

Questions

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Q1 - 2024 (04 Apr Shift 1)

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

- (1) increase concentration of Cl^- ions
- (2) increase concentration of NH_4^+ ions
- (3) prevent interference by phosphate ions
- (4) decrease concentration of OH^- ions

Q2 - 2024 (05 Apr Shift 1)



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]

Q3 - 2024 (06 Apr Shift 1)

Match List I with List II

	List - I (Precipitating reagent and conditions)		List - II (Cation)
A.	$\text{NH}_4\text{Cl} + \text{NH}_4\text{OH}/\text{ARKS}$	I.	Mn^{2+}
B.	$\text{NH}_4\text{OH} + \text{Na}_2\text{CO}_3$	II.	Pb^{2+}
C.	$\text{NH}_4\text{OH} + \text{NH}_4\text{Cl} + \text{H}_2\text{S gas}$	III.	Al^{3+}
D.	dilute HCl	IV.	Sr^{2+}

Choose the correct answer from the options given below:

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

Questions

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

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

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

Q4 - 2024 (06 Apr Shift 2)

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 :

(1) Br^- (2) I^- (3) Cl^- (4) CO_3^{2-}

Q5 - 2024 (06 Apr Shift 2)

Match List - I with List - II.

List - I List - II

Reaction 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 :

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

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

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

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

Q6 - 2024 (08 Apr Shift 1)

Questions

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Match List I with List II

	List-I		List-II
	(Name of the test)		(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.	$MSO_4 \xrightarrow[\Delta]{Na_2CO_3} MCO_3 \rightarrow MO \rightarrow M$

Choose the correct answer from the options given below:

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

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

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

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

Q7 - 2024 (09 Apr Shift 2)

Consider the following test for a group-IV cation.



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

Questions

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Answer Key

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Q1 (4) /// mathongo **Q2 (6)** /// mathongo **Q3 (1)** /// mathongo **Q4 (1)** /// mathongo

Q5 (4) /// mathongo **Q6 (2)** /// mathongo **Q7 (0)** /// mathongo /// mathongo

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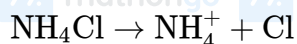
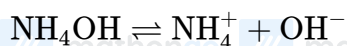
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Solutions

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Q1



Due to common ion effect of NH_4^+ ,

$[\text{OH}^-]$ decreases in such extent that only group-III cation can be precipitated, due to their very low K_{sp} in the range of 10^{-38} .

Q2

Fe^{+3} will give green coloured bead when heated at point B.

Number of unpaired e^- in $\text{Fe}^{+3} = 5$

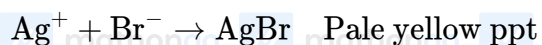
$$\mu = 5.92$$

Nearest integer = 6

Q3

Theory based question

Q4

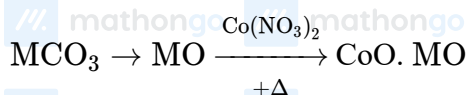


Q5

Fact Based

Q6

Cobalt nitrate test



Flame test



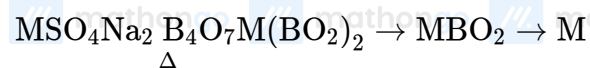
Borax Bead test

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Solutions

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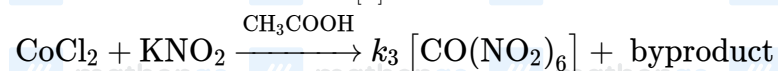
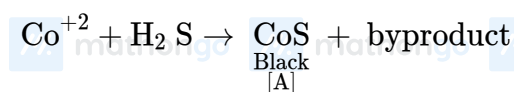
Charcoal cavity test



Q7

If $M^{+2} = Co^{+2}$

then



$[C] = Co^{+3} \rightarrow 3d^6 \Rightarrow NO_2$ is SFL so Co +3 has zero unpaired e^-

$$\Rightarrow n = 0 \Rightarrow u = \sqrt{n(n+2)} = 0 \text{ B.M}$$

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