

d-BLOCK

<u>n</u>	3	4	5	6	7	8	9	10	11	12	
(4)	Sc 21	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn 30	
5	4d	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd
6	5d	La 57	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg
(7)	6d	Ac 89	Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg	Cn

d टी n-1 करते हैं।

- Total d block elements = 40
- group → 3 to 10
- Period → 4 to 7
- La and Ac are d block elements
- Metals

Khel 2 : Transition elements

Khel 2 : Transition elements

- All d block elements are transition elements except g 12 → Zn, Cd, Hg, Cn
- at least 1 unpaired e- हाता चाहिए, अपने हाथ Transition elements हीलंगे,
- ∴ d block elements → 40 but transition elements → 36
- 3d Series → 1st T.S
4d Series → 2nd T.S
5d Series → 3rd T.S
6d Series → 4th T.S

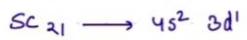
Khel 2 - जोड़ सकते हैं?



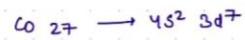
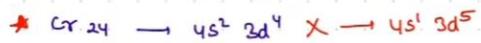
Khel 3 : कौन Stable ?

- Half filled and full filled orbitals are stable
- d subshell \rightarrow 5 orbitals
- $\therefore d^5$ and d^{10} stable ✓
- d^{10} > d^5 > d^3

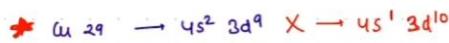
Khel 4 : 3d series का Valence Shell e⁻ conf.



Khel 4 : 3d series का Valence Shell e⁻ conf.



3



Khel 6 : unpaired e⁻ remaining का क्या होता है?

Khel 6 : Unpaired e- निकालना सीख



eg: $\text{Fe}_{26} \rightarrow 4s^2 3d^6$ 1 1 1 1 1
 $\therefore 4 \text{ unpaired } e^- \checkmark$

eg: $\text{Fe}_{26}^{+2} \rightarrow 4s^2 3d^6$ 1 1 1 1 1
 $4s^0 3d^6$ $\therefore 4 \text{ unpaired } e^-$

eg: $\text{Fe}_{26}^{+3} \rightarrow 4s^2 3d^5$ 1 1 1 1 1
 $4s^0 3d^5$ $5 \text{ unpaired } e^-$

eg: $\text{Zn}_{30}^{+2} \rightarrow 4s^2 3d^{10}$ 1 1 1 1 1
 $4s^0 3d^{10}$ $0 \text{ unpaired } e^-$

eg: $\text{Sc}_{21}^{+3} \rightarrow 4s^2 3d^1$ 1 1 1 1 1
 $4s^0 3d^0$ $0 \text{ unpaired } e^-$

d AND f BLOCK : END GAME | 32 khel me chapter taiyaar | NEET 2025



eg: $\text{Fe}_{26}^{+3} \rightarrow 4s^2 3d^6$ 1 1 1 1 1
 $4s^0 3d^5$ $5 \text{ unpaired } e^-$

eg: $\text{Zn}_{30}^{+2} \rightarrow 4s^2 3d^{10}$ 1 1 1 1 1
 $4s^0 3d^{10}$ $0 \text{ unpaired } e^-$

eg: $\text{Sc}_{21}^{+3} \rightarrow 4s^2 3d^1$ 1 1 1 1 1
 $4s^0 3d^0$ $0 \text{ unpaired } e^-$

eg: $\text{Cr}_{24} \rightarrow 4s^1 3d^5$ 1 1 1 1 1
 $4s^1 3d^5$ $6 \text{ unpaired } e^-$

Applications :

Scroll for details

Applications :-

① M.P and B.P :-

→ unpaired e^- जावा तो → Bonding असंदी
 \therefore M.P and B.P जावा

∴ highest → 6th group Cr, Mo, W (6 unpaired e^-)

∴ lowest → 12th group Zn, Cd, Hg (0 unpaired e^-)

exception :

$g \neq (Mn, Tc, Re) \rightarrow e^-$ → still M.P and B.P low

② Enthalpy of atomisation :-

unpaired e^- जावा नहीं → enthalpy of atomisation
 $\frac{\text{जावा}}{\text{जावा}}$

