WEIRD CHEMIST

f-Block Elements

Lanthanoids & Actinoids – General Characteristics

DPP – 09

Topic: f-Block Elements | **Questions:** 101 Questions | **Exam:** NEET / JEE

▶ TYPE 1 : Electronic Configuration

Q1. Which of the following is the electronic configuration of Gd ($Z = 64$)?

Xe $4f^7 5d^1 6s^2$
Rn $5f^7 6d^1 7s^2$

Xe $4f^7 6s^2$
Rn $5f^7 7s^2$

Q2. Ground state electronic configuration of Ce is (Atomic number of Ce $= 58$)

Xe $4f^2 5d^0 6s^1$
Xe $4f^1 5d^1 6s^2$

Xe $5d^1 6s^2$
Xe $4f^2 5d^1 6s^1$

Q3. The electronic configurations of Eu (Atomic No. 63), Gd (Atomic No. 64) and Tb (Atomic No. 65) are [NEET-2016]

Xe $4f^7 6s^2$, [Xe]$4f^7 5d^1 6s^2$ and [Xe]$4f^9 6s^2$
Xe $4f^7 6s^2$, [Xe]$4f^8 6s^2$ and [Xe]$4f^8 5d^1 6s^2$
Xe $4f^6 5d^1 6s^2$, [Xe]$4f^7 5f^1$ and [Xe]$4f^9 6s^2$
Xe $4f^6 5d^1 6s^2$, [Xe]$4f^7 5d^1 6s^2$ and [Xe]$4f^8 5d^1 6s^2$

Q4. Gadolinium belongs to the $4f$ series. Its atomic number is 64. Which of the following is the correct electronic configuration of gadolinium? [Re-AIPMT-2015]

Xe $4f^7 5d^1 6s^2$
Xe $4f^6 5d^2 6s^2$

Xe $4f^8 6d^2$
Xe $4f^9 5s^1$

Q5. General electronic configuration of lanthanides is

(1) $(n-2)f^{1-14}(n-1)d^{0-1}ns^2$
(2) $(n-2)f^{10-14}(n-1)d^{0-1}ns^2$
(3) $(n-2)f^{0-14}(n-1)d^{10}ns^2$
(4) $(n-2)d^{0-1}(n-1)f^{1-14}ns^2$

Q6. Match the column

Metal	Electronic configuration
A. Nd	i. $4f^{14}5d^{1}6s^{2}$
B. Pm	ii. $4f^{14}6s^{2}5d^{0}$
C. Yb	iii. $4f^{4}6s^{2}$
D. Lu	iv. $4f^{5}6s^{2}$

(1) A–iv; B–iii; C–i; D–iii
(2) A–iii; B–iv; C–i; D–ii
(3) A–iv; B–iii; C–ii; D–i
(4) A–iii; B–iv; C–ii; D–i

Q7. Which of the following is an electronic configuration of Th?

Rn $5f^{0}6d^{2}7s^{2}$
Rn $5f^{2}6d^{2}7s^{2}$
Rn $5f^{2}6d^{2}7s^{0}$
Rn $5f^{1}6d^{2}7s^{0}$

Q8. What is the general electronic configuration of the outer shell of f-block elements?

(1) $(n-2)f^{0-14}(n-1)d^{0-2}ns^{2}$
(2) $(n-2)f^{0-14}(n-1)d^{1-2}ns^{2}$
(3) $(n-1)f^{0-14}(n-1)d^{1-2}ns^{2}$
(4) $(n-1)f^{1-14}(n-1)d^{0-1}ns^{2}$

Q9. What is the electronic configuration of Ce ($Z=58$)?

Xe $4f^{2}5d^{0}6s^{2}$
Xe $4f^{1}5d^{1}6s^{2}$
Xe $5d^{2}6s^{2}$
Xe $4f^{2}5d^{1}6s^{1}$

Q10. Which of the following is the general electronic configuration of lanthanoids?

Xe $4f^{0-14}5d^{0-1}6s^{2}$
Xe $4f^{1-14}5d^{1-2}6s^{2}$
Xe $4f^{1-14}5d^{0-1}6s^{2}$
Xe $4f^{1-14}5d^{0-1}6s^{1-2}$

Q11. Which of the following is the general electronic configuration of actinides?

