

PRAAYAS

JEE 2026

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PHYSICAL CHEMISTRY

REDOX REACTION

Lecture – 03

FAISAL RAZAQ





Topics to be covered

A *n*-Factor Calculations

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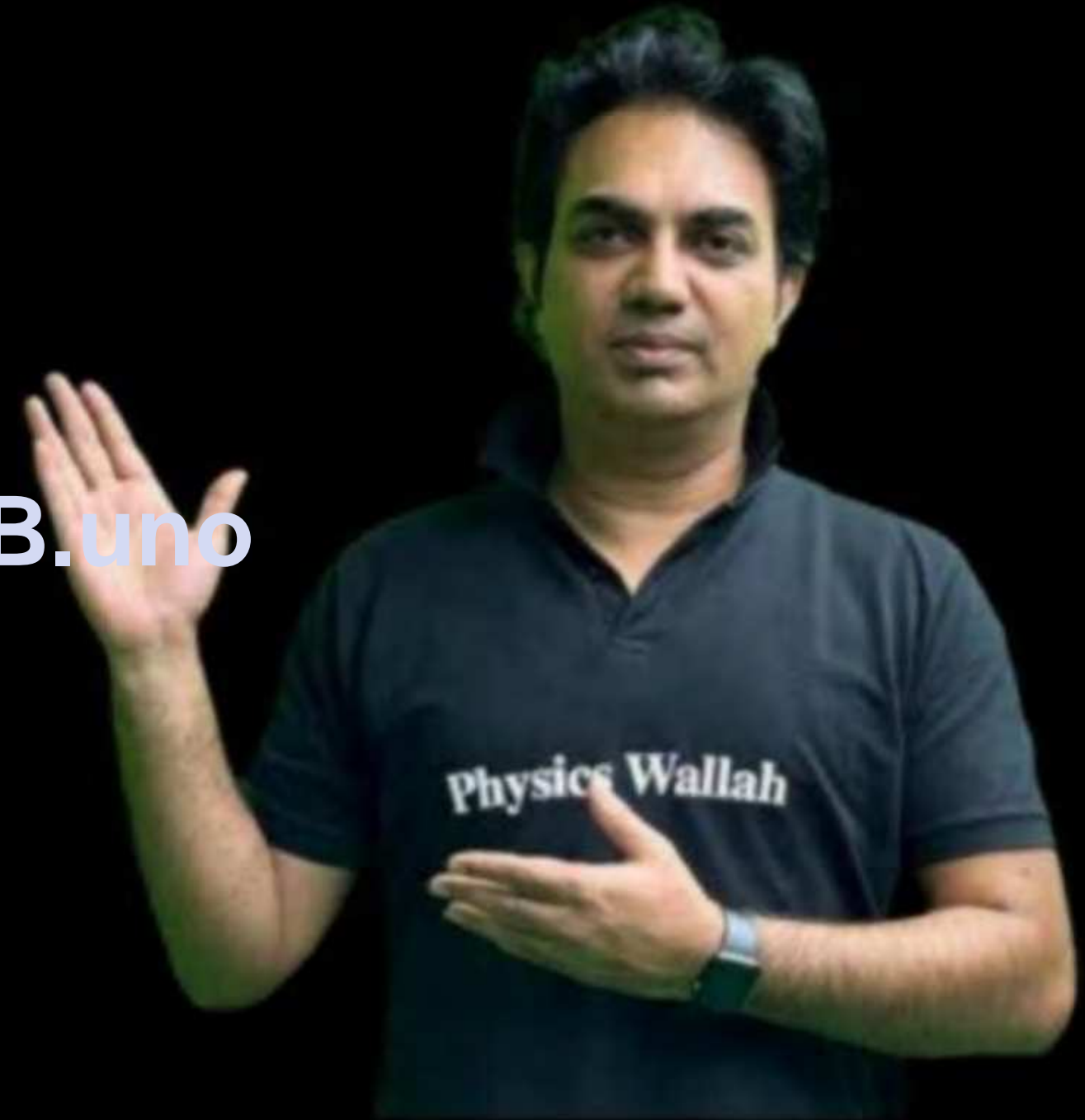