③ Enthalpy of atomisation :-

unpaired e^- जावा नहीं → enthalpy of atomisation
 $\frac{\text{जावा}}{\text{जावा}}$

exception → 3d series \neq max. enthalpy of atomisation

expected → Cr (6 unpaired e^-)

reality → Vanadium

④ Coloured ions :-

unpaired e^- ✓ नहीं • Colour show ✓
 • absorb visible light ✓

Note :- $d^0, d^{10} \rightarrow$ colourless eg:- Sc^{+3}, Zn^{+2}

$d^1 - d^9 \rightarrow$ Colour ✓

because of d-d transition

$d^0, d^{10} \rightarrow$ but still colour then because of → charge transfer transition

$\downarrow e^-$ in $KMnO_4, K_2Cr_2O_7$

↗ because of d-d transition
 d^0, d^{10} → but still colour then because of → charge transfer transition
 ↗ e.g. in $\text{K}_2\text{Cr}_2\text{O}_7$
 ✓ ★ $d^1, d^9 \rightarrow$ Blue ✓
 ★ $d^2, d^8 \rightarrow$ green ★ $\text{Cu}^{+2}, \text{Cr}^{+2} \rightarrow$ Blue
 ★ $\text{Mn}^{+2}, \text{Co}^{+2} \rightarrow$ Pink

④ Magnetic property :-
Paramagnetic Diamagnetic Ferromagnetic
→ attracted by MF → repelled by MF → strongly attracted by MF
★ Unpaired e^- → अवृत्त रूप → paramagnetic बोल दूरा
★ जिसे उसी unpaired e^- , जोना डाकि paramagnetic.
★ magnetic moment (μ) = $\sqrt{n(n+2)}$
 $n \rightarrow$ no. of unpaired e^-

Khet 7 : general e^- conf. $n=1 \quad \mu=1 \sim$

✓ magnetic moment (μ) = $\sqrt{n(n+2)}$
 $n \rightarrow$ no. of unpaired e^- $n=1 \quad \mu=1 \sim$

Khet 7 : general e^- conf.

$\text{Sc}_{21} \rightarrow \underbrace{1s^2}_{S} \underbrace{2s^2 2p^6}_{SP} \underbrace{3s^2 3p^6}_{SP} \underbrace{4s^2 3d^1}_{SDP}$

∵ general e^- conf. → $\frac{0^{-2}}{ns} \frac{(n-1)d}{(n-1)d} \frac{1^{-10}}{ns}$
 0 कहाँ से आया → समझ रखा

~~$\frac{0^{-2}}{ns}$~~
 $n \quad \text{group 10}$
 4 $\text{Ni}_{28}^{28} \quad \begin{matrix} 2 \\ 4s \end{matrix} \quad \begin{matrix} 8 \\ 3d \end{matrix}$
 5 $\text{Pd} \quad \begin{matrix} 0 \\ 5s \end{matrix} \quad \begin{matrix} 10 \\ 4d \end{matrix}$

$n=1 \quad \mu=1 \sim$
 $n=2 \quad \mu=2 \sim$
 $n=3 \quad \mu=3 \sim$
 and so on



44:19 / 2:33:24

Khel 8 : general properties of Transition metals

- metallic property show ✓

- ∴ a) highly tensile
- b) ductile and malleable
- c) conductivity T
- d) lustrous
- e) hard

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Khel 9 : Metal lattices of Transition metals

- Transition metals, metal lattice, अवृत्ति शैली,

- Zn, Cd, Fe, Cr, Mn

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Khel 9 : Metal lattices of Transition metals

- Transition metals, metal lattice बनाते हैं,
- Zn, Cd, Hg, Cr, Mn →
 - Metal lattice नहीं बनाते
 - HCP ✓
 - BCC ✓
 - CCP | FCC

3	4	5	6	7	8	9	10	11	12	
3d	Sc	Ti	V	Cr	Mn	Fe BCC	Co	Ni	Cu	Zn

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group में :- → Normally 9 I

3	4	5	6	7	8	9	10	11	12	
3d	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn
4d	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd
5d	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg
	AC									

atomic radius → $4d \approx 5d$ because of Lanthanoid contraction

Khel II : Ionisation energy

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◀ ▶ 🔍 ⚙️



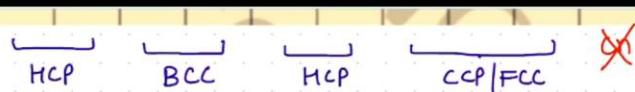
group 3 :- Normally 9 I

3	4	5	6	7	8	9	10	11	12	
3d	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn
4d	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd
5d	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg

