

JEE MAIN REDOX REACTIONS — PYQS

Max. Marks: 84

Questions: 21

Section A (MCQ) — 11 questions

Q.1 In order to oxidise a mixture of 1 mole each of FeC_2O_4 , $\text{Fe}_2(\text{C}_2\text{O}_4)_3$, FeSO_4 and $\text{Fe}_2(\text{SO}_4)_3$ in acidic medium, the number of moles of KMnO_4 required is

[JEE Main 2026 (Online) 4th April Morning Shift]

- (1) 3 (2) 2 (3) 5 (4) 7

Scan or tap for the full solution



Q.2 Given below are two statements :

Statement-I: Oxidising power of halogens decreases in the order $\text{F}_2 > \text{Cl}_2 > \text{Br}_2 > \text{I}_2$, which is the basis of "Layer test".

Statement-II: "Layer test" to identify Br_2 and I_2 in aqueous solution involves the oxidation of bromide or iodide into Br_2 or I_2 respectively with Cl_2 , which is a type of displacement redox reaction.

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

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

- (1) Both Statement-I and Statement-II are true
 (2) Both Statement-I and Statement-II are false
 (3) Statement-I is true but Statement-II is false
 (4) Statement-I is false but Statement-II is true

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Q.3 Match the List-I with List-II

List-I (Redox Reaction)	
A.	$\text{CH}_4(\text{g}) + 2\text{O}_2(\text{g}) \xrightarrow{\Delta} \text{CO}_2(\text{g}) + 2\text{H}_2\text{O}(\text{l})$
B.	$2\text{NaH}(\text{s}) \xrightarrow{\Delta} 2\text{Na}(\text{s}) + \text{H}_2(\text{g})$
C.	$\text{V}_2\text{O}_5(\text{s}) + 5\text{Ca}(\text{s}) \xrightarrow{\Delta} 2\text{V}(\text{s}) + 5\text{CaO}(\text{s})$
D.	$2\text{H}_2\text{O}_2(\text{aq}) \xrightarrow{\Delta} 2\text{H}_2\text{O}(\text{l}) + \text{O}_2(\text{g})$
List-II (Type of Redox Reaction)	
I.	Disproportionation reaction
II.	Combination reaction
III.	Decomposition reaction
IV.	Displacement reaction

Choose the correct answer from the options given below:

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

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



Solution

Q.4 The species which does not undergo disproportionation reaction is :

[JEE Main 2025 (Online) 22nd January Evening Shift]

- (1)
- ClO_4^-
- (2)
- ClO_3^-
- (3)
- ClO^-
- (4)
- ClO_2^-

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Q.5 Given below are two statements :

Statement-I: The oxidation state of an element in a particular compound is the charge acquired by its atom on the basis of electron gain enthalpy consideration from other atoms in the molecule.

Statement-II: $p\pi - p\pi$ bond formation is more prevalent in second period elements over other periods.

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

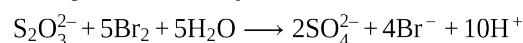
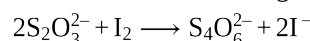
[JEE Main 2024 (Online) 9th April Morning Shift]

- (1) Statement-I is correct but Statement-II is incorrect
 (2) Both Statement-I and Statement-II are correct
 (3) Statement-I is incorrect but Statement-II is correct
 (4) Both Statement-I and Statement-II are incorrect

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Q.6 Thiosulphate reacts differently with iodine and bromine in the reactions given below:



Which of the following statements justifies the above dual behaviour of thiosulphate?

[JEE Main 2024 (Online) 8th April Morning Shift]

- (1) Thiosulphate undergoes oxidation by bromine and reduction by iodine in these reactions
 (2) Bromine is a weaker oxidant than iodine
 (3) Bromine is a stronger oxidant than iodine

- (4) Bromine undergoes oxidation and iodine undergoes reduction in these reactions

Scan or tap for the full solution



Q.7 Match **List I** with **List II**.

LIST I (Reaction)		LIST II (Type of redox reaction)	
A.	$\text{N}_2 + \text{O}_2 \longrightarrow 2\text{NO}$	I.	Decomposition
B.	$2\text{Pb}(\text{NO}_3)_2 \longrightarrow 2\text{PbO} + 4\text{NO}_2 + \text{O}_2$	II.	Displacement
C.	$2\text{Na} + 2\text{H}_2\text{O} \longrightarrow 2\text{NaOH} + \text{H}_2$	III.	Disproportionation
D.	$2\text{NO}_2 + 2\text{OH}^- \longrightarrow \text{NO}_2^- + \text{NO}_3^- + \text{H}_2\text{O}$	IV.	Combination

Choose the correct answer from the options given below : [JEE Main 2024 (Online) 6th April Evening Shift]

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



Solution

Q.8 Which of the following reactions are disproportionation reactions?

