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JEE MAIN PRINCIPLES RELATED TO PRACTICAL CHEMISTRY — QUALITATIVE SALT ANALYSIS OF CATIONS — PYQS

Max. Marks: 48 **Questions:** 12

Section A (MCQ) — 11 questions

Q.1 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 [JEE Main 2026 (Online) 4th April Evening Shift]

(1) +3 (2) +4 (3) +2 (4) +7

Scan or tap for the full solution

Q.2 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,

[JEE Main 2026 (Online) 2nd April Morning Shift]

(1) Ca^{2+} and SO_4^{2-} (2) Ba^{2+} and PO_4^{3-}

(3) Mn^{2+} and PO_4^{3-} (4) Ba^{2+} and SO_4^{2-}

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Q.3 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

[JEE Main 2026 (Online) 24th January Morning Shift]

(1) AgCl, Hg_2Cl_2 and $PbCl_2$

(2) $CuCl_2$, AgCl and $PbCl_2$

(3) $AlCl_3$, $PbCl_2$ and $BaCl_2$

(4) $MgCl_2$, AgCl and $AlCl_3$

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Q.4 In the Group analysis of cations, Ba^{2+} & Ca^{2+} are precipitated respectively as

[JEE Main 2026 (Online) 24th January Evening Shift]

(1) sulphide & sulphide

(2) hydroxide & carbonate

(3) chromate & sulphide

(4) carbonate & carbonate

Scan or tap for the full solution

Q.5 Consider the following reactions.

$$\underset{\text{(Hot solution)}}{PbCl_2} + K_2CrO_4 \longrightarrow A + 2KCl$$

$$A + NaOH \rightleftharpoons B + Na_2CrO_4$$

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

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

[JEE Main 2026 (Online) 21st January Morning Shift]

(1) $Na_2[Pb(OH)_2]$, $PbCrO_4$ and $[Pb(NH_3)_4]SO_4$

(2) $Na_2[Pb(OH)_2]$, $PbCrO_4$ and $(NH_4)_2[Pb(CH_3COO)_4]$

(3) $PbCrO_4$, $Na_2[Pb(OH)_4]$ and $(NH_4)_2[Pb(CH_3COO)_4]$

(4) $PbCrO_4$, $Na_2[Pb(OH)_4]$ and $[Pb(NH_3)_4]SO_4$

Scan or tap for the full solution

Q.6 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

[JEE Main 2025 (Online) 7th April Morning Shift]

(1) X = NH_3 and Y = HgO

(2) X = NH_4Cl and Y = KOH

(3) X = NH_3 and Y = K_2HgI_4 + KOH

(4) X = HCl and Y = NH_4Cl

Scan or tap for the full solution

Q.7 Choose the correct tests with respective observations.

Choose the correct answer from the options given below :

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

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

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

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

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

[JEE Main 2025 (Online) 2nd April Morning Shift]

(1) A, D and E only (2) A, B and C only
(3) B, D and E only (4) C, D and E only

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Q.8 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

[JEE Main 2025 (Online) 28th January Morning Shift]

(1) Cr^{3+} (2) Ti^{3+} (3) Ni^{2+} (4) Mn^{2+}

Scan or tap for the full solution

Q.9 Identify the inorganic sulphides that are yellow in colour :

A. $(NH_4)_2S$ B. PbS
C. CuS D. As_2S_3
E. As_2S_5

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

[JEE Main 2025 (Online) 28th January Evening Shift]

(1) (D) and (E) only
(2) (A) and (B) only
(3) (A), (D) and (E) only
(4) (A) and (C) only

Scan or tap for the full solution

Q.10 Find the compound 'A' from the following reaction sequences.

$$A \xrightarrow{\text{aqua-regia}} B \xrightarrow[\text{(2) AcOH}]{\text{(1) } KNO_2,\ NH_4OH} \text{yellow ppt}$$

[JEE Main 2025 (Online) 24th January Evening Shift]

(1) NiS (2) MnS (3) ZnS (4) CoS

Scan or tap for the full solution

Q.11 Identify A, B and C in the given below reaction sequence

[JEE Main 2025 (Online) 23rd January Evening Shift]

$$A \xrightarrow{HNO_3} Pb(NO_3)_2 \xrightarrow{H_2SO_4} B$$

$$B \xrightarrow{\substack{\text{(1) Ammonium acetate} \\ \text{(2) Acetic acid} \\ \text{(3) } K_2CrO_4}} C \text{ (Yellow ppt)}$$

(1) $PbCl_2$, $PbSO_4$, $PbCrO_4$
(2) PbS, $PbSO_4$, $Pb(CH_3COO)_2$
(3) PbS, $PbSO_4$, $PbCrO_4$
(4) $PbCl_2$, $Pb(SO_4)_2$, $PbCrO_4$

Scan or tap for the full solution

Section B (Numerical) — 1 question

Q.12 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+}

[JEE Main 2025 (Online) 24th January Morning Shift]

Scan or tap for the full solution

ANSWER KEY

Section A (MCQ) — 11 questions

Ques.	1	2	3	4	5	6	7	8	9	10	11
Ans.	**4**	**2**	**2**	**4**	**3**	**3**	**2**	**3**	**1**	**4**	**3**

Section B (Numerical) — 1 question

Ques.	12										
Ans.	**4**										