AC

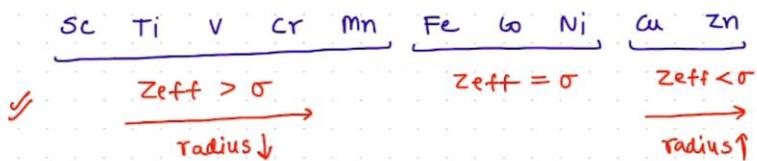
atomic radius → 4d = 5d because of lanthanoid contraction

Khel 11 : Ionisation energy



Khel 10 : Atomic radius

3d Series :- Normally PD



Since z_{eff} ∝ $\frac{1}{\text{at. radius}}$

* Mn का atomic radius Cr and Fe से जाए।

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mn का atomic radius Cr and Fe से जापा

group में :- Normally 9I

3d 4 5 6 7 8 9 10 11 12
 Sc Ti V Cr Mn Fe Co Ni Cu Zn
 Y Zr Nb Mo Tc Ru Rh Pd Ag Cd
 La Hf Ta W Re Os Ir Pt Au Hg

AC

atomic radius → 4d ≈ 5d because of lanthanoid contraction

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Khel II : Ionisation energy

3d series में :-
 normally → 1I
 but पर्याप्त → वकीनी से ऊँटा (V, Co, Ni)

group में :- normally 6D

3d 4 5 6 7 8 9 10 11 12
 Sc Ti V Cr Mn Fe Co Ni Cu Zn
 Y Zr Nb Mo Tc Ru Rh Pd Ag Cd
 La Hf Ta W Re Os Ir Pt Au Hg

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group 3 :- → normally G.D

	③	4	5	6	7	8	9	10	11	12
3d	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn
4d	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd
5d	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg

group 3 → G.D

group 4, 5, 6, 10 → G.I

पाकी groups 3 → 5d > 3d > 4d



Khel 12 : oxidation states

- d block elements shows variable O.S.
except Sc, Zn

3	4	5	6	7	8	9	10	11	12
Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn
+3		+2 +3 +4 +5	+2 +3 +4 +5 +6 +7	+2 +3 +4 +5 +6 +7	+2 +3 +4 +5 +6	+2 +3 +4	+2	+1 +2	+2

• Highest O.S in 3d series → Mn (+7)

• maximum no. of O.S in 3d series → Mn (6)



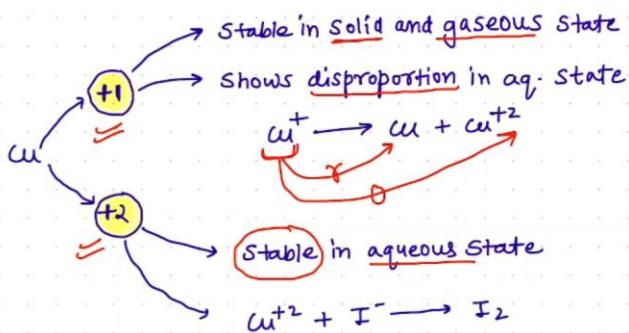
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- ✓ Highest O.S in 3d series → Mn (+7)
- ✓ Maximum no. of O.S in 3d series → Mn (6) $\xrightarrow{\text{P}} \text{d}$
- ✓ Highest O.S in whole P.T → Xe, Ru, Os (+8)
- ✓ The lowest O.S shown by d block element = 0
eg $\text{Fe}(\text{CO})_5$
 $\xrightarrow{\text{neutral}}$

• d block element shows variable O.S because $n\text{s} \rightarrow (n-1)\text{d}$
energy gap बहुत कम

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Khel 13 : Cu का Khel



Khel 14 : Catalytic Property

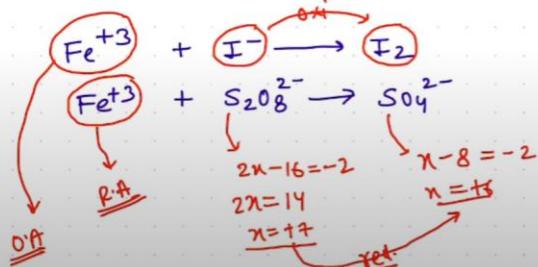
Khel 14 : Catalytic Property

→ due to variable O.S.