TELEGRAM GROUP BY FAISAL SIR



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LIST OF IONS

✓ Cl ⁻	chloride	✓ C ₂ O ₄ ²⁻	oxalate
✓ Br ⁻	bromide	✓ NO ₃ ⁻	nitrate
✓ F ⁻	fluoride	✓ N ³⁻	nitride
✓ I ⁻	iodide	✓ NO ₂ ⁻	nitrite
✓ CO ₃ ²⁻	carbonate	✓ ClO ₄ ⁻	perchlorate
✓ CN ⁻	cyanide	✓ ClO ₃ ⁻	chlorate
✓ NC ⁻	isocyanide	✓ ClO ₂ ⁻	chlorite
✓ SO ₄ ²⁻	sulphate	✓ ClO ⁻	hypochlorite
✓ SO ₃ ²⁻	sulphite	✓ CrO ₄ ²⁻	chromate
✓ S ₂ O ₃ ²⁻	thiosulphate	✓ Cr ₂ O ₇ ²⁻	dichromate
✓ S ²⁻	sulphide	✓ MnO ₄ ⁻	permanganate
✓ P ³⁻	phosphide	✓ PO ₄ ³⁻	phosphate

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Cu^{+1} Cuprous	Cu^{+2} Cupric
Fe^{+2} Ferrous	Fe^{+3} Ferric
Sn^{+2} Stannous	Sn^{+4} Stannic
Hg^{2+} Mercurous	Hg^{2+} Mercuric

QUESTION

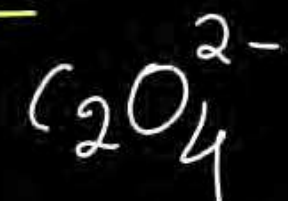
Find out the O.S of C in
 FeC_2O_4 and SnC_2O_4

Method-1

$$2 + 2x + 4(-2) = 0$$

$$x = +3$$

Method-2

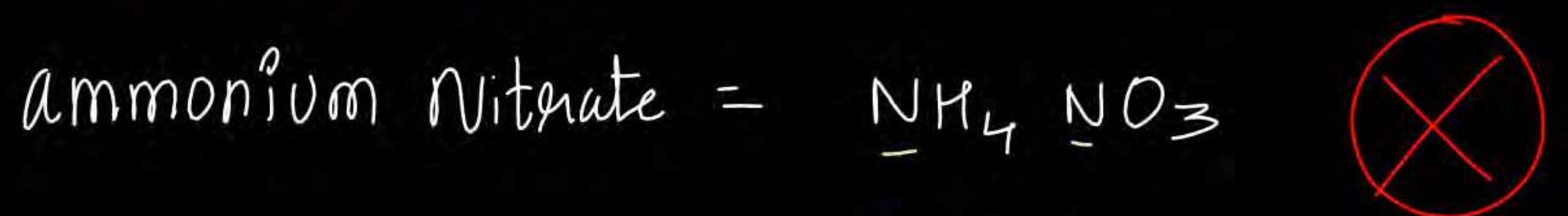


$$2x + 4(-2) = -2$$

$$x = +3$$

Question NO_3^- - nitrate ion NH_4^+ = ammonium ion

Find out the O.S of both the nitrogen atoms in ammonium nitrate.



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$$x + 4(+1) + y + 3(-2) = 0$$

$$\text{NH}_4^+ = x + 4(+1) = +1$$

$$x = -3$$

$$\text{NO}_3^- = y + 3(-2) = -1$$

$$y = +5$$

JEE Main 2 Sep 2022 Shift-2



The oxidation states of transition metal atoms in $\text{K}_2\text{Cr}_2\text{O}_7$, KMnO_4 and K_2FeO_4 , respectively, are x , y and z . The sum of x , y and z is _____.

$$\text{K}_2\text{Cr}_2\text{O}_7 = 2(+1) + 2(x) + 7(-2) = 0 \Rightarrow x = +6$$

$$\text{KMnO}_4 = 1 + x + 4(-2) = 0 \Rightarrow x = +7 = 19$$

$$\text{K}_2\text{FeO}_4 = 2(+1) + x + 4(-2) = 0 \Rightarrow x = +6$$

JEE Main 2019



N_2O_3 , NO, NO_2 , N_2O arrange the increasing order of O.S. of nitrogen -

- A N_2O , NO, N_2O_3 , NO_2
- B N_2O , NO_2 , N_2O_3 , NO
- C NO_2 , N_2O_3 , N_2O , NO
- D N_2O_3 , NO, N_2O , NO_2

$$N_2O = 2x - 2 = 0 \Rightarrow x = +1$$

$$NO = x - 2 = 0 \Rightarrow x = +2$$

$$N_2O_3 = 2x - 6 = 0 \Rightarrow x = +3$$

$$NO_2 = x - 4 = 0 \Rightarrow x = +4$$

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Question



In which of the following compound oxidation number of Cl is +3?

