chemistry

Question: Which of the following React with Hinsberg reagent?

- (i) Aniline
- (ii) N, N-Dimethylaniline
- (iii) Methyl amine
- (iv)  $C_6H_5NHC_6H_5$

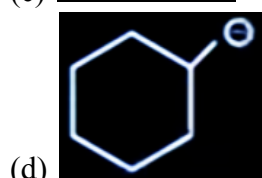
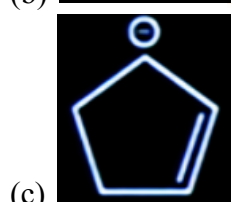
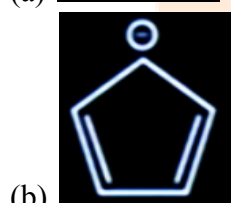
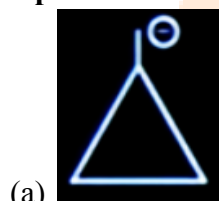
Options:

- (a) i only
- (b) i and iii only
- (c) i, iii and iv
- (d) i and ii only

Answer: (c)

Question: Among the following, the most stable carbanion is

Options:

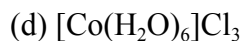


Answer: (b)

Question: Which of the following compound can show fac-mer isomerism?

Options:

- (a)  $[Co(NH_3)_6]Cl_3$
- (b)  $[Co(NH_3)_3Cl_3]$
- (c)  $[Co(en)_2(NH_3)_2]Cl_2$

**Answer: (b)****Question: Which of the following pair of ions are same coloured?****Options:**

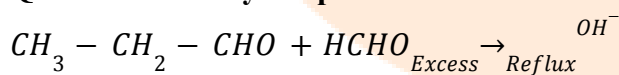
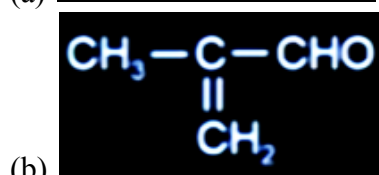
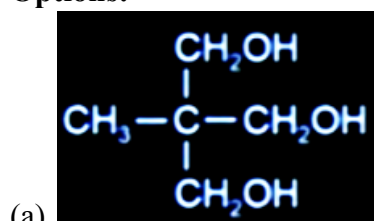
- (a)  $\text{Ti}^{4+}$ ,  $\text{V}^{3+}$
- (b)  $\text{Cr}^{2+}$ ,  $\text{Cu}^{2+}$
- (c)  $\text{Cr}^{3+}$ ,  $\text{Ni}^{2+}$
- (d)  $\text{Mn}^{3+}$ ,  $\text{Fe}^{2+}$

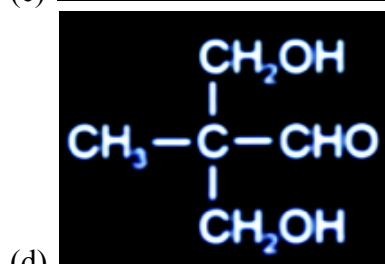
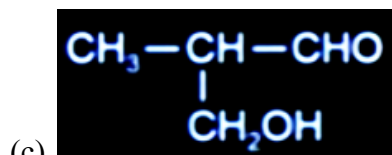
**Answer: (b)****Question: Which of the following does not belong to the same period in the modern periodic table?****Options:**

- (a) Pd
- (b) Ir
- (c) Pt
- (d) Os

**Answer: (a)****Question: Statement-1: Fructose can give tollens test even though it does not have aldehyde group****Statement-2: When reacted with base fructose can undergo rearrangement to produce aldehyde group****Options:**

- (a) If both Statement-1 and Statement-2 are true and the Statement-2 is the correct explanation of the assertion
- (b) If both Statement-1 and Statement-2 are true but Statement-2 is not the correct explanation of the assertion
- (c) If Statement-1 is true but Statement-2 is false
- (d) If the statement-1 and Statement-2 both are false