Ra $5f^{0-14}6d^{0-1}7s^{2}$
Ra $5f^{1-14}6d^{0-2}7s^{2}$
Ra $5f^{0-14}6d^{1-2}7s^{2}$
Ra $5f^{0-14}6d^{0-2}7s^{2}$

Q12. The electronic configuration of Curium (Atomic number 96) is

Rn $5f^{3}6d^{5}7s^{2}$
Rn $5f^{7}6d^{1}7s^{1}$
Rn $5f^{7}6d^{1}7s^{2}$
Rn $5f^{8}6d^{6}7s^{2}$

Q13. Configuration of Yb^{2+} is:–

Xe $4f^{14}5d^1$
Xe $4f^{14}$
Xe $4f^{14}6s^2$
Xe $4f^{14}5d^16s^2$

Q14. Electronic configuration of Gd(64) is:–

Xe $4f^2, 5d^9, 6s^2$
Xe $4f^7, 5d^1, 6s^2$
Xe $4f^6, 5d^2, 6s^2$
Xe $4f^7, 5d^0, 6s^2$

Q15. Which of the following actinoid elements has $5f^76d^17s^2$ configuration?

(1) Bk (2) Cm (3) Pa (4) No

▶ TYPE 2 : General Characteristics & Classification of f-Block

Q16. Which of the following statements is incorrect?

(1) Zn is not considered as a transition element
(2) Promethium (Pm) is radioactive
(3) $La(OH)_3$ is more basic than $Lu(OH)_3$
(4) Separation of lanthanoids is not possible by the ion exchange method

Q17. Which one of the following statements related to lanthanons is incorrect? `[NEET(Phase-2)-2016]`

(1) Europium shows $+2$ oxidation state
(2) The basicity decreases as the ionic radius decreases from Pr to Lu
(3) All the lanthanons are much more reactive than aluminium
(4) Ce$(+4)$ solutions are widely used as an oxidizing agent in volumetric analysis

Q18. Lanthanoids are

(1) 14 elements in the sixth period (atomic number 90 to 103) that are filling the $4f$ sublevel
(2) 14 elements in the seventh period (atomic number $= 90$ to 103) that are filling the $5f$ sublevel
(3) 14 elements in the sixth period (atomic number $= 58$ to 71) that are filling the $4f$ sublevel
(4) 14 elements in the seventh period (atomic number $= 50$ to 71) that are filling the $4f$ sublevel

Q19. Which of the following statements is not correct?

(1) $La(OH)_3$ is less basic than $Lu(OH)_3$
(2) In lanthanide series, ionic radius of Lu^{3+} ion decreases
(3) La is actually an element of the transition series rather than lanthanides
(4) Atomic radius of Zr and Hf are the same because of lanthanide contraction

Q20. Transuranic elements begin with

(1) Np (2) Cm (3) Pu (4) U

Q21. Assertion: There are 11 transuranic elements in actinoids.
Reason: The last natural element is U_{92}; after U_{92} all are transuranic elements.

(1) Both Assertion and Reason are true, Reason gives correct explanation
(2) Both Assertion and Reason are true, it doesn't give correct explanation
(3) Assertion is correct but Reason is false
(4) Both Assertion and Reason are false

Q22. Assertion: The first man-made lanthanoid is Pm.
Reason: f-block elements lie in group IV B.

(1) Both Assertion and Reason are true, Reason gives correct explanation
(2) Both Assertion and Reason are true, it doesn't give correct explanation
(3) Assertion is correct but Reason is false
(4) Both assertion and Reason are false

Q23. Rare earth elements are exhibited by.

(1) $Z = 58$ to 71 (2) $Z = 21$ to 30 (3) $Z = 39$ to 71 (4) $Z = 61$ to 91

Q24. What is the name of the element with $Z = 102$?

(1) Rutherfordium (2) Holmium (3) Dubnium (4) Nobelium

Q25. By which reason is element Th introduced in the f-block?

(1) According to electronic configuration
(2) According to physical properties
(3) According to chemical properties
(4) According to practical properties

Q26. Which of the following elements are included in the lanthanoid series?

(1) La to Lu (2) Ce to Lu (3) La to Yb (4) Ce to Yb

Q27. Which general symbol is used to represent lanthanoids?

(1) Ln (2) La (3) Le (4) Li

Q28. Which of the following elements are included in actinides?