- A ICl
- B ClO_3
- C ClF_3
- D HClO_4

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Question



Which of the following is the correct oxidation number of phosphorus in $\text{Mg}_2\text{P}_2\text{O}_7$

A -3

B +2

C +5

D +3

$$2(+2) + 2x + 7(-2) = 0$$

$$x = 5$$

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Question



Oxidation numbers of the two nitrogen atoms present in ammonium nitrate are respectively ?

- A +3 and +3
- B 0 and 0
- C -3 and +5
- D -1 and -1

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Question



The oxidation number of cobalt in $[\text{Co}(\text{CN})_6]^{3-}$ is -

A +3

B -3

C +6

D -6

$$x + 6(-1) = -3$$

$$x = +3$$

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Question



In which of the following compound oxidation number of iron is not +3

- A Fe_3O_4
- B Fe_2O_3
- C FeCl_3
- D FePO_4

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Question



In which of the following compound oxidation number of iron is not +3

- A Fe_3O_4
- B Fe_2O_3
- C FeCl_3
- D FePO_4

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$$K_2 \begin{matrix} 2 \\ -2 \\ 0 \\ 8 \end{matrix}$$

$$\lambda + 2\lambda + 8(-2) = 0$$

$$\lambda = \cancel{+7}$$

$$\text{Answer} = +6$$

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$$\begin{array}{ccccccc} & & -2 & & & -2 & \\ & & 0 & & & 0 & \\ & & || & & & || & \\ 11 & - & 0 & - & 5 & +6 & - & 0 & - & 0 & - & 5 & +6 & - & 0 & - & 11 \\ & & || & & & || & & & & || & & & & & & & \\ & & 0 & & & 0 & & & & 0 & & & & & & & \\ & & -2 & & & -2 & & & & -2 & & & & & & & \end{array}$$

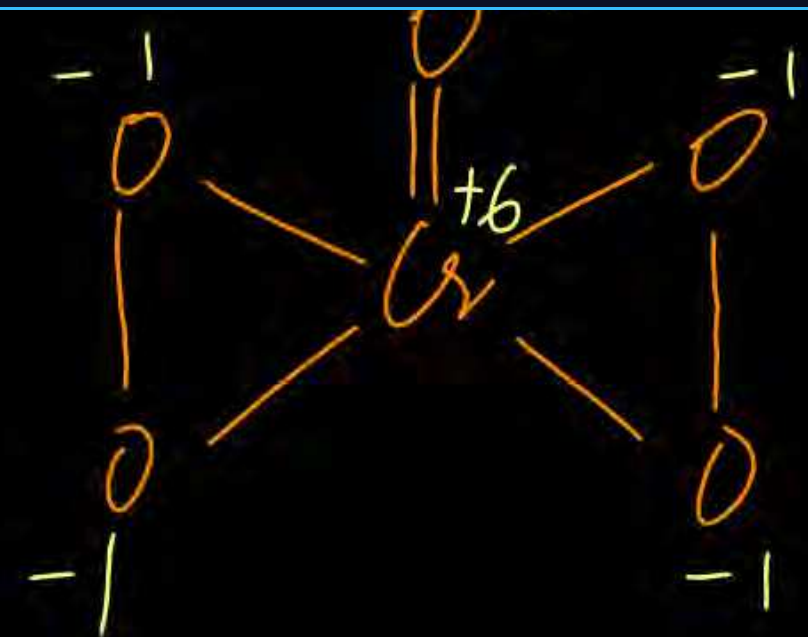
$$2 + 2\lambda + 6(-2) + 2(-1) = 0$$

$$\lambda = +6$$



$$x + 5(-2) = 0$$

$$x = +10$$



oh ho. kahi peroxy linkages **ATDB.uno** dekhna hai.