**Answer: (b)****Question: Identify the product formed in the following reaction****Options:**



Answer: (a)

**Question: Incorrect statement among the following is**

**Options:**

- (a)  $\text{SO}_2$  act as oxidizing agent but not reducing agent
- (b)  $\text{NO}_2$  exists as dimer
- (c)  $\text{PF}_3$  exists but  $\text{NF}_5$  does not
- (d)  $\text{PH}_3$  has lower proton affinity than  $\text{NH}_3$

Answer: (a)

**Question: Match the column appropriately regarding thermodynamics process.**

	Column-I		Column-II
(P)	When volume change is zero	(i)	$\Delta w = 0$
(Q)	When pressure is constant	(ii)	$\Delta Q = 0$
(R)	When no heat is exchanged	(iii)	Isobaric
(S)	Work done by the gas is equal to heat given to the gas	(iv)	Isothermal

**Options:**

- (a) P(iv), Q(iii), R(i), S(ii)
- (b) P(i), Q(iii), R(ii), S(iv)
- (c) P(ii), Q(iii), R(iv), S(i)
- (d) P(ii), Q(iii), R(i), S(iv)

Answer: (b)

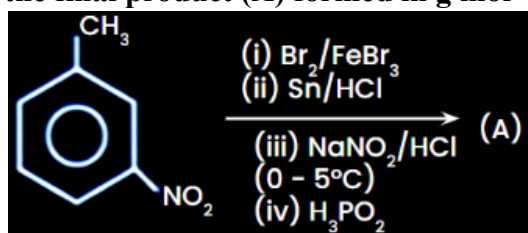
**Question:  $\text{Co}(\text{NH}_3)_x\text{Cl}_3$  has 0.1 modal. 100% Dissociation  $\Delta T_f = 0.558$  ( $k_f = 1.86$ ) Then formula of compound is**

**Options:**

- (a)  $[\text{Co}(\text{NH}_3)_3\text{Cl}_3]$
- (b)  $[\text{Co}(\text{NH}_3)_2\text{Cl}_4]$
- (c)  $[\text{Co}(\text{NH}_3)_5\text{Cl}]\text{Cl}_2$
- (d) None

Answer: (c)

**Question:** Consider the following sequence of reactions and find the molecular mass of the final product (A) formed in  $\text{g mol}^{-1}$ .



**Options:**

- (a) 108
- (b) 216
- (c) 171
- (d) 186

**Answer:** (c)

**Question:** Match the Column-I with Column-II and choose the correct

	Column-I		Column-II
(A)	$\text{BF}_3$	(i)	Odd e- species
(B)	$\text{CCl}_4, \text{CO}_2$	(ii)	Expanded octet
(C)	$\text{PCl}_5, \text{BrF}_5$	(iii)	Complete octet
(D)	NO	(iv)	Electron deficient

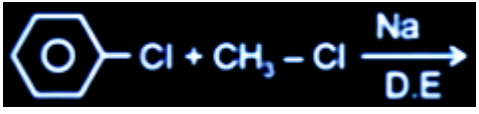
**Options:**

- (a) A-iii, B-iv, C-i, D-ii
- (b) A-iv, B-ii, C-iii, D-i
- (c) A-iv, B-iii, C-ii, D-i
- (d) A-i, B-ii, C-iii, D-iv

**Answer:** (c)

**Question:** Match the column and choose the correct option

	Column-I		Column-II
(A)		(P)	Sandmeyer reaction
(B)		(Q)	Fitting reaction

(C)		(R)	Wurtz-Fittig reaction
(D)	$\text{CH}_3 - \text{Cl} + \text{AgF} \rightarrow$	(S)	Swart's reaction

**Options:**

- (a) A-Q, B-P, C-R, D-S
- (b) A-Q, B-P, C-S, D-R
- (c) A-Q, B-R, C-S, D-P
- (d) A-Q, B-P C-R, D-S

**Answer: (d)**

**Question:**  $\text{Co}^{2+}$  is forming an octahedral complex with spin only magnetic moment 3.83 BM. Which of the following electronic configurations?