✓ Contact process : V_2O_5

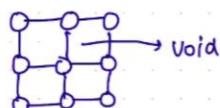
✓ Haber process : finely divided Fe ($\xrightarrow{\text{Promotor}} Mo$)

✓ Catalytic hydrogenation : $^{11}Ni, Pt, Pd$



Khel 15 : Interstitial Compound

- metal lattice \rightarrow interstitial spaces / voids \rightarrow little elements (H, B, C, N) इन से ज़िंदगी का अनुभव होता है।



✓ Metal lattice

- Interstitial Compounds are :-

- non stoichiometric
- neither ionic nor covalent
- M.P. ↑
- very hard

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→ M.P. ↑ ✓
→ very hard ✓
→ metallic conductivity ↑ ✓
→ chemically inert ✓

e.g.: $VH_{0.56}$, $TiH_{1.7}$

$\begin{array}{c} \text{V} \\ \text{Y} \end{array}$ $\begin{array}{c} \text{H} \\ \text{Y} \end{array}$

Khel 16 : Alloy formation

mixing of 2 metals

Alloy of copper :-

a) Brass → Cu + Zn
b) Bronze → Cu + Sn

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$\begin{array}{c} \text{Cu} \\ \text{Zn} \end{array}$ mixing of 2 metals

Alloy of copper :-

a) Brass → Cu + Zn
b) Bronze → Cu + Sn
c) Bell metal → Cu + Sn
d) Gun metal → Cu + Sn + Zn

• d block elements form alloys because of their similar radius.

Khel 17 : Electrode potential

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Khel 17 : Electrode potential

- Electrode Potential
 - oxidation Potential
 - Reduction Potential

- इन कसम खाते हैं → सारे सवाल Reduction Potential से करेंगे
- eg: $m^{+2} \rightarrow m$
- eg: $m^{+3} \rightarrow m^{+2}$

* 3d Series

Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn
$E^\circ m^{+2}/m \uparrow$								
Scroll for details ↓								

|| ▶ 1:11:38 / 2:33:24

CC

* 3d Series

Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn
-9	-8	-7	-6	-5	-4	-3	-2	-1
$E^\circ m^{+2}/m \uparrow$								

✓ $E^\circ m^{+2}/m \uparrow$
or
✓ ✓ -ve value of R.P. ↓

-9 < -2

- Cu have positive value of R.P.

Electrochemical Series

Strongest Reducing agent

Li न्हीं
K के



Electrochemical Series

Strongest Reducing agent

Li	नीचे
K	के
Ba	Bharat
Sr	Sarkar
Ca	का
Na	नाम
Mg	मांगे
Al	आलिया
Mn	मन्मान
Zn	जान
Cr	क्रूर
Fe	फैट
Cd	Cd
Co	कोर्टी
Ni	नीचे

$E^\circ_{RP} \uparrow$

II ▶ 1:15:29 / 2:33:24

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● ▶ CC ⚙

Co कोर्टी
Ni नीचे

-ve	Sn Sumo
↑	Pb Prabhat
$E^\circ_{RP} = 0$	H ₂ hai
↓	Cu संस्कृती
+ve	I ₂ आई

Hg	Hogi
Ag	आज
Br ₂	बाघर
Pt	पता
Cl ₂	चला
Au	Sona
F ₂	farar

Strongest oxidising agent

▶ 1:15:32 / 2:33:24

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Ques 18 : Higher oxidation states in halides



- 3d Series के metals अपनी higher O.S से generally Fluoride banate hai
 - eg VF_5 , CrF_6 , CoF_3
 - high bond enthalpy
 - high lattice energy
 - Mn +4 oxidation state ने halide banata hai and usme bhi +3 और +4 fluoride
 - Mn +7 oxidation state ने oxy Flouride banata hai (MnO_3F)