Max OS of Cr = +6

Question



Oxidation number of Fe in $K_3[Fe(CN)_6]$ is

A +2

B +3

C +1

D +4

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Question

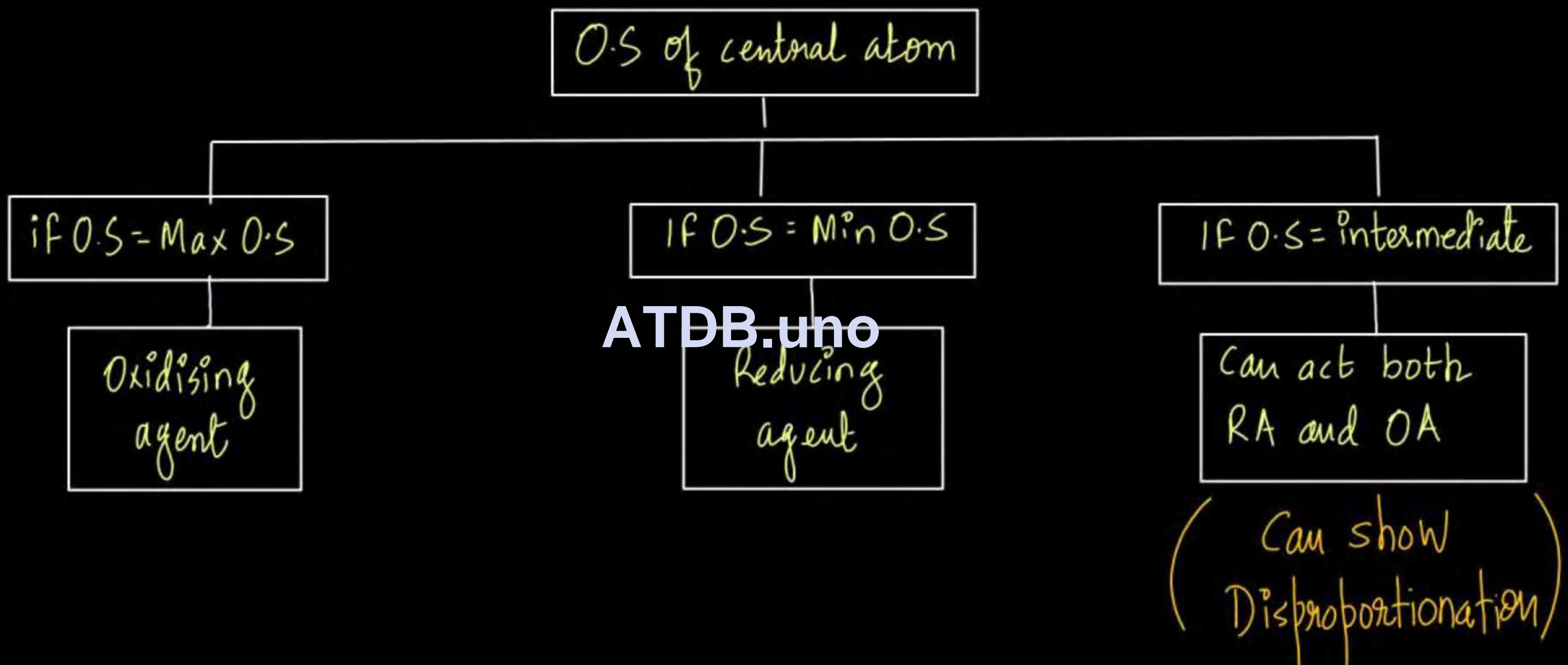


In which of the following compound, iodine is in its highest oxidation state

- A KI
- B KIO_4
- C KI_3