**Options:**

- (a)  $t_{2g}^5 e_g^2$
- (b)  $t_{2g}^6 e_g^1$
- (c)  $t_{2g}^4 e_g^3$
- (d)  $e_g^4 t_{2g}^3$

**Answer: (a)**

**Question:** Given below are two statements:

**Statement-I:** During Lassaigne's test, covalent compound is converted to ionic compound

**Statement-II:**  $\text{Na}_4[\text{Fe}(\text{CN})_6]$  gives Prussian blue colour on reaction with  $\text{Fe}_2(\text{SO}_4)_3$

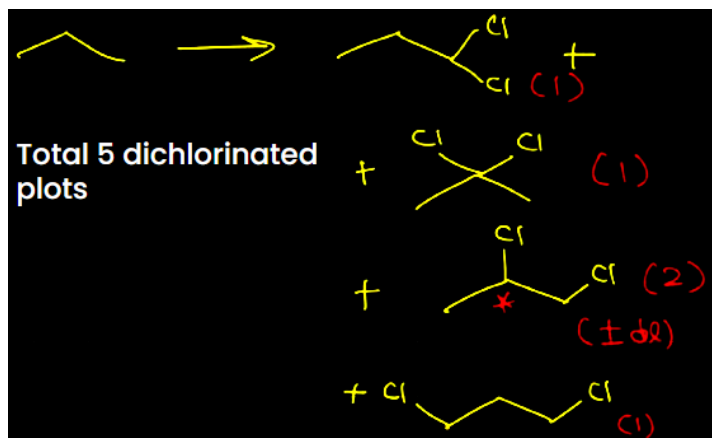
**Options:**

- (a) S-I is correct, S-II is incorrect
- (b) S-I is incorrect, S-II is correct
- (c) Both S-I and S-II are correct
- (d) Both S-I and S-II are incorrect

**Answer: (c)**

**Question:** How many dichlorinated products can be obtained for n-propane?

**Answer: (5)**



Question: Consider the following  $FeO_4^{2-} \xrightarrow{2.0V} Fe^{3+} \xrightarrow{0.8V} Fe^{2+} \xrightarrow{-0.5V} Fe^0$

Find  $E^0_{FeO_4^{2-}/Fe^{2+}}$  (Nearest integer)

Answer: (2)

Solution:

$$E^0 = \frac{n_1 E_1 + n_2 E_2}{n_1 + n_2} = \frac{(3)(2) + (1)(0.8)}{4} = \frac{6.8}{4} = 1.7V$$

Nearest integer = 2

Question: Consider the given values:

$$\Delta H = 55 \text{ kJ mol}^{-1}$$

$$\Delta S = 175 \text{ J mol}^{-1} \text{ K}^{-1}$$

$$T = 25^\circ\text{C}$$

Calculate the value of Gibbs free energy charge ( $\Delta G$ ) in  $\text{J mol}^{-1}$ .

Answer: (2850)

Question: Calculate the percentage by weight of S if 160 gram of organic compound produce 466 gram of  $BaSO_4$

Answer: (40%)

Question: If 2gm phenol is allowed to react with  $Br_2/H_2O$ . How much  $Br_2$  will be required to produce 2, 4, 6 tribromophenol (Rounded off to nearest integer)

Answer: (10)

Question: If 2gm phenol is allowed to react with  $Br_2/H_2O$ . How much  $Br_2$  will be required to produce 2, 4, 6 tribromophenol (Rounded off to nearest integer)

Answer: (179)

Solution:

$$\left(\frac{x+10^{-3}}{44}\right) - \frac{10^{21}}{6.022 \times 10^{23}} = 2.4 \times 10^{-3}$$

$x = 179$