(1) Th to Lr (2) Ac to Lr (3) Ac to No (4) Th to No

Q29. Lanthanoides elements are separated on the basis of their

(1) Chemical properties (2) Difference in basicity (3) Physical properties (4) Difference in acidity

Q30. Which of the following manmade elements is a Lanthanoid?

(1) Promethium (Pm) (2) Lutetium (Lu) (3) Ytterbium (Yb) (4) Samarium (Sm)

Q31. Which of the following is wrong statement?

(1) $La(OH)_3$ is less basic than $Lu(OH)_3$
(2) In lanthanoide series, ionic radius decreases while moving Ce^{3+} to Lu^{3+} ion
(3) La is actually a transition element
(4) Due to lanthanide contraction, atomic radius of Zn and Hf are the same

Q32. A element having atomic no. 56 is included in.

(1) Lanthanides (2) Actinides (3) Alkaline earth metals (4) None of above

Q33. The most common lanthanide is

(1) Lanthanum (2) Cerium (3) Samarium (4) Plutonium

Q34. Actinoids

(1) Are all synthetic elements (2) Include element 104 (3) Have any short-lived isotopes (4) Have variable valency

Q35. Identify the incorrect statement in the following

(1) d-block elements show irregular and erratic chemical properties among themselves.
(2) La and Lu have partially filled d-orbital and no other partially filled orbital.
(3) The chemistry of various lanthanoids is similar.
(4) $4f$ and $5f$ orbitals are equally shielded.

Q36. Which statement is incorrect among the following?

(1) Lanthanoids hydroxides are less basic in nature as compared to actinides.
(2) Lanthanoids form oxocations
(3) In lanthanoids, only promethium is radioactive
(4) Actinoids form oxocations

Q37. Europium is a:

(1) f-block element (2) d-block element (3) p-block element (4) s-block element

Q38. Lanthanides are:

(1) 14 elements in the sixth period (Atomic number 90 to 103) that are filling the $4f$-sublevel
(2) 14 elements in the sixth period (Atomic number 58 to 71) that are filling the $4f$-sublevel
(3) 14 elements in the seventh period (Atomic number 90 to 103) that are filling the $5f$-sublevel
(4) 14 elements in the seventh period (Atomic number 58 to 71) that are filling the $4f$-sublevel

Q39. In context of the lanthanoids, which of the following statements is not correct?

(1) There is a gradual decrease in the radii of the members with increasing atomic number in the series.
(2) All the members exhibit $+3$ oxidation state.
(3) Because of similar properties, the separation of lanthanoids is not easy.
(4) Availability of $4f$ electrons results in the formation of compounds in the $+4$ state for all the members of the series.

▶ TYPE 3 : Lanthanoid Contraction & Its Consequences

Q40. Consider the following statements.

(i) Zr and Hf have almost identical radii
(ii) Ce^{4+} is a strong reductant
(iii) Ln (lanthanoids) combine with nitrogen and form LnN_3

The correct statement(s) is/are [NCERT Pg. 235, 237]

(1) Only (i) (2) Only (ii) (3) Both (i) & (ii) (4) Both (i) & (iii)

Q41. Because of lanthanoid contraction, which of the following pairs of elements have nearly the same atomic radii? (Numbers in parentheses are atomic numbers) [AIPMT-2015]

(1) Zr (40) and Ta (73)
(2) Ti (22) and Zr (40)
(3) Zr (40) and Nb (41)
(4) Zr (40) and Hf (72)

Q42. The reason for lanthanoid contraction is [AIPMT-2014]

(1) Negligible screening effect of f orbitals
(2) Increasing nuclear charge
(3) Decreasing nuclear charge
(4) Decreasing screening effect

Q43. Identify the incorrect statement among the following [AIPMT (Prelims)-2007]

(1) Shielding power of $4f$ electrons is quite weak
(2) There is a decrease in the radii of the atoms or ions as one proceeds from La to Lu
(3) Lanthanoid contraction is the accumulation of successive shrinkages
(4) As a result of lanthanoid contraction, the properties of the $4d$ series of transition elements have no similarities with the $5d$ series of elements

Q44. The correct order of ionic radii of Y^{3+}, La^{3+}, Eu^{3+} and Lu^{3+} is (Atomic nos. Y $= 39$, La $= 57$, Eu $= 63$, Lu $= 71$)

(1) $Y^{3+} < La^{3+} < Eu^{3+} < Lu^{3+}$
(2) $Lu^{3+} < Y^{3+} < Eu^{3+} < La^{3+}$
(3) $Lu^{3+} < Eu^{3+} < La^{3+} < Y^{3+}$
(4) $La^{3+} < Eu^{3+} < Lu^{3+} < Y^{3+}$

Q45. The radius of La^{3+} ($Z = 57$) is 1.06 Å, which one of the following given values will be closest to the radius of Lu^{3+} ($Z = 71$)?