- D IF_5

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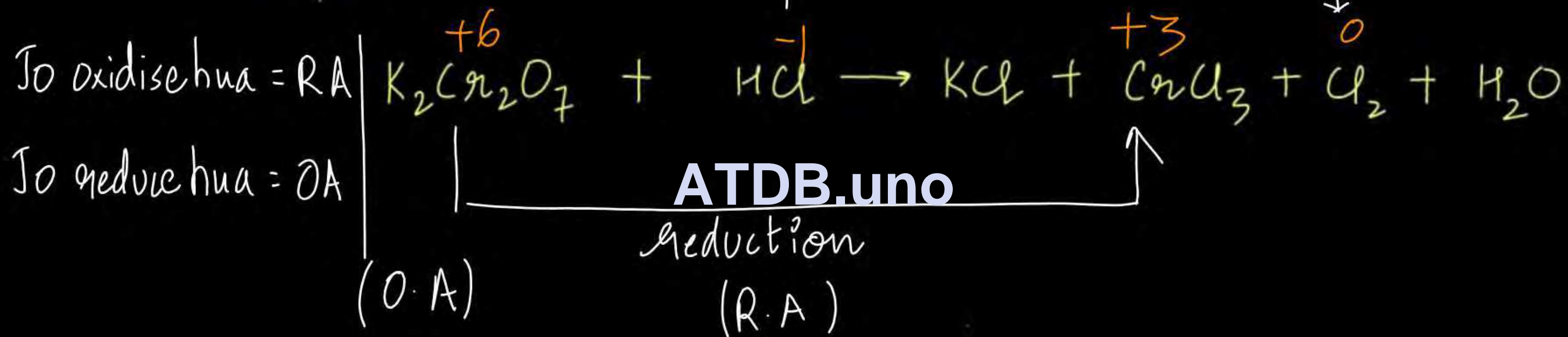
How to identify whether a particular substance is an OA or RA



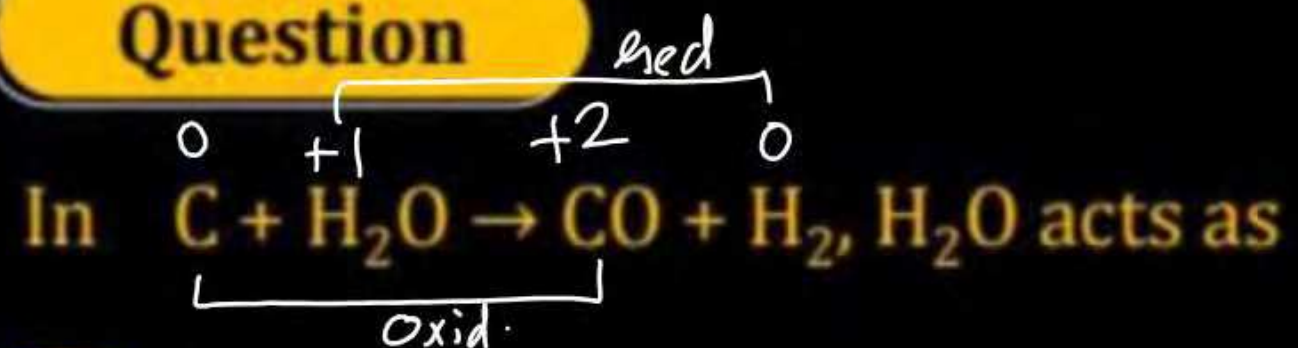
Redox Reaction



'A reaction in which reduction and oxidation simultaneously takes place.'