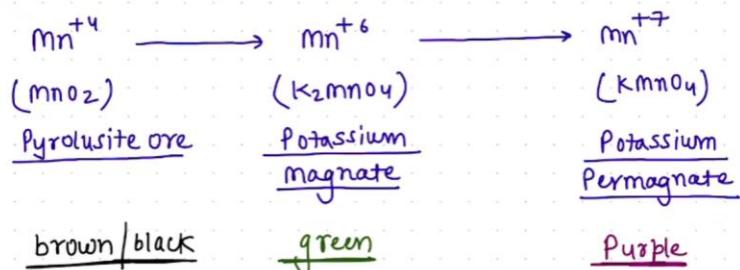
Khel 19 : Higher oxidation states in oxides



- Mn ने halide only +4 oxidation तक बनाया था
 (MnF_4) but Mn oxide \Rightarrow oxidation state $\neq -2$
 बना देता है (Mn_2O_7)
 - ∴ Stability of
 3d Series $>$ fluorides
 \neq oxides
 - $\text{Mn}_3\text{O}_4, \text{Fe}_3\text{O}_4, \text{Co}_3\text{O}_4 \rightarrow$ mixed oxides



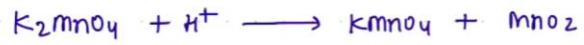
Khel 20 : Potassium Permagnate
($KMnO_4$) its Preparation
at Khel



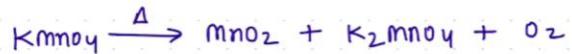
Khel 21 : Disproportion rxn. of Potassium magnate

DROWNED IN WATER GREEN Purple

Khel 21 : Disproportion rxn. of Potassium magnate



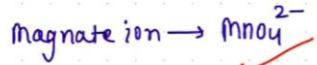
Khel 22 : Decomposition of $KMnO_4$



Khel 23 : magnate and permagnate ion



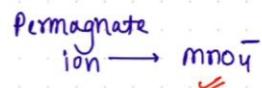
Potassium magnate



d¹

- ∴ 1 unpaired e⁻
- ∴ Paramagnetic
- ∴ Colour ✓ green
due to dd transition

Potassium Permagnate

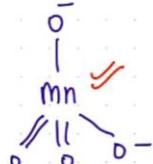


d⁰

- ∴ 0 unpaired e⁻
- ∴ diamagnetic
- ∴ colour X
but still purple
Colour
∴ due to charge

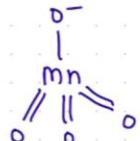


- ∴ Paramagnetic ✓
- ∴ Colour ✓ green
due to dd transition



• all bonds equal

- ∴ diamagnetic ✓
- ∴ colour X
but still purple
Colour
∴ due to charge transfer
transition.

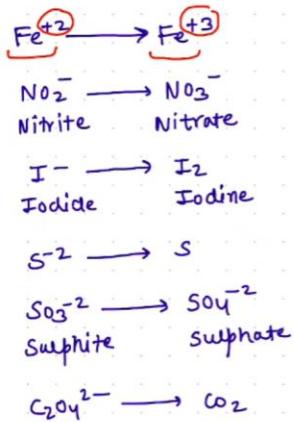


• all bonds equal.

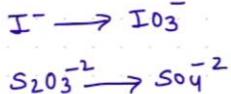
Khel 24 : Known as Strong O.A



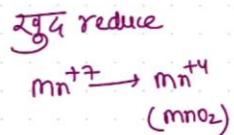
(a) acidic
medium



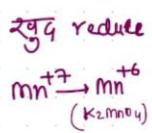
(b) Neutral
faintly
alkaline
medium



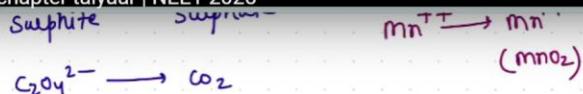
$$\text{Mn}^{+2} \rightarrow \text{MnO}_2$$



