

CHEMISTRY · JEE MAIN

Qualitative Analysis — Salt Analysis

Chapter-wise previous year questions, with answer key

22

PYQS

2021–2025

PAPERS

2

TOPICS

Basic Radicals (Cations)

Acid Radicals (Anions)

- 1 Attempt each question on paper first — they're grouped by topic, newest papers first.
- 2 Check yourself against the answer key at the end.
- 3 Got one wrong? Tap “Step-by-step solution” under it for the full working.

Stuck on a question?

Every question has a free step-by-step solution on PrepWiser — tap “Step-by-step solution” under it.

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Basic Radicals (Cations) · 10 PYQs

Q1 JEE Main 2025 · 28 Jan · Shift 1

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) Cr^{3+} (B) Ti^{3+}
(C) Ni^{2+} (D) Mn^{2+}

Step-by-step solution ► [prepwisser.in/questions/LSfUupwbXQ](https://www.prepwisser.in/questions/LSfUupwbXQ)

Q2 JEE Main 2024 · 29 Jan · Shift 2

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

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

Step-by-step solution ► [prepwisser.in/questions/27IPkgZB2U](https://www.prepwisser.in/questions/27IPkgZB2U)

Q3 JEE Main 2024 · 29 Jan · Shift 2

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

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

Step-by-step solution ► [prepwisser.in/questions/XSIJXjeJz](https://www.prepwisser.in/questions/XSIJXjeJz)

Q4 JEE Main 2023 · 6 Apr · Shift 2

Element not present in Nessler's reagent is :

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

Step-by-step solution ► [prepwisser.in/questions/GISTvKdHjN](https://www.prepwisser.in/questions/GISTvKdHjN)

Q5 JEE Main 2023 · 1 Feb · Shift 2

Which element is not present in Nessler's reagent?

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

Step-by-step solution ► [prepwisser.in/questions/ICaahugVYw](https://www.prepwisser.in/questions/ICaahugVYw)

Q6 JEE Main 2023 · 30 Jan · Shift 2

Formulae for Nessler's reagent is :

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

Step-by-step solution ► [prepwisser.in/questions/Vh9xvOXNrH](https://www.prepwisser.in/questions/Vh9xvOXNrH)

Q7 JEE Main 2023 · 29 Jan · Shift 1

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) CuO (B) $\text{Cu(BO}_2)_2$
(C) Cu_3B_2 (D) Cu

[Step-by-step solution ► prepwisser.in/questions/YqSsA9_meE](https://www.prepwisser.in/questions/YqSsA9_meE)

Q8 JEE Main 2022 · 29 Jul · Shift 2

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

- (A) B_2O_3
(B) $\text{Co(BO}_2)_2$
(C) CoB_4O_7
(D) $\text{Co[B}_4\text{O}_5(\text{OH})_4]$

[Step-by-step solution ► prepwisser.in/questions/Zt1d0YCMGd](https://www.prepwisser.in/questions/Zt1d0YCMGd)

Q9 JEE Main 2022 · 27 Jul · Shift 2

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

- (A) $[\text{Fe(H}_2\text{O)}_6]_2[\text{Fe(CN)}_6]$
(B) $\text{Fe}_2[\text{Fe(CN)}_6]_2$
(C) $\text{Fe}_3[\text{Fe(OH)}_2(\text{CN})_4]_2$
(D) $\text{Fe}_4[\text{Fe(CN)}_6]_3$

[Step-by-step solution ► prepwisser.in/questions/3drfWl6c0s](https://www.prepwisser.in/questions/3drfWl6c0s)

Q10 JEE Main 2021 · 1 Sep · Shift 2

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

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

[Step-by-step solution ► prepwisser.in/questions/tkqLAKyK3g](https://www.prepwisser.in/questions/tkqLAKyK3g)

Acid Radicals (Anions) · 12 PYQs

Q11 JEE Main 2024 · 9 Apr · Shift 1

On reaction of Lead Sulphide with dilute nitric acid which of the following is not formed?

- (A) Sulphur (B) Nitric oxide
(C) Lead nitrate (D) Nitrous oxide

[Step-by-step solution ► prepwisser.in/questions/ZwA7Ogg-zo](https://www.prepwisser.in/questions/ZwA7Ogg-zo)

Q12 JEE Main 2024 · 8 Apr · Shift 2

In qualitative test for identification of presence of phosphorous, the compound is heated with an oxidising agent. Which is further treated with nitric acid and ammonium molybdate respectively. The yellow coloured precipitate obtained is :

- (A) $\text{Na}_3\text{PO}_4 \cdot 12\text{MoO}_3$
(B) $(\text{NH}_4)_3\text{PO}_4 \cdot 12(\text{NH}_4)_2\text{MoO}_4$
(C) $\text{MoPO}_4 \cdot 21\text{NH}_4\text{NO}_3$
(D) $(\text{NH}_4)_3\text{PO}_4 \cdot 12\text{MoO}_3$

Step-by-step solution ► [prepwiser.in/questions/4gvZtuj9W-](https://www.prepwiser.in/questions/4gvZtuj9W-)

Q13 JEE Main 2024 · 4 Apr · Shift 2

When MnO_2 and H_2SO_4 is added to a salt (A), the greenish yellow gas liberated as salt (A) is :

- (A) NH_4Cl (B) CaI_2
(C) KNO_3 (D) NaBr

Step-by-step solution ► [prepwiser.in/questions/T89p9bG30C](https://www.prepwiser.in/questions/T89p9bG30C)

Q14 JEE Main 2024 · 31 Jan · Shift 1

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

$$\text{g mol}^{-1} : \text{Na} : 23, \text{N} : 14, \text{K} : 39, \text{O} : 16, \text{Br} : 80, \text{I} : 127, \text{F} : 19, \text{Ca} : 40)$$

Numerical answer — enter the value.