Question



- A Oxidising agent
- B Reducing agent
- C Both
- D None

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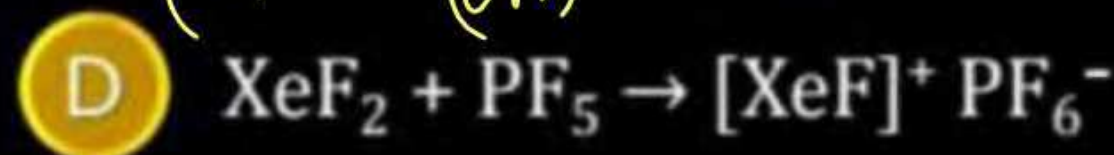
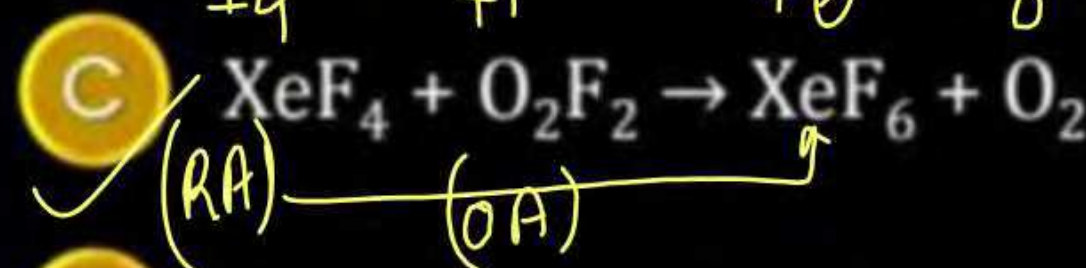
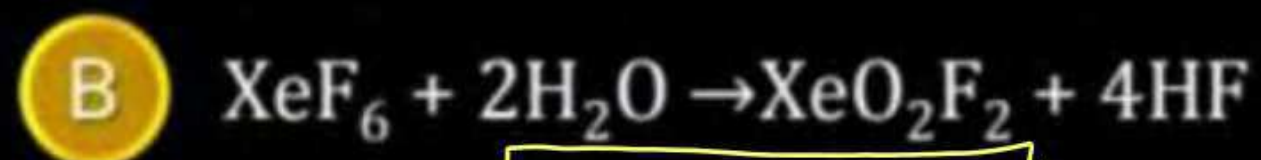
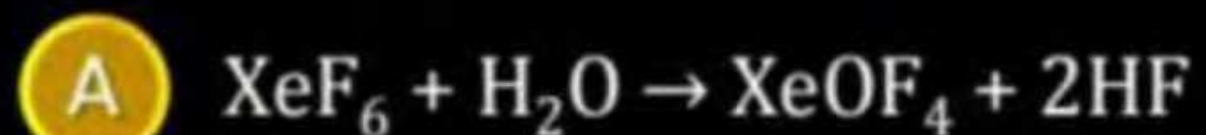
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$$O_2F_2 - 2x + 2(-1) = 0$$

$$x = +1$$



Which of the following reactions is an example of a redox reaction?

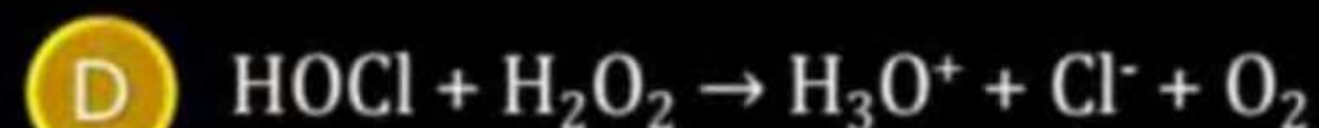
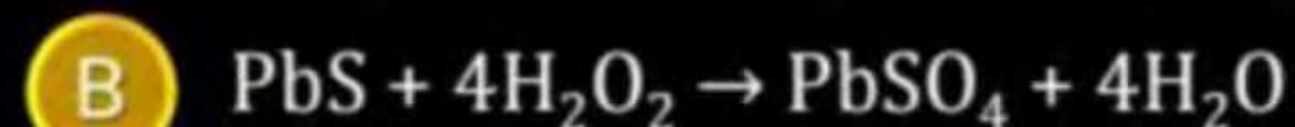


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In which of the following reactions, hydrogen peroxide acts as an oxidizing agent?



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Stumper



One mole of X_2H_4 releases 10 moles of electrons to form a compound Y. What should be the oxidation number of X in the compound Y ?

- A +3
- B -3
- C -6
- D +1

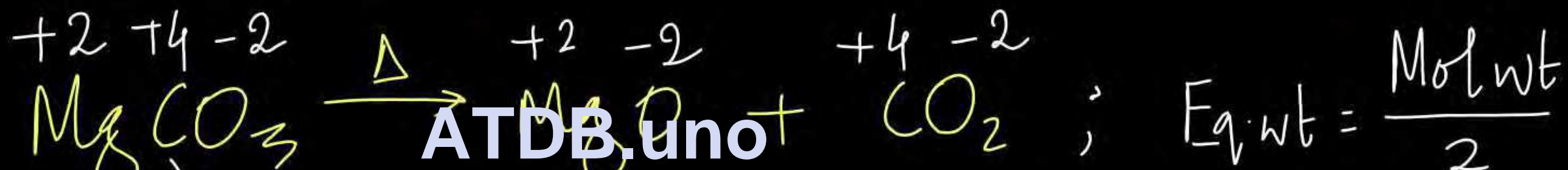
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SALTS WHICH REACT SUCH THAT **NO ATOM** UNDERGOES CHANGE IN OXIDATION STATE