(1) 1.60 Å (2) 1.40 Å (3) 1.06 Å (4) 0.85 Å

Q46. The lanthanoid contraction is responsible for the fact that

(1) Zr and Y have about the same radius
(2) Zr and Nb have similar oxidation state
(3) Zr and Hf have about the same radius
(4) Zr and Zn have the same oxidation number

Q47. Atomic radii of Zr (160 pm) and Hf (159 pm) is a consequence of–

(1) Transition contraction
(2) Inert pair effect
(3) Poor shielding of $4f$ electrons
(4) Actinoid contraction

Q48. The lanthanide contraction is responsible for the fact that

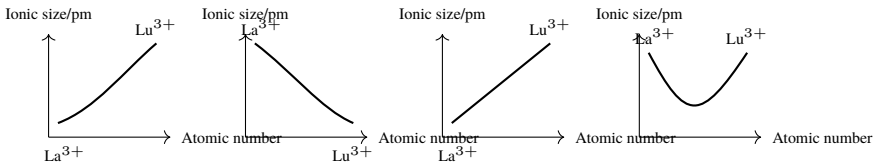
(1) Zn and Zr have the same oxidation state.
(2) Zr and Hf have the same covalent and ionic radius.
(3) Zr and Nb have the same oxidation state.
(4) Zr and Nb have the same covalent and ionic radius.

Q49. Lanthanide contraction is caused due to.....

(1) The appreciable shielding on outer electrons by $4f$ electrons from the nuclear charge.
(2) The appreciable shielding on outer electrons by $5d$ electrons from the nuclear charge.
(3) The same effective nuclear charge from Ce to Lu.

(4) The poor shielding on outer electrons by $4f$ electrons from the nuclear charge.

Q50. Which of the following graphs shows the correct trend in the size of $+3$ ions of lanthanides?



Q51. The correct order of ionic radii of Y^{+3}, La^{+3}, Eu^{+3} and Lu^{+3} is:–

Same underlying trend as Q.22.

(1) $La^{3+} < Eu^{3+} < Lu^{3+} < Y^{3+}$
(2) $Lu^{3+} < Eu^{3+} < La^{3+} < Y^{3+}$
(3) $Y^{3+} < Lu^{3+} < Eu^{3+} < La^{3+}$
(4) $Y^{3+} < La^{3+} < Eu^{3+} < Lu^{3+}$

Q52. The radius of La^{3+} is 1.06 Å, which of the following given values will be closest to the radius of Lu^{3+} (At. no. of Lu $= 71$, La $= 57$)?

Same as Q.25.

(1) 1.6 Å (2) 1.4 Å (3) 1.06 Å (4) 0.85 Å

Q53. The correct order of ionic radii of Ce, La, Pm and Yb in the $+3$ oxidation state is:–

(1) $La^{3+} < Pm^{3+} < Ce^{3+} < Yb^{3+}$
(2) $La^{3+} < Ce^{3+} < Pm^{3+} < Yb^{3+}$
(3) $Yb^{3+} < Ce^{3+} < Pm^{3+} < La^{3+}$
(4) $Yb^{3+} < Pm^{3+} < Ce^{3+} < La^{3+}$

▶ TYPE 4 : Oxidation States

Q54. Which of the following exhibits only a $+3$ oxidation state? [AIPMT (Mains)-2012]

(1) U (2) Th (3) Ac (4) Pa

Q55. The reason for the greater range of oxidation states in actinoids is attributed to [NEET-2017]

(1) The radioactive nature of actinoids
(2) Actinoid contraction
(3) $5f$, $6d$ and $7s$ levels having comparable energies
(4) $4f$ and $5d$ levels being close in energies

Q56. Which of the following oxidation states is the most common among the lanthanoids? [AIPMT (Mains)-2010]

(1) 4 (2) 2 (3) 5 (4) 3

Q57. More number of oxidation states are exhibited by the actinoids than by the lanthanoids. The main reason for this is [AIPMT (Prelims)-2006]

(1) More energy difference between $5f$ and $6d$ orbitals than that between $4f$ and $5d$ orbitals
(2) Lesser energy difference between $5f$ and $6d$ orbitals than that between $4f$ and $5d$ orbitals
(3) Greater metallic character of the lanthanoids than that of the corresponding actinoids
(4) More active nature of the actinoids

Q58. The main reason for the larger number of oxidation states exhibited by the actinides than the corresponding lanthanides, is [AIPMT (Prelims)-2005]

Tests the same fact as Q.18.

