

F-BLOCK

- Which one of the following lanthanoids does not form MO_2 ? [M is lanthanoid metal]
(1) Pr (2) Dy (3) Nd (4) Yb
- Given below are two statements:
Statement I : CeO_2 can be used for oxidation of aldehydes and ketones.
Statement II : Aqueous solution of EuSO_4 is a strong reducing agent.
In the light of the above statements, choose the correct answer from the options given below:
(1) Statement I is false but statement II is true
(2) Statement I is true but statement II is false
(3) Both statement I and statement II are true
(4) Both statement I and statement II are false
- Given below are two statements : one is labelled as Assertion A and the other is labelled as Reason R :
Assertion A : Size of Bk^{3+} ion is less than Np^{3+} ion.
Reason R : The above is a consequence of the lanthanoid contraction.
In the light of the above statements, choose the correct answer from the options given below :
(1) A is false but R is true
(2) Both A and R are true but R is not the correct explanation of A
(3) Both A and R are true and R is the correct explanation of A
(4) A is true but R is false
- The number of $4f$ electrons in the ground state electronic configuration of Gd^{2+} is _____.
[Atomic number of Gd = 64]
- The number of f electrons in the ground state electronic configuration of Np ($Z = 93$) is _____. (Nearest integer)
- Which one of the following lanthanides exhibits +2 oxidation state with diamagnetic nature?
(Given Z for Nd=60, Yb=70, La=57, Ce =58)
(1) Nd (2) Yb (3) La (4) Ce
- The Eu^{2+} ion is a strong reducing agent in spite of its ground state electronic configuration (outermost) : [Atomic number of Eu = 63]
(1) $4f^7 6s^2$ (2) $4f^6$
(3) $4f^7$ (4) $4f^6 6s^2$

SOLUTION**1. Official Ans. by NTA (4)**

Sol. Yb is the only element that do not form MO_2 type oxide

2. Official Ans. by NTA (3)

Sol. The +3 oxidation state of lanthanide is most stable and therefore lanthanide in +4 oxidation state has strong tendency to gain e^- and converted into +3 and therefore act as strong oxidizing agent.

eg Ce^{+4}

And therefore CeO_2 is used to oxidized alcohol aldehyde and ketones.

Lanthanide in +2 oxidation state has strong tendency to loss e^- and converted into +3 oxidation state therefore act as strong reducing agent.

$\therefore \text{EuSO}_4$ act as strong reducing agent.

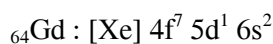
3. Official Ans. by NTA (4)

Sol. Size of ${}_{97}\text{Bk}^{3+}$ ion is less than that of ${}_{93}\text{Np}^{3+}$ due to actinoid contraction.

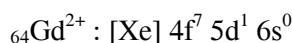
As we know that in a period from left to right radius decreases and in actinide series it is due to actinoid contraction.

4. Official Ans. by NTA (7)

Sol. The electronic configuration of



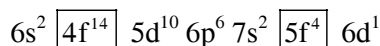
So the electronic configuration of



i.e. the number of 4f electrons in the ground state electronic configuration of Gd^{2+} is 7.

5. Official Ans. by NTA (4)

Sol. $\text{Np} = 1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6$



Total no. of 'f' electron = $14 e^- + 4e^- = 18$

6. Official Ans. by NTA (2)

Sol. Ytterbium shows +2 oxidation state with diamagnetic nature

So ans is 2

7. Official Ans. by NTA (3)

Sol. $\text{Eu} \rightarrow [\text{Xe}]4f^7 6s^2$