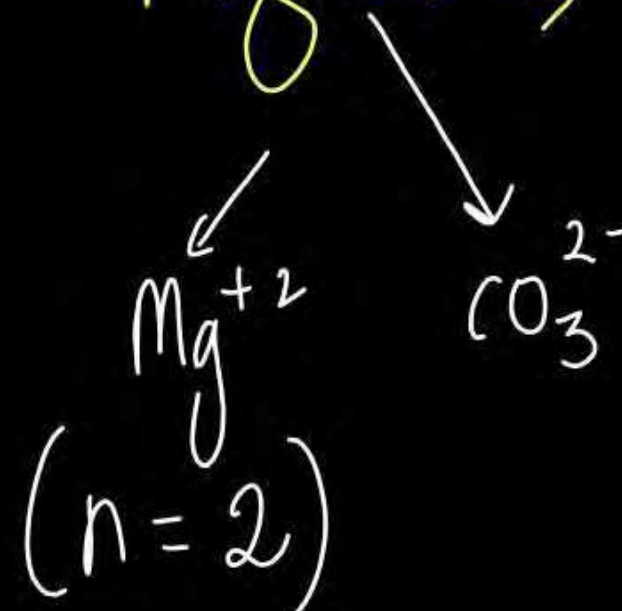


$$\text{Eq. wt.} = \frac{\text{Mol. wt.}}{n}$$

n -factor = total cationic or total anionic charge.



