

JEE MAIN D- AND F-BLOCK ELEMENTS — MELTING POINT AND ENTHALPY OF ATOMISATION OF D-BLOCK ELEMENTS — PYQS

Max. Marks: 20

Questions: 5

Section A (MCQ) — 4 questions

Q.1 Given below are two statements :

Statement-I: Presence of large number of unpaired electrons in transition metal atoms results in higher enthalpies of their atomisation.

Statement-II: $d_{xy} = d_{xz} = d_{yz} < d_{x^2-y^2} = d_{z^2}$ and $d_{x^2-y^2} = d_{z^2} < d_{xy} = d_{xz} = d_{yz}$ are the d-orbital splittings in $[\text{Fe}(\text{H}_2\text{O})_6]^{3+}$ and $[\text{Ni}(\text{Cl})_4]^{2-}$ complex ions respectively.

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

[JEE Main 2026 (Online) 5th April Evening Shift]

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

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Q.2 The first transition series metal 'M' has the highest enthalpy of atomisation in its series. One of its aquated ions (M^{n+}) exists in green colour. The nature of the oxide formed by the above M^{n+} ion is:

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

- (1) basic
- (2) neutral
- (3) amphoteric
- (4) acidic

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Q.3 The number of valence electrons present in the metal among Cr, Co, Fe and Ni which has the lowest enthalpy of atomisation is :

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

- (1) 10
- (2) 6
- (3) 9
- (4) 8

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Q.4 The correct option with order of melting points of the pairs (Mn, Fe), (Tc, Ru) and (Re, Os) is :

[JEE Main 2025 (Online) 29th January Morning Shift]

- (1) $\text{Fe} < \text{Mn}$, $\text{Ru} < \text{Tc}$ and $\text{Re} < \text{Os}$
- (2) $\text{Fe} < \text{Mn}$, $\text{Ru} < \text{Tc}$ and $\text{Os} < \text{Re}$
- (3) $\text{Mn} < \text{Fe}$, $\text{Tc} < \text{Ru}$ and $\text{Re} < \text{Os}$
- (4) $\text{Mn} < \text{Fe}$, $\text{Tc} < \text{Ru}$ and $\text{Os} < \text{Re}$

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Section B (Numerical) — 1 question

Q.5 Among Sc, Mn, Co and Cu, identify the element with highest enthalpy of atomisation. The spin only magnetic moment value of that element in its +2 oxidation state is _____ BM (in nearest integer).

[JEE Main 2025 (Online) 3rd April Evening Shift]

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ANSWER KEY

Section A (MCQ) — 4 questions

Ques.	1	2	3	4										
Ans.	1	1	2	4										

Section B (Numerical) — 1 question

Ques.	5													
Ans.	4													