The f-Block Elements and their Properties

SINGLE CORRECT CHOICE TYPE QUESTIONS

1. Colour of La^{2+} is due to
(A) *d–d* transition.
(B) *f–f* transition.
(C) charge transfer.
(D) None of these.

2. The colour of Nd^{3+} (At no. 60) will be similar to
(A) Ho^{3+} (At. no. 67).
(B) Gd^{3+} (At. no. 64).
(C) Er^{3+} (At. no. 68).
(D) Yb^{2+} (At. no. 70).

3. Choose the correct order of ionic radius from the given options (where atomic numbers of Ce, Pr, Eu and Dy are 58, 59, 63, and 66, respectively)
(A) $Ce^{3+} > Pr^{3+} > Dy^{3+} > Eu^{3+}$
(B) $Pr^{3+} > Dy^{3+} > Eu^{3+} > Ce^{3+}$
(C) $Dy^{3+} > Eu^{3+} > Ce^{3+} > Pr^{3+}$
(D) $Ce^{3+} > Pr^{3+} > Eu^{3+} > Dy^{3+}$

4. Which of following characteristics is not the point of resemblance between lanthanoids and actinoids?
(A) Reducing property.
(B) Oxidation state of +3.
(C) Trends of ionic radii for M^{3+} ions.
(D) Tendency towards complex formation.

5. Which of the following properties varies between lanthanoids and actinoids?
(A) Highest oxidation state.
(B) Radioactive nature.
(C) Basicity of hydroxides.
(D) All of these.

6. Which of the following elements is used in the treatment of cancer?
(A) Uranium (B) Thorium
(C) Cerium (D) Plutonium

7. Which of the following species is not paramagnetic?
(A) Yb^{2+} (At. no. 70)
(B) Ce^{4+} (At. no. 58)
(C) Lu^{3+} (At. no. 71)
(D) All of these.

8. Calculate the $Z_{effective}$ for the *f*-electron in Ce^{3+}.
(A) 54 (B) 5 (C) 4 (D) 3

9. Tb^{4+} (At. no. 65) is stable because
(A) it has noble gas configuration.
(B) it has half-filled electronic configuration of *f*-orbitals.
(C) it has fully-filled electronic configuration of *d*-orbitals.
(D) it has fully-filled electronic configuration of *f*-orbitals.

10. Actinoid contraction is more compared to lanthanoid contraction because
(A) 5*f* orbitals are more diffused as compared to 4*f*-orbital from nucleus.
(B) 4*f*-orbitals are more diffused as compared to 5*f*-orbitals.
(C) Shielding effect of electrons present in 4*f*- and 5*f*-orbitals is equal.
(D) The azimuthal quantum numbers of 4*f*- and 5*f*-orbitals are the same.

11. Which of the following cations has the strongest tendency towards complex formation?
(A) Sm^{3+} (B) Lu^{3+} (C) Gd^{3+} (D) Yb^{3+}

12. Which of the following elements has maximum composition in Misch metal, which is used in gas lighters?
(A) La (B) Fe (C) Ce (D) Other metals

13. Which of the following Ce compound is used for making crucibles?
(A) CeO_2 (B) CeS (C) ThO_2 (D) Nd_2O_3

14. The gradual decrease in radius for lanthanoid elements is not obeyed by
(A) Eu only (B) Yb only
(C) Both Eu and Yb (D) None

15. The gradual decrease in radius of M^{3+} ion for lanthanoids is not obeyed by
(A) Eu only (B) Yb only
(C) Both Eu and Yb (D) None of these

16. The magnetic moment of Am^{5+} (At. no. 95) is
(A) $\sqrt{24}$ BM (B) $\sqrt{35}$ BM
(C) $\sqrt{15}$ BM (D) $\sqrt{3}$ BM

17. Which of the following elements is not an *f*-block element?
(A) No (B) Nd (C) Nb (D) Np

18. On moving from Ce^{3+} to Lu^{3+}, the cation having maximum number of unpaired electrons is
(A) Ce^{3+} (B) Lu^{3+} (C) Eu^{3+} (D) Gd^{3+}

19. Lanthanoid from series is
(A) La to Lu
(B) Th to Lr
(C) Ce to Lu
(D) Ac to Lr

20. Which of the following statements is true for *f*-block elements?
(A) They can have electrons from f^0 to f^{14}.
(B) Group number is 3 in the periodic table.
(C) With the increase in number of *f*-electrons, the
(D) All of these.

ANSWERS

Single Correct Choice Type Questions

1. (A)	6. (B)	11. (B)	16. (A)
2. (C)	7. (D)	12. (C)	17. (C)
3. (D)	8. (C)	13. (B)	18. (D)
4. (D)	9. (B)	14. (C)	19. (C)
5. (D)	10. (A)	15. (D)	20. (D)