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CHEMISTRY · JEE MAIN

# Practical Chemistry & Qualitative Analysis

## Previous Year Questions with answers

**113** questions · **94** papers · **2002–2026** · newest paper first

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**What is in this PDF:** every Practical Chemistry & Qualitative Analysis question we hold from past JEE Main and AIEEE papers, with its options and answer. Where an answer comes from a source other than the official final key, it says so next to the answer.

**Step-by-step solutions** for every question are free in the EdLoop JEE app (Google Play) and on app.edloop.in. More chapters: pyq.edloop.in/free-pdfs/

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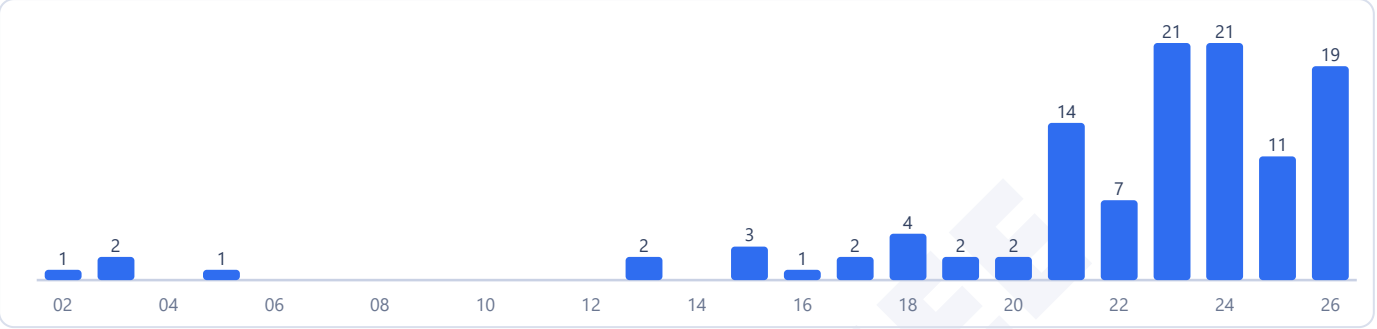
# Chapter at a glance

| 2.1% | 113 | 82 of 162 | 102 / 11 |
|---|---|---|---|
| of Chemistry questions, 2019–2026 | questions, 2002–2026 | papers asked it, 2019–2026 | MCQ / numerical, 2002–2026 |

**Trend.** Rising: 0.9 questions per paper in 2024–2026 against 0.4 in 2019–2023.

### Questions per year




Counts are the questions we hold: 113 in 94 papers. No question in this chapter was found repeated across papers.

### Most-asked topics in this chapter (2002–2026)




## How often it comes up

Practical chemistry and qualitative analysis covers salt analysis and titrimetric methods under Unit 20: Principles Related to Practical Chemistry in the Class 12 curriculum, holding rank 26 of 31 chapters with a 2.1% share of chemistry questions. During 2019 to 2026, Practical Chemistry & Qualitative Analysis registered 97 questions across 162 exam papers, accounting for 2.1% of chemistry questions and holding rank 26 of 31 chapters. In the earlier testing span from 2002 to 2018, it contributed 16 questions across 38 papers, delivering a 1.2% share. Across the recent 2024 to 2026 cycle, question counts rose sharply to 51 questions across 58 papers, capturing a 3.3% share. The testing weight has trended up across recent shifts.

The chapter has appeared every year from 2019 to 2026. Students met an average of 0.6 questions per paper over 2019 to 2026, rising to 0.9 questions per paper in the 2024 to 2026 period. Eleven numerical answer questions were included between 2019 and 2026.

## Most-asked topics

The syllabus divides across four distinct areas:

- Salt Analysis: Forms the core of the chapter with 80 total questions (66 in 2019 to 2026), examined continuously through 2026. Key areas test group reagent precipitations (groups zero through six), common ion effect in selective sulfide or hydroxide precipitation, confirmatory tests for cations (such as lead, copper, iron, aluminum, barium, and calcium), and anion identification tests (chromyl chloride test for chloride, brown ring test for nitrate, and Griess-Ilosvay reaction for nitrite).
- Organic Practicals: Yielded 15 total questions (all 15 during 2019 to 2026), evaluated through 2026. Focuses on functional group detection: Lucas test for alcohol classification, 2,4-DNP, Tollens and Fehling tests for carbonyls, carbylamine test for primary amines, and sodium bicarbonate effervescence for carboxylic acids.

- Titrimetric Analysis: Contributed 15 total questions (13 in 2019 to 2026), tested through 2026. Covers acid-base indicators, requirements of primary standards, and redox titrations of Mohr's salt or oxalic acid against potassium permanganate and potassium dichromate.
- Inorganic Preparations: Recorded 3 total questions (all 3 in 2019 to 2026), last assessed in 2024. Concepts explore synthesis of Mohr's salt (ferrous ammonium sulfate) and potash alum, including the preventive role of dilute sulfuric acid against hydrolysis.

## What the questions look like

Examiners test exact laboratory observations and chemical equations. Salt analysis questions frequently provide experimental sequences: adding specific group reagents, observing precipitate colors, and adding excess reagents to form soluble complex ions.

In organic functional testing, questions often present four isomeric compounds and ask which single test reagent can differentiate them. Titration questions evaluate indicator color changes and criteria that distinguish primary standards like oxalic acid from secondary standards like sodium hydroxide.

## How to practise it

Because qualitative analysis tests exact laboratory details, structure revision around tables:

1. Memorize group separation reagents: Know the analytical group, added reagent, and precipitating form for cations from lead and silver up to magnesium. 2. Learn classic confirmatory colored complexes: Memorize formulas for Turnbull's blue, Prussian blue, brown ring complex, Nessler's precipitate, and nickel dimethylglyoxime. 3. Understand solubility mechanisms: Explain why lead chloride dissolves in hot water while silver chloride dissolves in aqueous ammonia. 4. Review standard organic tests: Maintain a quick reference chart for Lucas reagent, neutral ferric chloride, bromine water, and iodoform reactions. 5. Review titration stoichiometry: Practise n-factor calculations for permanganate and dichromate oxidations.

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**Q1** JEE Main 2026 · 8 Apr · Shift 2 MCQ

Which of the following amino acid will give violet coloured complex with neutral ferric chloride solution ?

(A) Threonine
(B) Serine
(C) Tyrosine
(D) Cysteine

**Answer: (C) Tyrosine** · Official NTA final key

**Q2** JEE Main 2026 · 6 Apr · Shift 1 MCQ

Match the **LIST-I** with **LIST-II**

| **List-I Amino acid** | **List-II Positive reaction/Test for functional group present in side chain of amino acid** |
|---|---|
| A. Glutamine | I. Hinsberg's test |
| B. Lysine | II. Neutral $FeCl_3$ test |
| C. Tyrosine | III. Ceric ammonium nitrate test |
| D. Serine | IV. Hoffman bromamide degradation |

Choose the *__correct__* answer from the options given below:

(A) A-IV, B-II, C-I, D-III
(B) A-IV, B-I, C-II, D-III
(C) A-III, B-II, C-I, D-IV
(D) A-IV, B-I, C-III, D-II

**Answer: (B) A-IV, B-I, C-II, D-III** · Official NTA final key

**Q3** JEE Main 2026 · 5 Apr · Shift 1 MCQ

Given below are two statements:

**Statement I:** Sodium dichromate and potassium dichromate are classified as primary standards in titrimetric analysis.

**Statement II:** Phenolphthalein is a weak base, therefore it dissociates in acidic medium.

In the light of the above statements, choose the *__correct__* answer from the options given below

(A) Both Statement I and Statement II are ture
(B) Both Statement I and Statement II are false
(C) Statement I is true but Statement II is false
(D) Statement I is false but Statement II is true

**Answer: (B) Both Statement I and Statement II are false** · Official NTA final key

**Q4** JEE Main 2026 · 5 Apr · Shift 2 MCQ

A paper dipped in a dil. $H_2SO_4$ solution of 'X' upon treatment with $SO_2$ gas turns into green. The compound 'X' is :

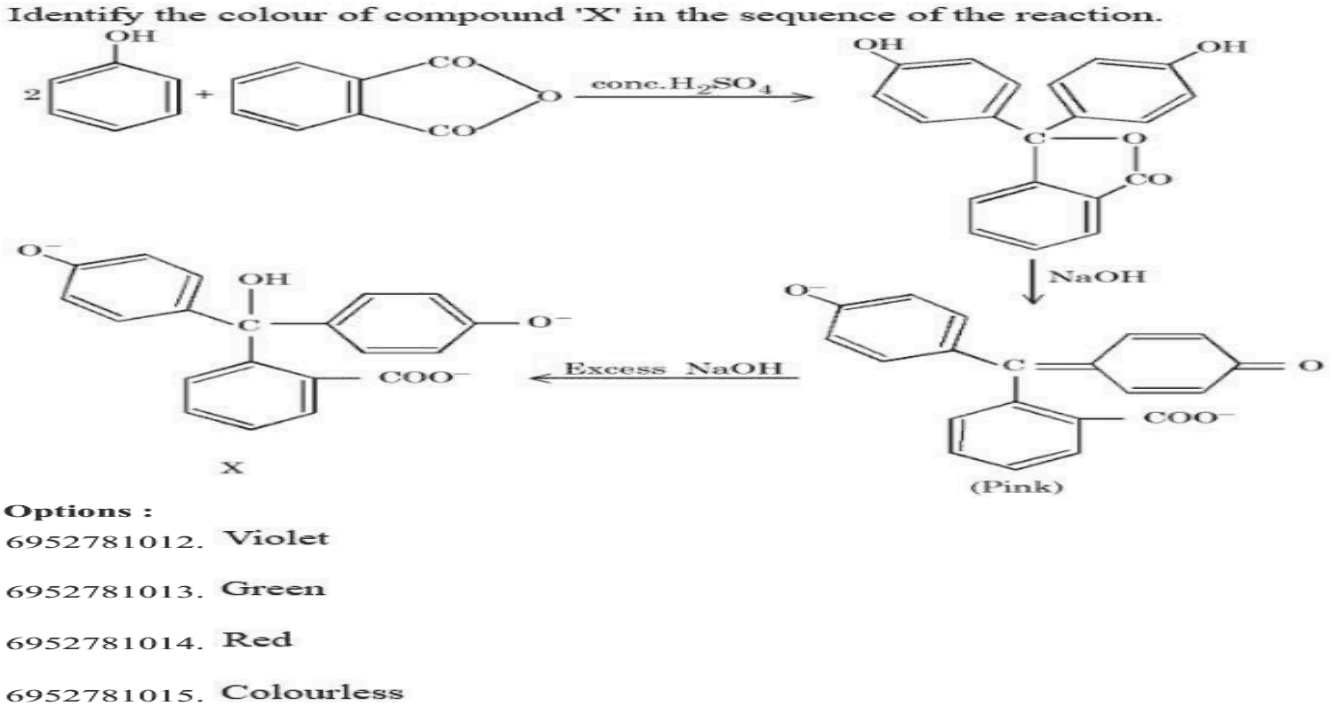
(A) KI-starch
(B) $KMnO_4$
(C) $Pb(CH_3COO)_2$
(D) $K_2Cr_2O_7$

**Answer: (D)** $K_2Cr_2O_7$ · Official NTA final key

**Q5** JEE Main 2026 · 4 Apr · Shift 1 MCQ

Identify the colour of compound 'X' in the sequence of the reaction.