C Basic
medium



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A man with a beard and short dark hair, wearing a blue and white horizontally striped t-shirt, is seated at a desk, looking down and writing in a white notebook with a pen. He is positioned in front of three large, vertical black-and-white posters mounted on a wall. The top poster is cut off at the top. The middle poster features the word 'GRIND' in large, bold, white capital letters, with the word 'VERB' printed below it. Below the word 'GRIND', there is a faint, blurry photograph of a person's face. The bottom poster is also cut off at the top. It contains the word 'CONQ' in large, bold, white capital letters, with the word 'VERB' printed below it. Below the word 'CONQ', there is a faint, blurry photograph of a person's face. The middle poster has text at the bottom that reads: 'TO PERFORM REPETITIVE TASKS OVER AND OVER IN ORDER TO ATTAIN A GOAL'. The bottom poster has text at the bottom that reads: 'CAREFULLY OVERSEEING THE CONTROLS OF THE SITUATION AND ADJUSTING AS NEEDED'. A red horizontal line is drawn across the bottom of the image.

ZgG reduce
 $m_n^{+7} \rightarrow m_n^{+2}$

oxi

- charge ↑
 - O ↑
 - H ↓

Khel 25 : Potassium dichromate

(K₂Cr₂O₇)

Khel 25 : Potassium dichromate
 $(K_2Cr_2O_7)$

Note : $\text{St}\text{r} Cr^{+6}$ then yellow to orange
 $\text{St}\text{r} Cr^{+3}$ then green

$\therefore K_2Cr_2O_7$

$+1$

$\begin{array}{c} \text{Cr} \\ \diagdown \quad \diagup \\ +6 \end{array} \rightarrow \therefore \text{orange}$

$2 + 2n - 14 = 0$
 $2n - 12 = 0$
 $2n = 12$
 $n = 1$

Chromate ion
 (CrO_4^{2-})

Dichromate ion
 $(Cr_2O_7^{2-})$

O^- $O \quad O$

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$\begin{array}{c} \text{Cr} \\ \diagdown \quad \diagup \\ +6 \end{array} \rightarrow \therefore \text{orange}$

Chromate ion
 (CrO_4^{2-})

$\begin{array}{c} O^- \\ || \\ Cr \\ || \\ O \quad O^- \end{array}$

yellow

Dichromate ion
 $(Cr_2O_7^{2-})$

$\begin{array}{c} O \\ || \\ Cr \\ || \\ O \quad O \\ || \\ Cr \\ || \\ O \quad O^- \end{array}$

orange

1:47:45 / 2:33:24

Scroll for details

Step ③

$$\text{Na}_2\text{Cr}_2\text{O}_7 + \text{KU} \rightarrow \text{K}_2\text{Cr}_2\text{O}_7$$

↗ Sodium dichromate
 ↗
 ↗
 ↗ Potassium dichromate
 (orange)

Khel 28 : Chromate dichromate eq.

Step 2

$$\text{CrO}_4^{2-} \xrightleftharpoons[\substack{\text{basic medium} \\ \text{pH} > 7}]{\substack{\text{acidic medium} \\ \text{pH} < 7}} \text{Cr}_2\text{O}_7^{2-}$$

yellow
 basic medium
 pH > 7
 orange

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Khel 29 : Chromyl chloride Test

$$\text{CrO}_2\text{Cl}_2$$

→ for metal chloride की प्रत्यावर्ती के लिए

Metal Chloride + Conc. H_2SO_4 + $\text{K}_2\text{Cr}_2\text{O}_7 \rightarrow \text{CrO}_2\text{Cl}_2$
 { red vapour
 Cromyl chloride

22

Khel 30 : f block elements

Khel 30 : f block elements

<u>n</u>	3	4	5	6	7	8	9	10	11	12
4	3d	Sc 21	Ti	V	Cr	Mn	Fe	Co	Ni	Cu
5	4d	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag
6	5d	La 57	Hf	Ta	W	Re	Os	Ir	Pt	Au
7	6d	Ac 89	Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg
										Cn

f-BLOCK

Lanthanoids <u>4f</u>	58 Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Hf Lu
Actinoids <u>5f</u>	90 Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	103 Lr

Lanthanoids <u>4f</u>	58 Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Hf Lu
Actinoids <u>5f</u>	90 Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	103 Lr

d → n-1

f → n-2

✓ Total f block elements : → 28

✓ Lanthanoids → 14 → p=6 , g=3

✓ Actinoids → 14 → p=7 , g=3

• f block elements → inner transition metals

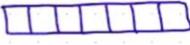
• shielding effect → s > p > d > f
23 4f > 5f

• 4f and 5f orbitals are not equally shielded.