Step-by-step solution ► [prepwiser.in/questions/P-8hvTfeuE](https://www.prepwiser.in/questions/P-8hvTfeuE)

Q15 JEE Main 2024 · 29 Jan · Shift 2

The oxidation number of iron in the compound formed during brown ring test for NO_3^- iron is _____.

Numerical answer — enter the value.

Step-by-step solution ► [prepwiser.in/questions/qGu7H2ARyd](https://www.prepwiser.in/questions/qGu7H2ARyd)

Q16 JEE Main 2023 · 30 Jan · Shift 1

During the qualitative analysis of SO_3^{2-} using dilute H_2SO_4 , SO_2 gas is evolved which turns $\text{K}_2\text{Cr}_2\text{O}_7$ solution (acidified with dilute H_2SO_4) :

- (A) blue (B) black
(C) red (D) green

Step-by-step solution ► [prepwiser.in/questions/fE4H3JgEwc](https://www.prepwiser.in/questions/fE4H3JgEwc)

Q17 JEE Main 2023 · 25 Jan · Shift 2

A chloride salt solution acidified with dil. HNO_3 gives a curdy white precipitate, [A], on addition of AgNO_3 . [A] on treatment with NH_4OH gives a clear solution B. A and B are respectively :

- (A) $\text{H}[\text{AgCl}_3] \& (\text{NH}_4)[\text{Ag}(\text{OH})_2]$ (B) $\text{AgCl} \& [\text{Ag}(\text{NH}_3)_2]\text{Cl}$
(C) $\text{H}[\text{AgCl}_3] \& [\text{Ag}(\text{NH}_3)_2]\text{Cl}$ (D) $\text{AgCl} \& (\text{NH}_4)[\text{Ag}(\text{OH})_2]$

Step-by-step solution ► [prepwiser.in/questions/GUo3oGULdH](https://www.prepwiser.in/questions/GUo3oGULdH)

Q18 JEE Main 2022 · 28 Jul · Shift 1

Match List - I with List - II, match the gas evolved during each reaction.

	List - I		List - II
(A)	$(\text{NH}_4)_2\text{Cr}_2\text{O}_7 \xrightarrow{\Delta}$	(I)	H_2
(B)	$\text{KMnO}_4 + \text{HCl} \rightarrow$	(II)	N_2
(C)	$\text{Al} + \text{NaOH} + \text{H}_2\text{O} \rightarrow$	(III)	O_2
(D)	$\text{NaNO}_3 \xrightarrow{\Delta}$	(IV)	Cl_2

Choose the correct answer from the options given below :

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

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

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

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

Step-by-step solution ► [prepwiser.in/questions/oj1oLyIkYm](https://www.prepwiser.in/questions/oj1oLyIkYm)

Q19 JEE Main 2022 · 30 Jun · Shift 1

Correct formula of the compound which gives a white precipitate with BaCl_2 solution, but not with AgNO_3 solution, is :

(A) $[\text{Co}(\text{NH}_3)_5\text{Br}]\text{SO}_4$

(B) $[\text{Co}(\text{NH}_3)_5\text{SO}_4]\text{Br}$

(C) $[\text{Pt}(\text{NH}_3)_4\text{Cl}_2]\text{Br}_2$

(D) $[\text{Pt}(\text{NH}_3)_4\text{Br}_2]\text{Cl}_2$

Step-by-step solution ► [prepwiser.in/questions/zNBKEuqtCe](https://www.prepwiser.in/questions/zNBKEuqtCe)

Q20 JEE Main 2022 · 26 Jun · Shift 1

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 $[\text{Fe}(\text{H}_2\text{O})_5(\text{NO})]\text{SO}_4$.

(D) Heating the nitrate salt with conc. H_2SO_4 , light brown fumes are evolved.

Step-by-step solution ► [prepwiser.in/questions/VJX4WuhWvU](https://www.prepwiser.in/questions/VJX4WuhWvU)

Q21 JEE Main 2021 · 31 Aug · Shift 1

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 answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/iLxtjC9J-c](https://www.prepwiser.in/questions/iLxtjC9J-c)

Q22 JEE Main 2021 · 26 Feb · Shift 1

On treating a compound with warm dil. H_2SO_4 , gas X is evolved which turns $\text{K}_2\text{Cr}_2\text{O}_7$ paper acidified with dil. H_2SO_4 to a green compound Y. X and Y respectively are :

- (A) $\text{X} = \text{SO}_2$, $\text{Y} = \text{Cr}_2\text{O}_3$
- (B) $\text{X} = \text{SO}_3$, $\text{Y} = \text{Cr}_2(\text{SO}_4)_3$
- (C) $\text{X} = \text{SO}_3$, $\text{Y} = \text{Cr}_2\text{O}_3$
- (D) $\text{X} = \text{SO}_2$, $\text{Y} = \text{Cr}_2(\text{SO}_4)_3$

[Step-by-step solution ► prepwiser.in/questions/cpKRHW_9EK](https://www.prepwiser.in/questions/cpKRHW_9EK)

Answer key — Qualitative Analysis — Salt Analysis

Numbers match the question numbers above. For full working, open the solution link under each question.

1	C	2	C	3	A	4	B	5	D	6	D	7	B	8	B
9	D	10	D	11	D	12	D	13	A	14	78	15	1	16	D
17	B	18	C	19	A	20	B	21	4	22	D				

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