*(see the figure above)*




(A) Violet
(B) Green
(C) Red
(D) Colourless

**Answer: (D) Colourless** · Official NTA final key

**Q6** JEE Main 2026 · 4 Apr · Shift 2 MCQ

Among $Fe^{3+}$, $Pb^{2+}$, $Cu^{2+}$ and $Mn^{2+}$, identify the one that gets precipitated out while passing $H_2S$ in presence of $NH_4OH$ as group reagent. The highest possible oxidation state of the corresponding metal is

(A) +3
(B) +4
(C) +2
(D) +7

**Answer: (D)** +7 · Official NTA final key

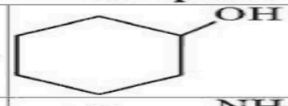
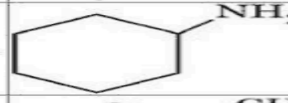
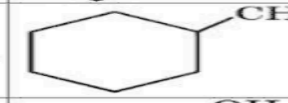
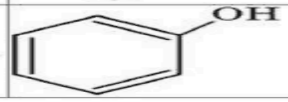
**Q7** JEE Main 2026 · 4 Apr · Shift 2 MCQ

Match the **LIST-I** with **LIST-II**

| **List-I Compound** | **List-II Test** |
|---|---|
| A. *(see the figure above)* | I. Hinsberg's reagent test |
| B. *(see the figure above)* | II. Phthalein dye test |
| C. *(see the figure above)* | III. Lucas test |
| D. *(see the figure above)* | IV. Tollen's test |

Choose the *__correct__* answer from the options given below:

Match the LIST-I with LIST-II

| List-I Compound | | List-II Test | |
|---|---|---|---|
| A. |  | I. | Hinsberg's reagent test |
| B. |  | II. | Phthalein dye test |
| C. |  | III. | Lucas test |
| D. |  | IV. | Tollen's test |

Choose the *correct* answer from the options given below:

**Options :**

6952781522. A-III, B-I, C-IV, D-II

6952781523. A-III, B-IV, C-I, D-II

6952781524. A-I, B-III, C-II, D-IV

6952781525. A-I, B-II, C-III, D-IV

(A) A-III, B-I, C-IV, D-II
(B) A-III, B-IV, C-I, D-II
(C) A-I, B-III, C-II, D-IV
(D) A-I, B-II, C-III, D-IV

**Answer: (A)** A-III, B-I, C-IV, D-II · Official NTA final key

**Q8** JEE Main 2026 · 2 Apr · Shift 1 MCQ

Match **List - I** with **List - II**.

| List - I Mixture of Compounds | List - II Reagent used to distinguish |
|---|---|
| A. Diethyl amine + Ethyl amine | I. Bromine water |
| B. Acetaldehyde + Acetone | II. $CHCl_3$ + KOH, $\Delta$ |
| C. Ethanol + Phenol | III. Neutral $FeCl_3$ |
| D. Benzoic acid + Cinnamic acid | IV. Ammonical silver nitrate |

Choose the **correct** answer from the options given below :

(A) A-IV, B-II, C-I, D-III
(B) A-IV, B-II, C-III, D-I
(C) A-II, B-IV, C-I, D-III
(D) A-II, B-IV, C-III, D-I

**Answer: (D) A-II, B-IV, C-III, D-I** · Official NTA final key

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**Q9** JEE Main 2026 · 2 Apr · Shift 1 MCQ

A salt with few drops of conc. HCl gives apple green colour in flame test. The group precipitate of the salt is dissolved in acetic acid and treated with $K_2CrO_4$ to give yellow precipitate. When the sodium carbonate extract of the salt solution is heated with conc. $HNO_3$ and ammonium molybdate, it resulted a canary yellow precipitate. The cation and anion present in the salt are respectively,

(A) $Ca^{2+}$ and $SO_4^{2-}$
(B) $Ba^{2+}$ and $PO_4^{3-}$
(C) $Mn^{2+}$ and $PO_4^{3-}$
(D) $Ba^{2+}$ and $SO_4^{2-}$

**Answer: (B)** $Ba^{2+}$ and $PO_4^{3-}$ · Official NTA final key

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**Q10** JEE Main 2026 · 2 Apr · Shift 2 MCQ

Among $Fe^{2+}$, $Fe^{3+}$, $Cr^{2+}$ and $Zn^{2+}$, the ion that shows positive borax bead test and with highest ionisation enthalpy is :

(A) $Fe^{2+}$
(B) $Zn^{2+}$
(C) $Cr^{2+}$
(D) $Fe^{3+}$

**Answer: (D)** $Fe^{3+}$ · Official NTA final key

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**Q11** JEE Main 2026 · 28 Jan · Shift 1 MCQ

Given below are two statements:

**Statement I:** Griss–Ilosvay test is used for the detection of nitrite ion, which involves the use of sulphanilic acid and $\alpha$–naphthylamine reagent.

**Statement II:** In the above test, sulphanilic acid is diazotized by the acidified nitrite ion, which on further coupling with $\alpha-$naphthylamine forms an azo$-$dye.

In the light of the above statements, choose the ***correct*** answer from the options given below

(A) Statement I is false but Statement II is true

(B) Both Statement I and Statement II are true

(C) Both Statement I and Statement II are false

(D) Statement I is true but Statement II is false

**Answer: (B) Both Statement I and Statement II are true** · Official NTA final key

## Q12 JEE Main 2026 · 28 Jan · Shift 1 MCQ

Given below are the four isomeric compounds (P, Q, R, S)

*(see the figure above)*

Identify **correct** statements from below.

A. Q, R and S will give precipitate with 2, 4 $-$ DNP.

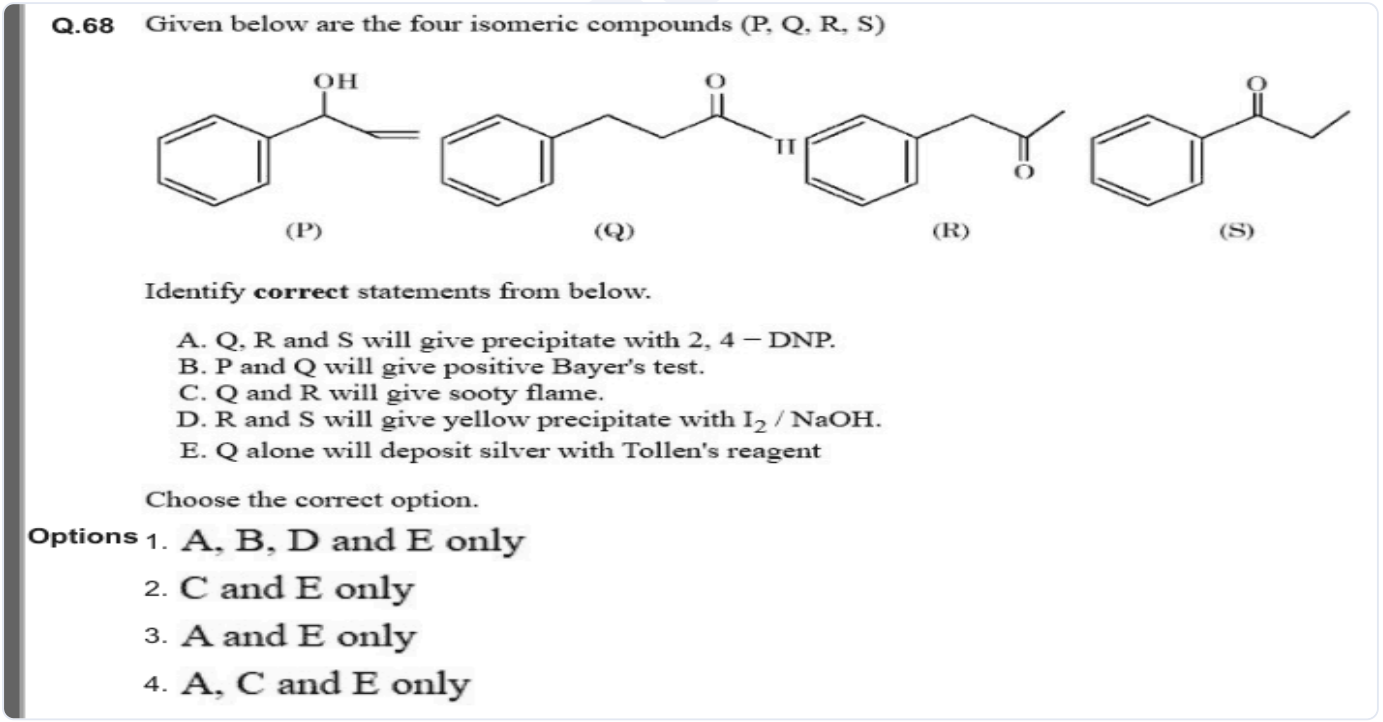
B. P and Q will give positive Bayer's test.

C. Q and R will give sooty flame.

D. R and S will give yellow precipitate with $I_2$ / NaOH.

E. Q alone will deposit silver with Tollen's reagent

Choose the correct option.