• Stable and most common o.s in F block elements → +3

d AND f BLOCK : END GAME | 32 khel me chapter taiyaar | NEET 2025

- ✓ Stable and most common o.s in F block elements $\rightarrow +3$
- ✓ f Subshell $\rightarrow 7$ f orbitals



- ✓ half filled orbitals (f^7)
 full filled orbitals (f^{14})
 empty orbitals (f^0)

$\left. \begin{array}{l} \text{half filled orbitals } (f^7) \\ \text{full filled orbitals } (f^{14}) \\ \text{empty orbitals } (f^0) \end{array} \right\} \rightarrow \text{stable} \quad \text{high exchange enthalpy}$

- general e⁻ conf $\rightarrow ns^2 (n-2)f^{1-14} (n-1)d^0$

L.S $\rightarrow n=6 \quad 6s^2 \quad 4f^{1-14} \quad 5d^0,1$
A.S $\rightarrow n=7 \quad 7s^2 \quad 5f^{1-14} \quad 6d^0,1$

Khel 31 : Lanthanoid Series

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d AND f BLOCK : END GAME | 32 khel me chapter taiyaar | NEET 2025

Khel 31 : Lanthanoid Series

- ✓ 4f series
- ✓ 1st inner transition Series
- ✓ rare earth elements

$_{58}\text{Ce}$	$\checkmark \text{Pr}$	$\checkmark \text{Nd}$	$\checkmark \text{Pm}$	$\checkmark \text{Sm}$	$\checkmark \text{Eu}$	$\checkmark \text{Gd}_{64}$	$\checkmark \text{Tb}$	$\checkmark \text{dy}$
Ho	$\checkmark \text{Er}$	$\checkmark \text{Tm}$	$\checkmark \text{Yb}$	$\checkmark \text{Lu}_{71}$				

Total elements = 14

- e⁻ conf $\rightarrow 6s^2 4f^{1-14} 5d^0,1$

Khel :-

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d AND f BLOCK : END GAME | 32 khel me chapter taiyaar | NEET 2025

- Total elements = 4
- e⁻ conf $\rightarrow 6s^2 \ 4f^{1-4} \ 5d^0, 1$

Khel :-

- ★ all $6s^2$
- ★ 4f $1 \ 3 \ 4 \ 5 \ 6 \ 7 \ 8 \ 9 \ 10 \ 11 \ 12 \ 13 \ 14 \ 15$ $\cancel{14}$
- ★ 5d Good luck cena has d^1 , rest d^0
qd Lu ce

* eq :- $qd \rightarrow 6s^2 \ 4f^7 \ 5d^1$

- Most common O.S $\rightarrow +3$
- Eu, Yb $\rightarrow +2, +3$

d AND f BLOCK : END GAME | 32 khel me chapter taiyaar | NEET 2025

★ 4f 1 3 4 5 6 7 8 9 10 11 12 13 14 15

★ 5d Good luck cena has d¹, rest d⁰
qd Lu ce

* eq: qd → 6s² 4f⁷ 5d¹

- Most common 0-S → +3
- Eu, Yb → +2, +3

 → R.A
- Ce, Pr, Nd → +4, +3
 Tb Dy

 → O.A

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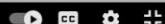
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Lanthanoids $\ddot{\sigma}$ reactions :-

- $\text{Ln}^{+3} + \text{H}_2\text{O} \longrightarrow \text{Ln}(\text{OH})_3 + \text{H}_2\uparrow$
- $\text{Ln}^{+3} + \text{O}_2 \longrightarrow \text{Ln}_2\text{O}_3$
- $\text{Ln}^{+3} + \text{N}_2 \longrightarrow \text{LnN}$
- $\text{Ln}^{+3} + \text{H}_2 \longrightarrow \text{LnH}_3$
- $\text{Ln}^{+3} + \text{S} \longrightarrow \text{Ln}_2\text{S}_3$
- $\text{Ln}^{+3} + \text{Cl} \longrightarrow \text{LnCl}_3$
- $\text{Ln}^{+3} + \text{HCl} \longrightarrow \text{LnCl}_3 + \text{H}_2\uparrow$
- $\star \text{Ln}^{+3} + \text{C} \longrightarrow \text{LnC}_2$