$$\begin{aligned} \text{CO}_3^{2-} \\ 2 - 6 = -2 \\ 2 = +4 \end{aligned}$$

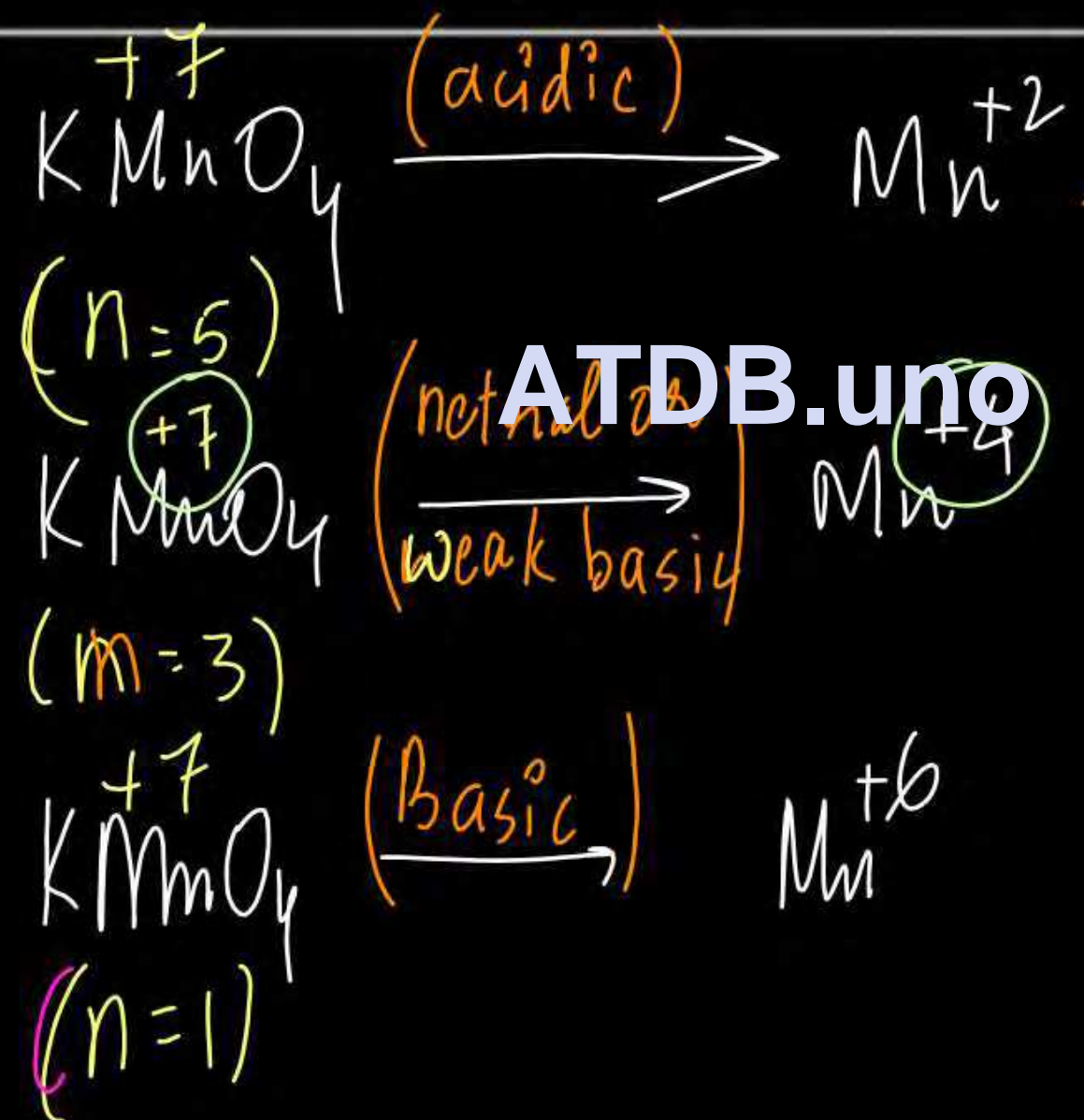


$$\begin{aligned} &= \frac{84}{2} \\ &= 42 \end{aligned}$$

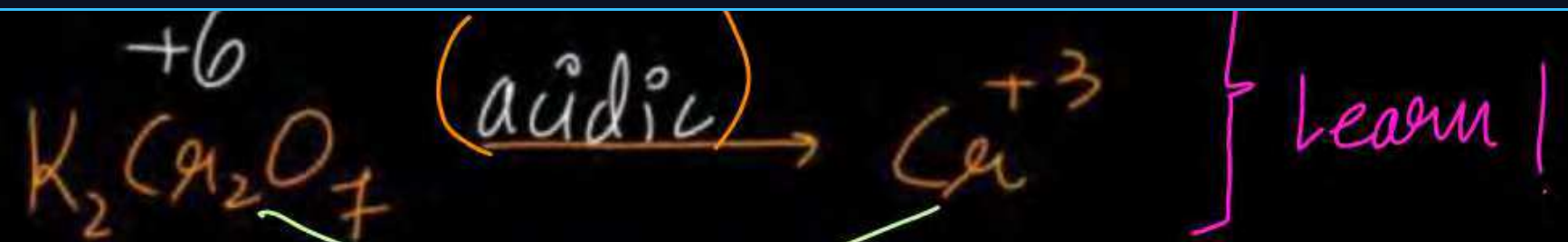
SALTS WHICH REACT IN A MANNER THAT **ONLY ONE ATOM** UNDERGOES CHANGE IN OXIDATION STATE AND GOES IN ONLY ONE PRODUCT



n -factor = moles of electron transfer by per mole of salt



learn!



} Learn!

(Ce is already (n=6))

$$3 \times 2 = 6$$

in its max. O.s

So it can only
be reduced

So always behaves
like an oxidising
agent or oxidant.

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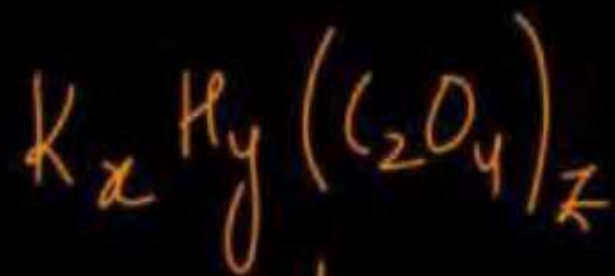
find out the eq. wt of $\text{Fe}_2(\text{C}_2\text{O}_4)_3$ in this rxn -



H.W.

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#

 E_1

NaOH

 E_2 H.W.

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THANK YOU

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