(A) A, B, D and E only
(B) C and E only
(C) A and E only
(D) A, C and E only

**Answer: (D) A, C and E only** · Official NTA final key

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**Q13** JEE Main 2026 · 28 Jan · Shift 2 MCQ

Consider the following reactions

$\mathrm{Na_2B_4O_7} \xrightarrow{\Delta} 2\mathrm{X} + \mathrm{Y}$

$\mathrm{CuSO_4} + \mathrm{Y} \xrightarrow{\text{Non-Luminous flame}} \mathrm{Z} + \mathrm{SO_3}$

$2\mathrm{Z} + 2\mathrm{X} + \mathrm{Carbon} \xrightarrow{\text{Luminous flame}} 2\mathrm{Q} + \mathrm{Na_2B_4O_7} + \mathrm{CO}$

The oxidation states of Cu in Z and Q, respectively are :

(A) $+2$ and $+1$
(B) $+1$ and $+2$
(C) $+2$ and $+2$
(D) $+1$ and $+1$

**Answer: (A)** $+2$ and $+1$ · Official NTA final key

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**Q14** JEE Main 2026 · 24 Jan · Shift 1 MCQ

Consider three metal chlorides x, y and z, where x is water soluble at room temperature, y is sparingly soluble in water at room temperature and z is soluble in hot water. x, y and z are respectively

(A) $\mathrm{AlCl_3}$, $\mathrm{PbCl_2}$ and $\mathrm{BaCl_2}$
(B) AgCl, $\mathrm{Hg_2Cl_2}$ and $\mathrm{PbCl_2}$
(C) $\mathrm{CuCl_2}$, AgCl and $\mathrm{PbCl_2}$
(D) $\mathrm{MgCl_2}$, AgCl and $\mathrm{AlCl_3}$

**Answer: (C)** $\mathrm{CuCl_2}$, AgCl and $\mathrm{PbCl_2}$ · Official NTA final key

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**Q15** JEE Main 2026 · 24 Jan · Shift 2 MCQ

In the Group analysis of cations, $\mathrm{Ba^{2+}}$ & $\mathrm{Ca^{2+}}$ are precipitated respectively as

(A) hydroxide & carbonate
(B) sulphide & sulphide
(C) chromate & sulphide
(D) carbonate & carbonate

**Answer: (D) carbonate & carbonate** · Official NTA final key

**Q16** JEE Main 2026 · 23 Jan · Shift 1 MCQ

Match List - I with List - II.

| List - I Functional group (detection) | List - II Change observed during detection |
|---|---|
| A. Unsaturation (Baeyer's test) | I. Red colour appears |
| B. Alcoholic group (Ceric ammonium nitrate test) | II. Silver mirror appears |
| C. Aldehyde group (Tollen's reagent) | III. Violet colour appears |
| D. Phenolic group ($FeCl_3$ test) | IV. Discharge of pink colour |

Choose the **correct** answer from the options given below :

(A) A-IV, B-I, C-II, D-III
(B) A-III, B-IV, C-II, D-I
(C) A-IV, B-III, C-II, D-I
(D) A-III, B-IV, C-I, D-II

**Answer: (A) A-IV, B-I, C-II, D-III** · Official NTA final key

**Q17** JEE Main 2026 · 22 Jan · Shift 2 MCQ

Identify the **correct** statements :

A. Hydrated salts can be used as primary standard.

B. Primary standard should not undergo any reaction with air.

C. Reactions of primary standard with another substance should be instantaneous and stoichiometric.

D. Primary standard should not be soluble in water.

E. Primary standard should have low relative molar mass.

Choose the **correct** answer from the options given below :

(A) A, B and C Only
(B) A, B, C and E Only
(C) A, B and E Only
(D) D and E Only

**Answer: (A) A, B and C Only** · Official NTA final key

**Q18** JEE Main 2026 · 21 Jan · Shift 1 MCQ

Consider the following reactions.

$PbCl_2 + K_2CrO_4 \rightarrow A + 2KCl$

(Hot solution)

$A + NaOH \rightleftharpoons B + Na_2CrO_4$

$PbSO_4 + 4CH_3COONH_4 \rightarrow (NH_4)_2SO_4 + X$

In the above reactions, A, B and X are respectively.

(A) $Na_2[Pb(OH)_2]$, $PbCrO_4$ and $(NH_4)_2[Pb(CH_3COO)_4]$
(B) $Na_2[Pb(OH)_2]$, $PbCrO_4$ and $[Pb(NH_3)_4]SO_4$
(C) $PbCrO_4$, $Na_2[Pb(OH)_4]$ and $[Pb(NH_3)_4]SO_4$
(D) $PbCrO_4$, $Na_2[Pb(OH)_4]$ and $(NH_4)_2[Pb(CH_3COO)_4]$

**Answer: (D)** $PbCrO_4$, $Na_2[Pb(OH)_4]$ **and** $(NH_4)_2[Pb(CH_3COO)_4]$ · Official NTA final key

**Q19** JEE Main 2026 · 21 Jan · Shift 2 MCQ

On heating a mixture of common salt and $K_2Cr_2O_7$ in equal amount along with concentrated $H_2SO_4$ in a test tube, a gas is evolved. Formula of the gas evolved and oxidation state of the central metal atom in the gas respectively are :

(A) $CrO_2Cl_2$ and $+6$
(B) $CrO_2Cl_2$ and $+5$
(C) $Cr_2O_2Cl_2$ and $+3$
(D) $Cr_2O_2Cl_2$ and $+6$

**Answer: (A)** $CrO_2Cl_2$ **and** $+6$ · Official NTA final key

**Q20** JEE Main 2025 · 8 Apr · Shift 2 MCQ

Match the LIST-I with LIST-II

| LIST-I (Reagent) | LIST-II (Functional Group detected) |
|---|---|
| A. Sodium bicarbonate solution | I. double bond/unsaturation |
| B. Neutral ferric chloride | II. carboxylic acid |
| C. ceric ammonium nitrate | III. phenolic - OH |
| D. alkaline $KMnO_4$ | IV alcoholic - OH |

Choose the correct answer from the options given below:

(A) A-III, B-II, C-IV, D-I
(B) A-II, B-IV, C-III, D-I
(C) A-II, B-III, C-I, D-IV
(D) A-II, B-III, C-IV, D-I

**Answer: (D)** A-II, B-III, C-IV, D-I · Key from source paper

**Q21** JEE Main 2025 · 7 Apr · Shift 1 MCQ

When a salt is treated with sodium hydroxide solution it gives gas $X$. On passing gas $X$ through reagent Y a brown coloured precipitate is formed. X and Y respectively, are

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(A) $X = NH_3$ and $Y = K_2HgI_4 + KOH$
(B) $X = HCl$ and $Y = NH_4Cl$
(C) $X = NH_3$ and $Y = HgO$
(D) $X = NH_4Cl$ and $Y = KOH$

**Answer: (A)** $X = NH_3$ and $Y = K_2HgI_4 + KOH$ · Key from source paper

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**Q22** JEE Main 2025 · 3 Apr · Shift 2 MCQ

Compounds that should not be used as primary standards in titrimetric analysis are :

A. $Na_2Cr_2O_7$

B. Oxalic acid

C. NaOH

D. $FeSO_4 \cdot 6H_2O$

E. Sodium tetraborate

Choose the most appropriate answer from the options given below:

(A) B and D Only
(B) C, D and E Only
(C) A, C and D Only
(D) D and E Only

**Answer: (C)** A, C and D Only · Key from source paper

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**Q23** JEE Main 2025 · 2 Apr · Shift 1 MCQ

Choose the correct tests with respective observations.

(A) $CuSO_4$ (acidified with acetic acid) $+K_4[Fe(CN)_6] \rightarrow$ Chocolate brown precipitate.

(B) $FeCl_3 + K_4[Fe(CN)_6] \rightarrow$ Prussian blue precipitate.

(C) $ZnCl_2 + K_4[Fe(CN)_6]$, neutralised with $NH_4OH \rightarrow$ White or bluish white precipitate.

(D) $MgCl_2 + K_4[Fe(CN)_6] \rightarrow$ Blue precipitate.

(E) $BaCl_2 + K_4[Fe(CN)_6]$, neutralised with $NaOH \rightarrow$ White precipitate.

Choose the correct answer from the options given below :

(A) B, D and E only
(B) C, D and E only
(C) A, B and C only
(D) A, D and E only

**Answer: (C)** A, B and C only · Key from source paper

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**Q24** JEE Main 2025 · 2 Apr · Shift 2 MCQ

Formation of $Na_4\,[Fe(CN)_5NOS]$, a purple coloured complex formed by addition of sodium nitroprusside in sodium carbonate extract of salt indicates the presence of :

(A) Sulphite ion
(B) Sodium ion
(C) Sulphate ion
(D) Sulphide ion

**Answer: (D) Sulphide ion** · Key from source paper

**Q25** JEE Main 2025 · 28 Jan · Shift 1 MCQ

Given below are two statements: Statement I: In the oxalic acid vs $\mathrm{KMnO_4}$ (in the presence of dil $\mathrm{H_2SO_4}$ ) titration the solution needs to be heated initially to $60^{\circ}\mathrm{C}$, but no heating is required in Ferrous ammonium sulphate (FAS) vs $\mathrm{KMnO_4}$ titration (in the presence of dil $\mathrm{H_2SO_4}$ ) Statement II: In oxalic acid vs $\mathrm{KMnO_4}$ titration, the initial formation of $\mathrm{MnSO_4}$ takes place at high temperature, which then acts as catalyst for further reaction. In the case of FAS vs $\mathrm{KMnO_4}$, heating oxidizes $\mathrm{Fe^{2+}}$ into $\mathrm{Fe^{3+}}$ by oxygen of air and error may be introduced in the experiment. In the light of the above statements, choose the correct answer from the options given below

(A) Both Statement I and Statement II are false
(B) Both Statement I and Statement II are true
(C) Statement I is false but Statement II is true
(D) Statement I is true but Statement II is false

**Answer: (B) Both Statement I and Statement II are true** · Key from source paper

**Q26** JEE Main 2025 · 28 Jan · Shift 1 MCQ

The metal ion whose electronic configuration is not affected by the nature of the ligand and which gives a violet colour in non-luminous flame under hot condition in borax bead test is

(A) $\mathrm{Mn^{2+}}$
(B) $\mathrm{Cr^{3+}}$
(C) $\mathrm{Ni^{2+}}$
(D) $\mathrm{Ti^{3+}}$

**Answer: (C)** $\mathrm{Ni^{2+}}$ · Key from source paper

**Q27** JEE Main 2025 · 28 Jan · Shift 2 MCQ

Identify the inorganic sulphides that are yellow in colour : (A) $(\mathrm{NH_4})_2\,\mathrm{S}$ (B) Pbs (C) Cus (D) $\mathrm{As_2\,S_3}$ (E) $\mathrm{As_2\,S_5}$ Choose the correct answer from the options given below :

(A) (A), (D) and (E) only
(B) (D) and (E) only
(C) (A) and (B) only
(D) (A) and (C) only

**Answer: (A)** (A), (D) and (E) only · Key from source paper

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**Q28** JEE Main 2025 · 24 Jan · Shift 1 · Numerical

Among the following cations, the number of cations which will give characteristic precipitate in their identification tests with $K_4[Fe(CN)_6]$ is _____ . $Cu^{2+}, Fe^{3+}, Ba^{2+}, Ca^{2+}, NH_4^+, Mg^{2+}, Zn^{2+}$

Numerical value type: the answer is a number.