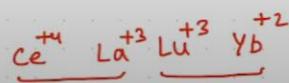
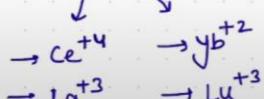
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• Lanthanoids are \rightarrow P SSC

- Paramagnetic
- Silvery white
- Soft \rightarrow except Sm
- Coloured \rightarrow except $\text{La}^{+3}, \text{Lu}^{+3}$

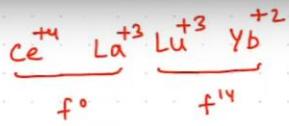
- f^0, f^{14} diamagnetic ✓



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Notes:-

→ Ionic radius

→ Lanthanoid contraction ✓

* due to **Lanthanoid Contraction** → size of $4d \approx 5d$

Note :-

due to negligible shielding
effect of $4f$ orbitals

→ Lanthanoid contraction ✓

* due to **Lanthanoid Contraction** → size of $4d \approx 5d$

Note :-

due to negligible shielding
effect of $4f$ orbitals



Basicity ↓

Hardness ↑

* misch metal → alloy of 95% lanthanoids + 5% iron

khel 32 : Actinoid Series

- 5f Series

Scroll for details

* misch metal → alloy of 95% lanthanoids + 5% iron

Khel 32 : Actinoid Series

- 5f Series
- IInd inner transition series
- e⁻ conf → $7s^2 5f^{14} 6d^{0/1}$
- $\text{Th}_{90} \text{ Pa } \underbrace{\text{U } \text{Np } \text{Pu } \text{Am } \text{Cm}}_{\substack{\text{ES } \text{Fm } \text{Md } \text{No } \\ 27}} \text{Bk } \text{Cf}$ Shows variable O.S.

Khel

* जब तक नजर पड़ी (NP) → d¹] Rest

Scroll for details



Khel 32 : Actinoid Series

- ✓ 5f Series
- ✓ IInd inner transition series
- e⁻ conf → $7s^2 5f^{14} 6d^{0/1}$
- $\text{Th}_{90} \text{ Pa } \underbrace{\text{U } \text{Np } \text{Pu } \text{Am } \text{Cm}}_{\substack{\text{ES } \text{Fm } \text{Md } \text{No } \\ 27}} \text{Bk } \text{Cf}$ Shows variable O.S.

Khel

* जब तक नजर पड़ी (NP) → d¹] Rest
* कम लड़ा → d⁰

★ जब तक नेहरू पड़ता (NP) $\rightarrow a$. } Rest
d¹⁰

★ कम लड़ा $\rightarrow d^1$
Cm Lr

★ Thorium (Th) $\rightarrow d^2$
Block exception

★ all $7s^2$

★ $5f \rightarrow$ 0 2 3 4 6 7 8 9 10 11 12 13 14 15

• Oxidation State :-

→ all have +3 (except Th $\rightarrow +4$)

→ कड़की से → only +3 O.S

d AND f BLOCK : END GAME | 32 khel me chapter taiyaar | NEET 2025

• Oxidation State :-

→ all have +3 (except Th → +4)
→ कड़की से → only +3 O's
↙ Cf

Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr
					+2								
	+3	+3	+3	+3	+3	+3	+3	+3	+3	+3	+3	+3	+3
+4	+4	+4	+4	+4	+4	+4	+4						
+5	+5	+5	+5	+5	+5								
	+6	+6	+6	+6									
	+7	+7	+7										
								28					

• Actinoids →
• Radio active
• Paramagnetic

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	+5	+5	+5	+5	+5	
	+6	+6	+6	+6		
	+7	+7	+7		28	



- Actinoids →
 - Radio active
 - Paramagnetic
 - Silvery white
 - on exposure to alkali gets tarnished
- + HCl ✓
- + HNO₃ X ↗
 - due to the formation of Protective layer of oxide.

Note : Actinoids show more O's than Lanthanoids



↙ alkali gets tarnished
due to the formation of Protective layer of oxide.

Note : Actinoids show more O's than Lanthanoids

↙ ↘
Reason → lower energy difference b/w 5f and 6d
then b/w 4f and 5d