- A. $\text{Cu}^+ \longrightarrow \text{Cu}^{2+} + \text{Cu}$
 B. $3\text{MnO}_4^{2-} + 4\text{H}^+ \longrightarrow 2\text{MnO}_4^- + \text{MnO}_2 + 2\text{H}_2\text{O}$
 C. $2\text{KMnO}_4 \longrightarrow \text{K}_2\text{MnO}_4 + \text{MnO}_2 + \text{O}_2$
 D. $2\text{MnO}_4^- + 3\text{Mn}^{2+} + 2\text{H}_2\text{O} \longrightarrow 5\text{MnO}_2 + 4\text{H}^+$

Choose the correct answer from the options given below :

[JEE Main 2024 (Online) 1st February Morning Shift]

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

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Q.9 Given below are two statements:

Statement-I: S_8 solid undergoes disproportionation reaction under alkaline conditions to form S^{2-} and $\text{S}_2\text{O}_3^{2-}$.

Statement-II: ClO_4^- can undergo disproportionation reaction under acidic condition.

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

[JEE Main 2024 (Online) 31st January Evening Shift]

- (1) Statement-I is correct but statement II is incorrect
 (2) Both statement I and statement II are incorrect
 (3) Statement-I is incorrect but statement II is correct

- (4) Both statement I and statement II are correct

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Q.10 Chlorine undergoes disproportionation in alkaline medium as shown below :



The values of a, b, c and d in a balanced redox reaction are respectively :

[JEE Main 2024 (Online) 29th January Morning Shift]

- (1) 3, 4, 4 and 2 (2) 1, 2, 1 and 1
 (3) 2, 4, 1 and 3 (4) 2, 2, 1 and 3

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Q.11 Which of the following cannot function as an oxidising agent?

[JEE Main 2024 (Online) 27th January Evening Shift]

- (1) SO_4^{2-} (2) MnO_4^- (3) N^{3-} (4) BrO_3^-

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Section B (Numerical) — 10 questions

Q.12 500 mL of 0.2 M MnO_4^- solution in basic medium when mixed with 500 mL of 1.5 M KI solution, oxidises iodide ions to liberate molecular iodine. This liberated iodine is then titrated with a standard x M thiosulphate solution in presence of starch till the end point. If 300 mL of thiosulphate was consumed, then the value of x is _____.

[JEE Main 2026 (Online) 6th April Evening Shift]

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Q.13 500 mL of 1.2 M KI solution is mixed with 500 mL of 0.2 M KMnO_4 solution in basic medium. The liberated iodine was titrated with standard 0.1 M $\text{Na}_2\text{S}_2\text{O}_3$ solution in the presence of starch indicator till the blue color disappeared. The volume (in L) of $\text{Na}_2\text{S}_2\text{O}_3$ consumed is _____. (Nearest integer)

[JEE Main 2026 (Online) 28th January Morning Shift]

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Q.14 X and Y are the number of electrons involved, respectively during the oxidation of I^- to I_2 and S^{2-} to S by acidified $\text{K}_2\text{Cr}_2\text{O}_7$. The value of X + Y is _____.

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

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- Q.15** 200 cc of $x \times 10^{-3}$ M potassium dichromate is required to oxidise 750 cc of 0.6 M Mohr's salt solution in acidic medium.

Here $x =$ _____.

[JEE Main 2026 (Online) 23rd January Evening Shift]

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- Q.16** Only 2 mL of KMnO_4 solution of unknown molarity is required to reach the end point of a titration of 20 mL of oxalic acid (2M) in acidic medium. The molarity of KMnO_4 solution should be _____ M.

[JEE Main 2024 (Online) 4th April Morning Shift]

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- Q.17** The lowest oxidation number of an atom in a compound A_2B is -2. The number of electrons in its valence shell is _____.

[JEE Main 2024 (Online) 1st February Morning Shift]

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- Q.18** Number of moles of H^+ ions required by 1 mole of MnO_4^- to oxidise oxalate ion to CO_2 is _____.

[JEE Main 2024 (Online) 31st January Evening Shift]

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- Q.19** $2\text{MnO}_4^- + \text{I}^- + \text{CH}_2\text{O} \longrightarrow x\text{I}_2 + y\text{MnO}_2 + z\text{OH}^-$
If the above equation is balanced with integer coefficients, the value of z is _____.

[JEE Main 2024 (Online) 30th January Morning Shift]

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- Q.20** Total number of species from the following which can undergo disproportionation reaction is _____.
 H_2O_2 , ClO_3^- , P_4 , Cl_2 , Ag , Cu^{+1} , F_2 , NO_2 , K^+

[JEE Main 2024 (Online) 30th January Evening Shift]

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- Q.21** From the given list, the number of compounds with +4 oxidation state of Sulphur _____.
 SO_3 , H_2SO_3 , SOCl_2 , SF_4 , BaSO_4 , $\text{H}_2\text{S}_2\text{O}_7$

[JEE Main 2024 (Online) 27th January Morning Shift]

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ANSWER KEY

Section A (MCQ) — 11 questions

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

Section B (Numerical) — 10 questions

Ques.	12	13	14	15	16	17	18
Ans.	1	3	12	375	8	6	8
Ques.	19	20	21				
Ans.	8	6	3				