**Answer: 3.** · Key from source paper

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**Q29** JEE Main 2025 · 24 Jan · Shift 2 · MCQ

Find the compound ' A ' from the following reaction sequences. A $\xrightarrow{\text{aqua-regia}}$ B $\xrightarrow[(2)\ AcOH]{(1)\ KNO_2|NH_4OH}$ yellow ppt

(A) CoS
(B) ZnS
(C) NiS
(D) MnS

**Answer: (A)** CoS · Key from source paper

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**Q30** JEE Main 2025 · 23 Jan · Shift 2 · MCQ

Identify A, B and C in the given below reaction sequence A $\xrightarrow{HNO_3}$ $Pb(NO_3)_2$ $\xrightarrow{H_2SO_4}$ B $\xrightarrow[(2)\ \text{Acetic acid}\ (3)\ K_2CrO_4]{(1)\ \text{Ammonium acetate}}$

(A) $PbCl_2, PbSO_4, PbCrO_4$
(B) $PbS, PbSO_4, Pb(CH_3COO)_2$
(C) $PbCl_2, Pb(SO_4)_2, PbCrO_4$
(D) $PbS, PbSO_4, PbCrO_4$

**Answer: (D)** $PbS, PbSO_4, PbCrO_4$ · Key from source paper

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**Q31** JEE Main 2024 · 9 Apr · Shift 1 · MCQ

Identify the incorrect statements regarding primary standard of titrimetric analysis. (A) It should be purely available in dry form. (B) It should not undergo chemical change in air. (C) It should be hygroscopic and should react with another chemical instantaneously and stoichiometrically. (D) It should be readily soluble in water. (E) $KMnO_4$ & NaOH can be used as primary standard. Choose the correct answer from the options given below :

(A) (A) and (B) only
(B) (C) and (E) only
(C) (B) and (E) only
(D) (C) and (D) only

**Answer: (B)** (C) and (E) only · Key from source paper

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**Q32** JEE Main 2024 · 9 Apr · Shift 2 MCQ

Match List I with List II

| List - I (Test) | List - II (Observation) |
|---|---|
| A. $Br_2$ water test | I. Yellow orange or orange red precipitate formed |
| B. Ceric ammonium nitrate test | II. Reddish orange colour disappears |
| C. Ferric chloride test | III. Red colour appears |
| D. 2, 4 - DNP test | IV. Blue, Green, Violet or Red colour appear |

Choose the correct answer from the options given below:

(A) A-III, B-IV, C-I, D-II
(B) A-I, B-II, C-III, D-IV
(C) A-IV, B-I, C-II, D-III
(D) A-II, B-III, C-IV, D-I

**Answer: (D)** A-II, B-III, C-IV, D-I · Key from source paper

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**Q33** JEE Main 2024 · 9 Apr · Shift 2 Numerical

Consider the following test for a group-IV cation.

$M^{2+} + H_2S \rightarrow A$ (Black precipitate) + by product

$A+$ aqua regia $\rightarrow B + NOCl + S + H_2O$

$B + KNO_2 + CH_3COOH \rightarrow C+$ by product

The spin-only magnetic moment value of the metal complex C is _____ BM (Nearest integer)

Numerical value type: the answer is a number.

**Answer: 0.** · Key from source paper

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**Q34** JEE Main 2024 · 8 Apr · Shift 1 MCQ

Match List I with List II Choose the correct answer from the options given below:

| List-I (Name of the test) | List-II (Reaction sequence involved) [M is metal] |
|---|---|
| A. Borax bead test | I. $MCO_3 \rightarrow MO \xrightarrow{Co(NO_3)_2} CoO \cdot MO$ |
| B. Charcoal cavity test | II. $MCO_3 \rightarrow MCl_2 \rightarrow M^{2+}$ |
| C Cobalt nitrate test | III $MSO_4 \xrightarrow[\Delta]{Na_2B_4O_7} M(BO_2)_2 \rightarrow MBO_2 \rightarrow M$ |

D. Flame test IV $\mathrm{MSO_4} \xrightarrow[\Delta]{\mathrm{Na_2CO_3}} \mathrm{MCO_3} \rightarrow \mathrm{MO} \rightarrow \mathrm{M}$

(A) A-III, B-II, C-IV, D-I
(B) A-III, B-IV, C-I, D-II
(C) A-III, B-I, C-II, D-IV
(D) A-III, B-I, C-IV, D-II

**Answer: (B) A-III, B-IV, C-I, D-II** · Key from source paper

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**Q35** JEE Main 2024 · 8 Apr · Shift 2 MCQ

Match List - I with List - II.

| (Test) | (Identification) |
|---|---|
| (A) Bayer's test MARKS | (I) Phenol VIARKS |
| (B) Ceric ammonium nitrate test | (II) Aldehyde |
| (C) Phthalein dye test $R$ K | (III) Alcoholic-OH group |
| (D) Schiff's test | (IV) Unsaturation |

Choose the correct answer from the options given below :

(A) (A)-(IV), (B)-(III), (C)-(I), (D)-(II)
(B) (A)-(II), (B)-(III), (C)-(IV), (D)-(I)
(C) (A)-(IV), (B)-(I), (C)-(II), (D)-(III)
(D) (A)-(III), (B)-(I), (C)-(IV), (D)-(II)

**Answer: (A) (A)-(IV), (B)-(III), (C)-(I), (D)-(II)** · Key from source paper

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**Q36** JEE Main 2024 · 6 Apr · Shift 1 MCQ

Match List I with List II Choose the correct answer from the options given below:

| List - I (Precipitating reagent and conditions) | List - II (Cation) |
|---|---|
| A. $NH_4Cl + NH_4OH$/ARKS | I. $Mn^{2+}$ |
| B. $NH_4OH + Na_2CO_3$ | II. $Pb^{2+}$ |
| C. $NH_4OH + NH_4Cl + H_2$ S gas | III. $Al^{3+}$ |
| D. dilute HCl | IV. $Sr^{2+}$ |

(A) A-III, B-IV, C-I, D-II
(B) A-III, B-IV, C-II, D-I
(C) A-IV, B-III, C-II, D-I
(D) A-IV, B-III, C-I, D-II

**Answer: (A) A-III, B-IV, C-I, D-II** · Key from source paper

**Q37** JEE Main 2024 · 6 Apr · Shift 2 MCQ

During the detection of acidic radical present in a salt, a student gets a pale yellow precipitate soluble with difficulty in $NH_4OH$ solution when sodium carbonate extract was first acidified with dil. $HNO_3$ and then $AgNO_3$ solution was added. This indicates presence of :

(A) $Br^-$
(B) $I^-$
(C) $Cl^-$
(D) $CO_3^{2-}$

**Answer: (A)** $Br^-$ · Key from source paper

**Q38** JEE Main 2024 · 6 Apr · Shift 2 MCQ

Match List - I with List - II.

| List - I Reaction | List - II Type of redox reaction |
|---|---|
| (A) Li | (I) 589.2 |
| (B) Na | (II) 455.5 |
| (C) Rb | (III) 670.8 |
| (D) Cs | (IV) 780.0 |

Choose the correct answer from the options given below :

(A) (A)-(II), (B)-(IV), (C)-(III), (D)-(I)
(B) (A)-(I), (B)-(IV), (C)-(III), (D)-(II)
(C) (A)-(IV), (B)-(II), (C)-(I), (D)-(III)
(D) (A)-(III), (B)-(I), (C)-(IV), (D)-(II)

**Answer: (D)** (A)-(III), (B)-(I), (C)-(IV), (D)-(II) · Key from source paper

**Q39** JEE Main 2024 · 5 Apr · Shift 1 Numerical

*see figure*

Q60.




In a borax bead test under hot condition, a metal salt (one from the given) is heated at point B of the flame,

resulted in green colour salt bead. The spin-only magnetic moment value of the salt is _____ BM (Nearest integer) [Given atomic number of Cu = 29, Ni = 28, Mn = 25, Fe = 26]

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Numerical value type: the answer is a number.

**Answer: 6.** · Key from source paper

**Q40** JEE Main 2024 · 5 Apr · Shift 2 MCQ

While preparing crystals of Mohr's salt, dil $H_2SO_4$ is added to a mixture of ferrous sulphate and ammonium sulphate, before dissolving this mixture in water, dil $H_2SO_4$ is added here to :

(A) prevent the hydrolysis of ferrous sulphate
(B) prevent the hydrolysis of ammonium sulphate
(C) make the medium strongly acidic
(D) increase the rate of formation of crystals

**Answer: (A) prevent the hydrolysis of ferrous sulphate** · Key from source paper

**Q41** JEE Main 2024 · 4 Apr · Shift 1 MCQ

In the precipitation of the iron group (III) in qualitative analysis, ammonium chloride is added before adding ammonium hydroxide to :

(A) increase concentration of $Cl^-$ ions
(B) increase concentration of $NH_4^+$ ions
(C) prevent interference by phosphate ions
(D) decrease concentration of $^-OH$ ions

**Answer: (D) decrease concentration of $^-OH$ ions** · Key from source paper

**Q42** JEE Main 2024 · 1 Feb · Shift 1 MCQ

Given below are two statements :

Statement (I) : Potassium hydrogen phthalate is a primary standard for standardisation of sodium hydroxide solution.

Statement (II) : In this titration phenolphthalein can be used as indicator.

In the light of the above statements, choose the most appropriate answer from the options given below:

(A) Both Statement I and Statement II are correct
(B) Statement I is correct but Statement II is incorrect
(C) Statement I is incorrect but Statement II is correct
(D) Both Statement I and Statement II are incorrect

**Answer: (A) Both Statement I and Statement II are correct** · Key from source paper

**Q43** JEE Main 2024 · 1 Feb · Shift 1 Numerical

The number of white coloured salts among the following is .....

A $SrSO_4$ B $MgNH_4PO_4$ C $BaCrO_4$

D $Mn(OH)_2$ E $PbSO_4$ F $PbCrO_4$

G AgBr H $PbI_2$ I $CaC_2O_4$

J $Fe(OH)_2CH_3COO$

Numerical value type: the answer is a number.

**Answer: 5.** · Key from source paper

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**Q44** JEE Main 2024 · 31 Jan · Shift 1 MCQ

The compound that is white in color is

(A) ammonium sulphide
(B) lead sulphate
(C) lead iodide
(D) ammonium arsinomolybdate

**Answer: (B) lead sulphate** · Key from source paper

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**Q45** JEE Main 2024 · 31 Jan · Shift 1 Numerical

Molar mass of the salt from NaBr, $NaNO_3$, KI and $CaF_2$ which does not evolve coloured vapours on heating with concentrated $H_2SO_4$ is _____ g $mol^{-1}$, (Molar mass in g $mol^{-1}$ : Na : 23, N : 14, K : 39, O : 16, Br : 80, I : 127, F : 19, Ca : 40 )

Numerical value type: the answer is a number.

**Answer: 78.** · Key from source paper

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**Q46** JEE Main 2024 · 31 Jan · Shift 2 Numerical

In the reaction of potassium dichromate, potassium chloride and sulfuric acid (conc.), the oxidation state of the chromium in the product is + _____.

Numerical value type: the answer is a number.

**Answer: 6.** · Key from source paper

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**Q47** JEE Main 2024 · 30 Jan · Shift 1 MCQ

Given below are two statements:

Statement-I: The gas liberated on warming a salt with dil $H_2SO_4$, turns a piece of paper dipped in lead acetate into black, it is a confirmatory test for sulphide ion.

Statement-II: In statement-I the colour of paper turns black because of formation of lead sulphite.

In the light of the above statements, choose the most appropriate answer from the options given below:

(A) Both Statement-I and Statement-II are false
(B) Statement-I is false but Statement-II is true
(C) Statement-I is true but Statement-II is false
(D) Both Statement-I and Statement-II are true.

**Answer: (C) Statement-I is true but Statement-II is false** · Key from source paper

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**Q48** JEE Main 2024 · 30 Jan · Shift 2 Numerical

Number of metal ions characterized by flame test among the following is _____.

$Sr^{2+}$, $Ba^{2+}$, $Ca^{2+}$, $Cu^{2+}$, $Zn^{2+}$, $Co^{2+}$, $Fe^{2+}$

Numerical value type: the answer is a number.

**Answer: 4.** · Key from source paper

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**Q49** JEE Main 2024 · 29 Jan · Shift 2 MCQ

On passing a gas, '$X$', through Nessler's reagent, a brown precipitate is obtained. The gas '$X$' is

(A) $H_2S$
(B) $CO_2$
(C) $NH_3$
(D) $Cl_2$

**Answer: (C)** $NH_3$ · Key from source paper

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**Q50** JEE Main 2024 · 29 Jan · Shift 2 MCQ

A reagent which gives brilliant red precipitate with Nickel ions in basic medium is

(A) sodium nitroprusside
(B) neutral $FeCl_3$
(C) meta-dinitrobenzene
(D) dimethyl glyoxime

**Answer: (D) dimethyl glyoxime** · Key from source paper

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**Q51** JEE Main 2024 · 27 Jan · Shift 1 MCQ

NaCl reacts with conc. $H_2SO_4$ and $K_2Cr_2O_7$ to give reddish fumes (B), which react with NaOH to give yellow solution (C). (B) and (C) respectively are ;

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(A) $CrO_2Cl_2$, $Na_2CrO_4$
(B) $Na_2CrO_4$, $CrO_2Cl_2$
(C) $CrO_2Cl_2$, $KHSO_4$
(D) $CrO_2Cl_2$, $Na_2Cr_2O_7$

**Answer: (A)** $CrO_2Cl_2$, $Na_2CrO_4$ · Key from source paper

**Q52** JEE Main 2023 · 13 Apr · Shift 2 MCQ

In the wet tests for detection of various cations by precipitation, $Ba^{2+}$ cations are detected by obtaining precipitate of

(A) Ba(ox) : Barium oxalate
(B) $BaCO_3$
(C) $Ba(OAc)_2$
(D) $BaSO_4$

**Answer: (B)** $BaCO_3$ · Key from source paper

**Q53** JEE Main 2023 · 11 Apr · Shift 1 MCQ

When a solution of mixture having two inorganic salts was treated with freshly prepared ferrous sulphate in acidic medium, a dark brown ring was formed whereas on treatment with neutral $FeCl_3$, it gave deep red colour which disappeared on boiling and a brown red ppt was formed. The mixture contains

(A) $SO_3^{2-}$ & $CH_3COO^-$
(B) $CH_3COO^-$ & $NO_3^-$
(C) $SO_3^{2-}$ & $C_2O_4^{2-}$
(D) $C_2O_4^{2-}$ & $NO_3^-$

**Answer: (B)** $CH_3COO^-$ & $NO_3^-$ · Key from source paper

**Q54** JEE Main 2023 · 11 Apr · Shift 2 MCQ

Match List I with List II
LIST-I Complex
A. $Mg(NH_4)PO_4$
B. $K_3[Co(NO_2)_6]$
C. $MnO(OH)_2$
D. $Fe_4[Fe(CN)_6]_3$
LIST-II Colour
I. brown
II. white
III. yellow

IV. blue

Choose the correct answer from the options given below:

(A) A-III, B-IV, C-II, D-I

(B) A-II, B-III, C-I, D-IV

(C) A-II, B-IV, C-I, D-III

(D) A-II, B-III, C-IV, D-I

**Answer: (B) A-II, B-III, C-I, D-IV** · Key from source paper

## Q55 JEE Main 2023 · 10 Apr · Shift 1 MCQ

Prolonged heating is avoided during the preparation of ferrous ammonium sulphate to

(A) Prevent hydrolysis

(B) Prevent reduction

(C) Prevent breaking

(D) Prevent oxidation

**Answer: (D) Prevent oxidation** · Key from source paper

## Q56 JEE Main 2023 · 8 Apr · Shift 1 MCQ

Match List I with List II :

List I (Reagents used) List II (Compound with Functional group detected)

A. Alkaline solution of copper sulphate and sodium citrate I. *(see the figure above)*

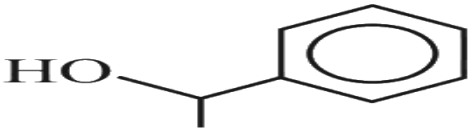
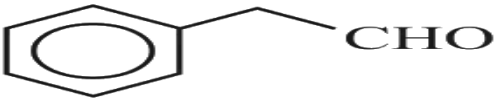
B. Neutral $FeCl_3$ solution II. *(see the figure above)*

C. Alkaline chloroform solution III. *(see the figure above)*

D. Potassium iodide and sodium hypochloride IV. *(see the figure above)*

Choose the correct answer from the options given below :

**Q57.** . Match List I with List II :

| List I (Reagents used) | List II (Compound with Functional group detected) |
|---|---|
| A. Alkaline solution of copper sulphate and sodium citrate | I.  |
| B. Neutral $FeCl_3$ solution | II.  |
| C. Alkaline chloroform solution | III.  |
| D. Potassium iodide and sodium hypochloride | IV  |

Choose the correct answer from the options given below :

(1) A-III, B-IV, C-I, D-II (2) A-III, B-IV, C-II, D-I

(3) A-IV, B-I, C-II, D-III (4) A-II, B-IV, C-III, D–I

(A) A-III, B-IV, C-I, D-II
(B) A-III, B-IV, C-II, D-I
(C) A-IV, B-I, C-II, D-III
(D) A-II, B-IV, C-III, D–I

**Answer: (B) A-III, B-IV, C-II, D-I** · Key from source paper

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**Q57** JEE Main 2023 · 8 Apr · Shift 2 MCQ

Given below are two statements:

**Statement I:** In redox titration, the indicators used are sensitive to change in pH of the solution.

**Statement II:** In acid-base titration, the indicators used are sensitive to change in oxidation potential.

In the light of the above statements, choose the **most appropriate** answer from the options given below

(A) **Statement I** is correct but **Statement II** is incorrect
(B) Both **Statement I** and **Statement II** are incorrect
(C) **Statement I** is incorrect but **Statement II** is correct
(D) Both **Statement I** and **Statement II** are correct

**Answer: (B) Both Statement I and Statement II are incorrect** · Key from source paper

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**Q58** JEE Main 2023 · 6 Apr · Shift 2 MCQ

Element not present in Nessler's reagent is

(A) N
(B) Hg
(C) I
(D) K

**Answer: (A) N** · Key from source paper

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**Q59** JEE Main 2023 · 6 Apr · Shift 2 MCQ

Formation of which complex, among the following, is not a confirmatory test of $Pb^{2+}$ ions

(A) Lead sulphate
(B) Lead nitrate
(C) Lead chromate
(D) Lead iodide

**Answer: (B) Lead nitrate** · Key from source paper

**Q60** JEE Main 2023 · 1 Feb · Shift 1 MCQ

A solution of $FeCl_3$ when treated with $K_4Fe(CN)_6$ gives a prussian blue precipitate due to the formation of

(A) $KFe_2(CN)_6$
(B) $FeFe(CN)_6$
(C) $Fe_3Fe(CN)_{62}$
(D) $Fe_4Fe(CN)_{63}$

**Answer: (D)** $Fe_4Fe(CN)_{63}$ · Key from source paper

**Q61** JEE Main 2023 · 1 Feb · Shift 1 MCQ

Match List I and List II

| List I (Test) | List II (Functional group / Class of Compound) |
|---|---|
| (A) Molisch's Test | (I) Peptide |
| (B) Biuret Test | (II) Carbohydrate |
| (C) Carbylamine Test | (III) Primary amine |
| (D) Schiff's Test | (IV) Aldehyde |

Choose the correct answer from the options given below:

(A) (A) - I, (B) - II, (C) - III, (D) - IV
(B) (A) - III, (B) - IV, (C) -I, (D) - II
(C) (A) - II, (B) - I, (C) - III, (D) - IV
(D) (A) - III, (B) - IV, (C) -II, (D) - I

**Answer: (C)** (A) - II, (B) - I, (C) - III, (D) - IV · Key from source paper

**Q62** JEE Main 2023 · 1 Feb · Shift 2 MCQ

Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).
Assertion (A) : An aqueous solution of KOH when for volumetric analysis, its concentration should be checked before the use.
Reason (R) : On aging,KOH solution absorbs atmospheric $CO_2$.
In the light of the above statements, choose the correct answer from the options given below.

(A) (A) is not correct but (R) is correct
(B) Both (A) and (R) are correct but (R) is not the correct explanation of (A)
(C) Both (A) and (R) are correct and (R) is the correct explanation of (A)
(D) (A) is correct but (R) is not correct

**Answer: (C)** Both (A) and (R) are correct and (R) is the correct explanation of (A) · Key from source paper

**Q63** JEE Main 2023 · 1 Feb · Shift 2 MCQ

Which element is not present in Nessler's reagent?

(A) Mercury
(B) Potassium
(C) Iodine
(D) Oxygen

**Answer: (D) Oxygen** · Key from source paper

**Q64** JEE Main 2023 · 31 Jan · Shift 2 MCQ

Given below are two statements :
Statement I : Upon heating a borax bead dipped in cupric sulphate in a luminous flame, the colour of the bead becomes green.
Statement II : The green colour observed is due to the formation of copper(I) metaborate In the light of the above statements, choose the most appropriate answer from the options given below:

(A) Both Statement I and Statement II are false
(B) Both Statement I and Statement II are true
(C) Statement I is false but Statement II is true
(D) Statement I is true but Statement II is false

**Answer: (A) Both Statement I and Statement II are false** · Key from source paper

**Q65** JEE Main 2023 · 30 Jan · Shift 1 MCQ

During the qualitative analysis of $SO_3^{2-}$ using dilute $H_2SO_4$, $SO_2$ gas is evolved which turns $K_2Cr_2O_7$ solution (acidified with dilute $H_2SO_4$):

(A) Black
(B) Red
(C) Green
(D) Blue

**Answer: (C) Green** · Key from source paper

**Q66** JEE Main 2023 · 30 Jan · Shift 1 MCQ

In the wet tests for identification of various cations by precipitation, which transition element cation doesn't belong to group IV in qualitative inorganic analysis?

(A) $Fe^{3+}$
(B) $Zn^{2+}$
(C) $Co^{2+}$
(D) $Ni^{2+}$

**Answer: (A)** $Fe^{3+}$ · Key from source paper

**Q67** JEE Main 2023 · 30 Jan · Shift 2 MCQ

Formulae for Nessler's reagent is:

(A) $KHg_2I_2$
(B) $KHgI_3$
(C) $K_2HgI_4$
(D) $HgI_2$

**Answer: (C)** $K_2HgI_4$ · Key from source paper

**Q68** JEE Main 2023 · 29 Jan · Shift 1 MCQ

During the borax bead test with $CuSO_4$, a blue green colour of the bead was observed in oxidising flame due to the formation of

(A) $Cu_3B_2$
(B) $Cu$
(C) $Cu(BO_2)_2$
(D) $CuO$

**Answer: (C)** $Cu(BO_2)_2$ · Key from source paper

**Q69** JEE Main 2023 · 25 Jan · Shift 1 MCQ

Match List I with List II
List I (Elements): A K; B Ca; C Sr; D Ba
List II (Colour imparted to the flame): I Brick Red; II Violet; III Apple Green; IV Crimson Red
Choose the correct answer from the options given below:

(A) A-II, B-I, C-III, D-IV
(B) A-II, B-IV, C-I, D-III
(C) A-II, B-I, C-IV, D-III
(D) A-IV, B-III, C-II, D-I

**Answer: (C) A-II, B-I, C-IV, D-III** · Key from source paper

**Q70** JEE Main 2023 · 25 Jan · Shift 1 MCQ

Match the List-I with List-II :
Cations

P $\rightarrow \mathrm{Pb}^{2+}, \mathrm{Cu}^{2+}$
Q $\rightarrow \mathrm{Al}^{3+}, \mathrm{Fe}^{3+}$
R $\rightarrow \mathrm{Co}^{2+}, \mathrm{Ni}^{2+}$
S $\rightarrow \mathrm{Ba}^{2+}, \mathrm{Ca}^{2+}$
Group reaction
$\mathrm{H_2S}$ gas in presence of dilute HCl
$(\mathrm{NH_4})_2\mathrm{CO_3}$ in presence of $\mathrm{NH_4OH}$
$\mathrm{NH_4OH}$ in presence of $\mathrm{NH_4Cl}$
$\mathrm{H_2S}$ in presence of $\mathrm{NH_4OH}$

(A) P $\rightarrow$ i, Q $\rightarrow$ iii, R $\rightarrow$ ii, S $\rightarrow$ iv
(B) P $\rightarrow$ iv, Q $\rightarrow$ ii, R $\rightarrow$ iii, S $\rightarrow$ i
(C) P $\rightarrow$ iii, Q $\rightarrow$ i, R $\rightarrow$ iv, S $\rightarrow$ ii
(D) P $\rightarrow$ i, Q $\rightarrow$ iii, R $\rightarrow$ iv, S $\rightarrow$ ii

**Answer: (D)** P $\rightarrow$ i, Q $\rightarrow$ iii, R $\rightarrow$ iv, S $\rightarrow$ ii · Key from source paper

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## Q71 JEE Main 2023 · 25 Jan · Shift 2 MCQ

A chloride salt solution acidified with dil. $\mathrm{HNO_3}$ gives a curdy white precipitate, [A], on addition of $\mathrm{AgNO_3}$. [A] on treatment with $\mathrm{NH_4OH}$ gives a clear solution, B.

(A) $\mathrm{H[AgCl_3]}$ & $\mathrm{[Ag(NH_3)_2]Cl}$
(B) $\mathrm{H[AgCl_3]}$ & $\mathrm{(NH_4)[Ag(OH)_2]}$
(C) $\mathrm{AgCl}$ & $\mathrm{[Ag(NH_3)_2]\ Cl}$
(D) $\mathrm{AgCl}$ & $\mathrm{(NH_4)[Ag(OH)_2]}$

**Answer: (C)** $\mathrm{AgCl}$ & $\mathrm{[Ag(NH_3)_2]\ Cl}$ · Key from source paper

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## Q72 JEE Main 2023 · 24 Jan · Shift 1 MCQ

An ammoniacal metal salt solution gives a brilliant red precipitate on addition of dimethylglyoxime. The metal ion is :

(A) $Cu^{2+}$
(B) $Ni^{2+}$
(C) $Fe^{2+}$
(D) $\mathrm{Co}^{2+}$

**Answer: (B)** $Ni^{2+}$ · Key from source paper

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## Q73 JEE Main 2022 · 29 Jul · Shift 2 MCQ

When borax is heated with CoO on a platinum loop, blue coloured bead formed is largely due to

(A) $B_2O_3$
(B) $CoBO_{2_2}$
(C) $CoB_4O_7$
(D) $CoB_4O_5OH_4$

**Answer: (B)** $CoBO_{2_2}$ · Key from source paper

**Q74** JEE Main 2022 · 27 Jul · Shift 2 MCQ

$Fe^{3+}$ cation gives a prussian blue precipitate on addition of potassium ferrocyanide solution due to the formation of

(A) $[Fe(H_2O)_6]_2[Fe(CN)_6]$
(B) $Fe_2[Fe(CN)_6]_2$
(C) $Fe_3[Fe(OH)_2(CN)_4]_2$
(D) $Fe_4[Fe(CN)_6]_3$

**Answer: (D)** $Fe_4[Fe(CN)_6]_3$ · Key from source paper

**Q75** JEE Main 2022 · 29 Jun · Shift 2 MCQ

A white precipitate was formed when $BaCl_2$ was added to water extract of an inorganic salt. Further, a gas 'X' with characteristic odour was released when the formed white precipitate was dissolved in dilute HCl. The anion present in the inorganic salt is:

(A) $I^-$
(B) $SO_3^{2-}$
(C) $S^{2-}$
(D) $NO_2^-$

**Answer: (B)** $SO_3^{2-}$ · Key from source paper

**Q76** JEE Main 2022 · 27 Jun · Shift 2 MCQ

Match List I with List II.
List-I (Anion)
(A) $CO_3^{2-}$
(B) $S^{2-}$
(C) $SO_3^{2-}$
(D) $NO_2^-$
List-II (gas evolved on reaction with dil. $H_2SO_4$)
(I) Colourless gas which turns lead acetate paper black.
(II) Colourless gas which turns acidified potassium dichromate solution green.
(III) Brown fumes which turns acidified KI solution containing starch blue.
(IV) Colourless gas evolved with brisk effervescence, which turns lime water milky.
Choose the correct answer from the options given below

(A) A — III, B — I, C — II, D — IV
(B) A — II, B — I, C — IV, D — III
(C) A — IV, B — I, C — III, D — II
(D) A — IV, B — I, C — II, D — III

**Answer: (D) A — IV, B — I, C — II, D — III** · Key from source paper

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**Q77** JEE Main 2022 · 26 Jun · Shift 1 MCQ

Which statement is not true with respect to nitrate ion test?

(A) A dark brown ring is formed at the junction of two solutions.
(B) Ring is formed due to nitroferrous sulphate complex.
(C) The brown complex is $[Fe(H_2O)_5(NO)]\ SO_4$
(D) Heating the nitrate salt with conc. $H_2SO_4$, light brown fumes are evolved.

**Answer: (B) Ring is formed due to nitroferrous sulphate complex.** · Key from source paper

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**Q78** JEE Main 2022 · 24 Jun · Shift 1 MCQ

During the qualitative analysis of salt with cation $y^{2+}$, addition of a reagent (X) to alkaline solution of the salt gives a bright red precipitate. The reagent (X) and the cation $\left(y^{2+}\right)$ present respectively are :

(A) Dimethylglyoxime and $Ni^{2+}$
(B) Dimethylglyoxime and $Co^{2+}$
(C) Nessler's reagent and $Hg^{2+}$
(D) Nessler's reagent and $Ni^{2+}$

**Answer: (A) Dimethylglyoxime and $Ni^{2+}$** · Key from source paper

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**Q79** JEE Main 2022 · 24 Jun · Shift 2 MCQ

In the flame test of a mixture of salts, a green flame with blue centre was observed. Which one of the following cations may be present?

(A) Calcium
(B) Copper
(C) Barium
(D) Strontium

**Answer: (B) Copper** · Key from source paper

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**Q80** JEE Main 2021 · 1 Sep · Shift 2 MCQ

The potassium ferrocyanide solution gives a Prussian blue colour, when added to :

(A) $CoCl_3$
(B) $CoCl_2$
(C) $FeCl_2$
(D) $FeCl_3$

**Answer: (D)** $FeCl_3$ · Key from source paper

**Q81** JEE Main 2021 · 31 Aug · Shift 1 Numerical

Consider the sulphides HgS, PbS, CuS, $Sb_2S_3$, $As_2S_3$ and CdS. Number of these sulphides soluble in $50\%$ $HNO_3$ is _____.

Numerical value type: the answer is a number.

**Answer: 4.** · Key from source paper

**Q82** JEE Main 2021 · 31 Aug · Shift 2 MCQ

Match List - I with List - II :
List - I (Metal ion)
(a) $Mn^{2+}$
(b) $As^{3+}$
(c) $Cu^{2+}$
(d) $Al^{3+}$
List - II (Group in Qualitative analysis)
(i) Group - III
(ii) Group - IIA
(iii) Group - IV
(iv) Group - IIB
Choose the most appropriate answer from the options given below :

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

**Answer: (A)** (a)-(iii), (b)-(iv), (c)-(ii), (d)-(i) · Key from source paper

**Q83** JEE Main 2021 · 27 Aug · Shift 1 MCQ

Acidic ferric chloride solution on treatment with excess of potassium ferrocyanide gives a Prussian blue coloured colloidal species. It is:

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(A) $HFe[Fe(CN)_6]$
(B) $K_5Fe[Fe(CN)_6]_2$
(C) $Fe_4[Fe(CN)_6]_3$
(D) $KFe[Fe(CN)_6]$

**Answer: (D)** $KFe[Fe(CN)_6]$ · Key from source paper

**Q84** JEE Main 2021 · 26 Aug · Shift 1 Numerical

The ratio of number of water molecules in Mohr's salt and potash alum is $\times 10^{-1}$. (Integer answer)

Numerical value type: the answer is a number.

**Answer: 5.** · Key from source paper

**Q85** JEE Main 2021 · 27 Jul · Shift 2 MCQ

To an aqueous solution containing ions such as $Al^{3+}$, $Zn^{2+}$, $Ca^{2+}$, $Fe^{3+}$, $Ni^{2+}$, $Ba^{2+}$ and $Cu^{2+}$ was added conc. HCl, followed by $H_2S$. The total number of cations precipitated during this reaction is/are :

(A) 1
(B) 3
(C) 4
(D) 2

**Answer: (A)** 1 · Key from source paper

**Q86** JEE Main 2021 · 20 Jul · Shift 1 MCQ

An inorganic Compound 'X' on treatment with concentrated $H_2SO_4$ produces brown fumes and gives dark brown ring with $FeSO_4$ in presence of concentrated $H_2SO_4$. Also Compound 'X' gives precipitate 'Y', when its solution in dilute HCl is treated with $H_2S$ gas. The precipitate 'Y' on treatment with concentrated $HNO_3$ followed by excess of $NH_4OH$ further gives deep blue coloured solution, Compound 'X' is:

(A) $Co(NO_3)_2$
(B) $Pb(NO_2)_2$
(C) $Cu(NO_3)_2$
(D) $Pb(NO_3)_2$

**Answer: (C)** $Cu(NO_3)_2$ · Key from source paper

**Q87** JEE Main 2021 · 18 Mar · Shift 1 MCQ

Reagent, $1-$naphthylamine and sulphanilic acid in acetic acid is used for the detection of

(A) $N_2O$
(B) $NO_3^-$
(C) $NO$
(D) $NO_2^-$

**Answer: (D)** $NO_2^-$ · Key from source paper

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**Q88** JEE Main 2021 · 18 Mar · Shift 2 Numerical

$10.0\ ml$ of $Na_2\ CO_3$ solution is titrated against $0.2\ M$ HCl solution. The following values were obtained in 5 readings. $4.8\ ml, 4.9\ ml, 5.0\ ml, 5.0\ ml$ and $5.0\ ml$
Based on these readings, and convention of titrimetric estimation of concentration of $Na_2\ CO_3$ solution is _____ mM.
(Round off to the Nearest integer)

Numerical value type: the answer is a number.

**Answer: 50.** · Key from source paper

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**Q89** JEE Main 2021 · 26 Feb · Shift 1 MCQ

On treating a compound with warm dil. $H_2SO_4$, gas X is evolved which turns $K_2Cr_2O_7$ paper acidified with dil. $H_2SO_4$ to a green compound Y. X and Y respectively are :

(A) $X = SO_2,\ Y = Cr_2O_3$
(B) $X = SO_2,\ Y = Cr_2(SO_4)_3$
(C) $X = SO_3,\ Y = Cr_2(SO_4)_3$
(D) $X = SO_3,\ Y = Cr_2O_3$

**Answer: (B)** $X = SO_2,\ Y = Cr_2(SO_4)_3$ · Checked by our team

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**Q90** JEE Main 2021 · 26 Feb · Shift 2 MCQ

Ceric ammonium nitrate and $CHCl_3$ / alc. KOH are used for the identification of functional groups present in _____ and _____ respectively.

(A) amine, phenol
(B) alcohol, amine
(C) amine, alcohol
(D) alcohol, phenol

**Answer: (B)** alcohol, amine · Key from source paper

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**Q91** JEE Main 2021 · 25 Feb · Shift 1 Numerical

$0.4\ g$ mixture of NaOH, $Na_2\ CO_3$ and some inert impurities was first titrated with $\frac{N}{10}$ HCl using phenolphthalein as an indicator, $17.5\ mL$ of HCl was required at the end point. After this methyl

orange was added and titrated. $1.5\ \mathrm{mL}$ of same HCl was required for the next end point. The weight percentage of $\mathrm{Na_2\ CO_3}$ in the mixture is (Rounded-off to the nearest integer)

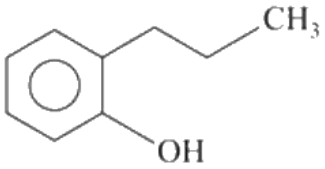
Numerical value type: the answer is a number.

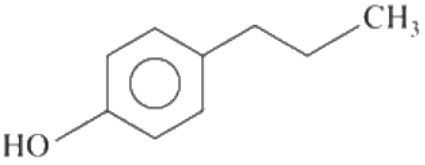
**Answer: 4.** · Key from source paper

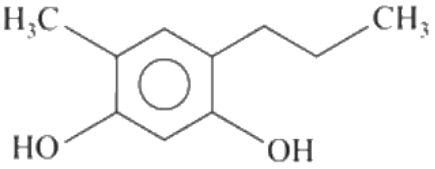
## Q92 JEE Main 2021 · 24 Feb · Shift 1 MCQ

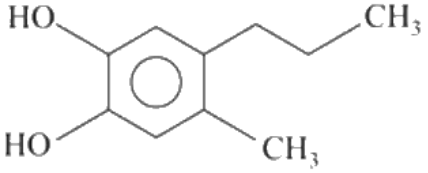
Which of the following compound gives pink colour on reaction with phthalic anhydride in conc. $\mathrm{H_2SO_4}$ followed by treatment with NaOH?

**Q36.** Which of the following compound gives pink colour on reaction with phthalic anhydride in conc. $\mathrm{H_2SO_4}$ followed by treatment with NaOH?

(1) 


(2) 


(3) 


(4) 


(A) *see figure*
(B) *see figure*
(C) *see figure*
(D) *see figure*

**Answer: (A)** · Key from source paper

## Q93 JEE Main 2021 · 24 Feb · Shift 1 MCQ

Given below are two statements:
Statement I: Colourless cupric metaborate is reduced to cuprous metaborate in a luminous flame.
Statement II: Cuprous metaborate is obtained by heating boric anhydride and copper sulphate in a non-luminous flame.
In the light of the above statements, choose the most appropriate answer from the options given below.

(A) Statement I is false but Statement II is true
(B) Both Statement I and Statement II are false
(C) Both Statement I and Statement II are true
(D) Statement I is true but Statement II is false

**Answer: (B) Both Statement I and Statement II are false** · Key from source paper

**Q94** JEE Main 2020 · 2 Sep · Shift 1 MCQ

While titration dilute HCl solution with aqueous NaOH, which of the following will not be required ?

(A) Burette and porcelain tile
(B) Pipette and distilled water
(C) Clamp and phenolphthalein
(D) Bunsen burner and measuring cylinder

**Answer: (D) Bunsen burner and measuring cylinder** · Key from source paper

**Q95** JEE Main 2020 · 8 Jan · Shift 1 MCQ

The strength of an aqueous NaOH solution is most accurately determined by titrating: (Note: consider that an appropriate indicator is used)

(A) Aq. NaOH in a pipette and aqueous oxalic acid in a burette
(B) Aq. NaOH in a burette and aqueous oxalic acid in a conical flask
(C) Aq. NaOH in a burette and concentrate $H_2SO_4$ in a conical flask
(D) Aq. NaOH in a volumetric flask and concentrated $H_2SO_4$ in a conical flask

**Answer: (B) Aq. NaOH in a burette and aqueous oxalic acid in a conical flask** · Key from source paper

**Q96** JEE Main 2019 · 9 Apr · Shift 2 MCQ

The peptide that gives positive ceric ammonium nitrate and carbylamine tests is:

(A) Gln - Asp
(B) Asp - Gln
(C) Lys - Asp
(D) Ser - Lys

**Answer: (D) Ser - Lys** · Key from source paper

**Q97** JEE Main 2019 · 10 Jan · Shift 2 MCQ

The correct match between item I and item II is
Item I (Compound)
a. Lysine
b. Furfural
c. Benzyl alcohol
d. Styrene
Item II (Reagent)
p. 1-naphthol
q. Ninhydrin
r. $KMnO_4$
s. Ceric ammonium nitrate

(A) a → q, b → r, c → s, d → p
(B) a → q, b → p, c → s, d → r
(C) a → r, b → p, c → q, d → s
(D) a → q, b → p, c → r, d → s

**Answer: (B) a → q, b → p, c → s, d → r** · Key from source paper

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## Q98 JEE Main 2018 · 16 Apr · Online MCQ

For standardizing NaOH solution, which of the following is used as a primary standard?

(A) Sodium tetra borate
(B) Ferrous Ammonium sulphate
(C) Oxalic acid
(D) Dil. HCl

**Answer: (C) Oxalic acid** · Key from source paper

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## Q99 JEE Main 2018 · 16 Apr · Online MCQ

The **incorrect** statement is:

(A) $Cu^{2+}$ ion gives chocolate coloured precipitate with potassium ferrocyanide solution
(B) $Cu^{2+}$ and $Ni^{2+}$ ions give black precipitate with $H_2S$ in presence of HCl solution
(C) Ferric ion gives blood red colour with potassium thiocyanate
(D) $Cu^{2+}$ salts give red coloured borax bead test in reducing flame

**Answer: (B) $Cu^{2+}$ and $Ni^{2+}$ ions give black precipitate with $H_2S$ in presence of HCl solution** · Key from source paper

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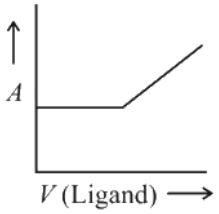
## Q100 JEE Main 2018 · 16 Apr · Online MCQ

In a complexometric titration of metal ion with ligand $M$ (Metal ion) + $L$(Ligand) → $C$ (Complex) end point is estimated spectrophotometrically (through light absorption). If 'M' and 'C' do not absorb light and only 'L' absorbs then the titration plot between absorbed light ($A$) versus volume of ligand 'L' ($V$) would look like:
*(see the figure above)*

**Q51.** In a complexometric titration of metal ion with ligand $M$ (Metal ion) $+ L$(Ligand) $\rightarrow C$ (Complex) end point is estimated spectrophotometrically (through light absorption). If 'M' and 'C' do not absorb light and only 'L' absorbs then the titration plot between absorbed light $(A)$ versus volume of ligand 'L' $(V)$ would look like:

(1)

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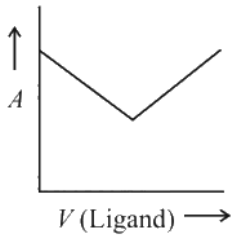


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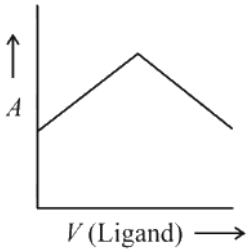
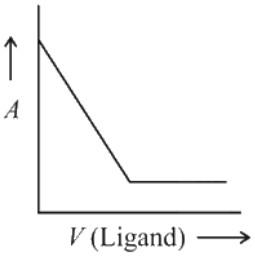



(4)




(A) *see figure*
(B) *see figure*
(C) *see figure*
(D) *see figure*

**Answer: (A)** · Key from source paper

## Q101 JEE Main 2018 · 15 Apr · Shift 1 MCQ

A white sodium salt dissolves readily in water to give a solution which is neutral to litmus. When silver nitrate solution is added to the aforementioned solution, a white precipitate is obtained which does not dissolve in dil. nitric acid. The anion is :

(A) $CO_3^{2-}$
(B) $SO_4^{2-}$
(C) $S^{2-}$
(D) $Cl^-$

**Answer: (D)** $Cl^-$ · Key from source paper

## Q102 JEE Main 2017 · 8 Apr · Online MCQ

A solution containing a period−IV cation gives a precipitate on passing $H_2S$. A solution of this precipitate in dil. HCl produces a white precipitate with NaOH solution and bluish-white precipitate with basic potassium ferrocyanide. The cation is

(A) $Mn^{2+}$
(B) $Zn^{2+}$
(C) $Ni^{2+}$
(D) $Co^{2+}$

**Answer: (B)** $Zn^{2+}$ · Key from source paper

**Q103** JEE Main 2017 · 2 Apr · Offline MCQ

The sodium salt of an organic acid X produces effervescence with concentrated $H_2SO_4$. X reacts with the acidified aqueous $CaCl_2$ solution to give a white precipitate which decolourises acidic solution of $KMnO_4$. X is

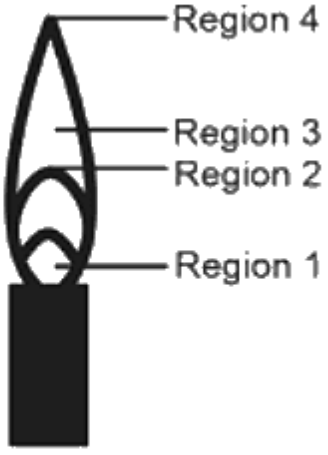
(A) $HCOONa$
(B) $CH_3COONa$
(C) $Na_2C_2O_4$
(D) $C_6H_5COONa$

**Answer: (C)** $Na_2C_2O_4$ · Key from source paper

**Q104** JEE Main 2016 · 3 Apr · Offline MCQ

The hottest region of Bunsen flame shown in the figure below is:
*(see the figure above)*

**Q48.** The hottest region of Bunsen flame shown in the figure below is:




(1) Region 3
(2) Region 4
(3) Region 1
(4) Region 2

(A) Region 3
(B) Region 4
(C) Region 1
(D) Region 2

**Answer: (D) Region 2** · Key from source paper

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**Q105** JEE Main 2015 · 10 Apr · Online MCQ

The cation that will not be precipitated by $H_2S$ in the presence of dil HCl is:

(A) $Co^{2+}$
(B) $As^{3+}$
(C) $Pb^{2+}$
(D) $Cu^{2+}$

**Answer: (A)** $Co^{2+}$ · Key from source paper

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**Q106** JEE Main 2015 · 10 Apr · Online MCQ

An aqueous solution of a salt X turns blood red on treatment with $SCN^-$ and blue on treatment with $K_4[Fe(CN)_6]$ , X also gives a positive chromyl chloride test. The salt X is:

(A) $FeCl_3$
(B) $Fe(NO_3)_3$
(C) $CuCl_2$
(D) $Cu(NO_3)_2$

**Answer: (A)** $FeCl_3$ · Key from source paper

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**Q107** JEE Main 2015 · 4 Apr · Offline MCQ

Which one of the following compounds is not a yellow colored compound ?

(A) $BaCrO_4$
(B) $Zn_2[Fe(CN)_6]$
(C) $K_3[Co(NO_2)_6]$
(D) $(NH_4)_3[As\,(Mo_3O_{10})_4]$

**Answer: (B)** $Zn_2[Fe(CN)_6]$ · Key from source paper

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**Q108** JEE Main 2013 · 22 Apr · Online MCQ

Which of the following statements is incorrect?

(A) $Fe^{2+}$ ion also gives blood red colour with $SCN^-$ ion.
(B) $Fe^{3+}$ ion also gives blood red colour with $SCN^-$ ion.
(C) On passing $H_2$ S into $Na_2ZnO_2$ solution a white ppt of ZnS is formed.
(D) Cupric ion reacts with excess of ammonia solution to give deep blue colour of $[Cu(NH_3)_4]^{2+}$ ion.

**Answer: (A) $Fe^{2+}$ ion also gives blood red colour with $SCN^-$ ion.** · Key from source paper

## Q109 JEE Main 2013 · 9 Apr · Online MCQ

Sodium Carbonate cannot be used in place of $(NH_4)_2CO_3$ for the identification of $Ca^{2+}$, $Ba^{2+}$ and $Sr^{2+}$ ions (in group V ) during mixture analysis because :

(A) $Mg^{2+}$ ions will also be precipitated.
(B) Concentration of $CO_3^{2-}$ ions is very low.
(C) Sodium ions will react with acid radicals.
(D) $Na^+$ ions will interfere with the detection of $Ca^{2+}$, $Ba^{2+}$, $Sr^{2+}$ ions.

**Answer: (A) $Mg^{2+}$ ions will also be precipitated.** · Key from source paper

## Q110 AIEEE 2005 MCQ

Calomel $(Hg_2Cl_2)$ on reaction with ammonium hydroxide gives

(A) $HgNH_2Cl$
(B) $NH_2 - Hg - Hg - Cl$
(C) $Hg_2O$
(D) $HgO$

**Answer: (A) $HgNH_2Cl$** · Key from source paper

## Q111 AIEEE 2003 MCQ

Which one of the following statements is correct?

(A) From a mixed precipitate of AgCl and AgI, ammonia solution dissolves only AgCl
(B) Ferric ions give a deep green precipitate on adding potassium ferrocyanide solution
(C) On boiling a solution having $K^+$, $Ca^{2+}$ and $HCO_3^-$ ions we get a precipitate of $K_2Ca(CO_3)_2$.
(D) Manganese salts give a violet borax bead test in the reducing flame

**Answer: (A) From a mixed precipitate of AgCl and AgI, ammonia solution dissolves only AgCl** · Key from source paper

## Q112 AIEEE 2003 MCQ

A red solid is insoluble in water. However it becomes soluble if some KI is added to water. Heating the red solid in a test tube results in liberation of some violet coloured fumes and droplets of a metal appear on the cooler parts of the test tube. The red solid is

(A) $HgI_2$
(B) $HgO$
(C) $Pb_3O_4$
(D) $(NH_4)_2Cr_2O_7$

**Answer: (A)** $HgI_2$ · Key from source paper

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**Q113** AIEEE 2002 MCQ

How do we differentiate between $Fe^{3+}$ and $Cr^{3+}$ in group III?

(A) by taking excess of $NH_4OH$ solution
(B) by increasing $NH_4^+$ ion concentration
(C) by decreasing $OH^-$ ion concentration
(D) both (b) and (c)

**Answer: (D)** both (b) and (c) · Key from source paper

EdLoop JEE