(1) Lesser energy difference between $5f$ and $6d$ orbitals than between $4f$ and $5d$ orbitals
(2) Larger atomic size of actinides than the lanthanides
(3) More energy difference between $5f$ and $6d$ orbitals than between $4f$ and $5d$ orbitals
(4) Greater reactive nature of the actinides than the lanthanides

Q59. Which one of the following elements shows the maximum number of different oxidation states in its compounds?

(1) Gd (2) La (3) Eu (4) Am

Q60. Larger number of oxidation states are exhibited by the actinoids than those by the lanthanoids, the main reason being

Tests the same fact as Q.18 and Q.19.

(1) Lesser energy difference between $5f$ and $6d$ than between $4f$ and $5d$ orbitals
(2) More energy difference between $5f$ and $6d$ than between $4f$ and $5d$ orbitals
(3) More reactive nature of the actinoids than the lanthanoids
(4) $4f$ orbitals more diffused than the $5f$ orbitals

Q61. Ce^{4+} is stable. This is because of

(1) Half-filled $5d$-orbitals (3) Noble gas configuration
(2) All paired electrons (4) Fully filled $5d$-orbitals

Q62. Ce ($Z = 58$) and Yb ($Z = 70$) exhibit stable $+4$ and $+2$ oxidation states respectively. This is because

(1) Ce^{4+} and Yb^{2+} acquire f^7 configuration

(2) Ce^{4+} and Yb^{2+} acquire f^0 configuration
(3) Ce^{4+} and Yb^{2+} acquire f^0 and f^{14} configuration
(4) Ce^{4+} and Yb^{2+} acquire f^7 and f^{14} configuration

Q63. Lanthanoids for which $+2$ and $+3$ oxidation states are common.

(1) La (2) Nd (3) Ce (4) Eu

Q64. Ce is an important member of the lanthanoid series. Which of the following is a wrong statement for Ce?

(1) The general oxidation states of Ce are $+3$ and $+4$.
(2) $+3$ oxidation state of Ce is more stable than $+4$
(3) $+4$ oxidation state of Ce is not available in its aqueous solution.
(4) Ce (IV) behaves as an oxidizing agent.

Q65. The actinides exhibit more oxidation states in general than the lanthanides, because.....

(1) The $5f$-orbitals are more spread in space than the $4f$ orbitals.
(2) Energy difference between $5f$ and $6d$ orbitals is less than that of $4f$ and $5d$ orbitals.
(3) Energy difference between $5f$ and $6d$ orbitals is more than that of $4f$ and $5d$ orbitals.
(4) Actinides are more reactive than lanthanides.

Q66. The general oxidation state of lanthanide elements is $+3$. Which of the following is an incorrect statement for them?

(1) Ln(III) hydroxides are mainly basic in character.
(2) Because of the large size of the (III) ions, the bonding in its compounds is ionic in character.
(3) Ln(III) compounds are generally colourless.
(4) The ionic sizes of Ln(III) decrease with increase in atomic number.

Q67. Which of the following lanthanide elements has $+2$ and $+3$ as general oxidation states.

Same as Q.39.

(1) La (2) Nd (3) Ce (4) Eu

Q68. Which of the following is proper reason for the stability of Gd^{3+} ion.

(1) $4f$ orbital is completely filled
(2) $4f$ orbital is half filled
(3) Shows electronic configuration similar to an inert gas.
(4) $4f$ orbital is completely vacant

Q69. Which of the following actinoids show oxidation states up to $+7$?

(i) Am (ii) Pu (iii) U (iv) Np

(1) i and ii (2) ii and iv (3) iii and iv (4) i and iii

Q70. Knowing that the chemistry of lanthanoids (Ln) is dominated by its $+3$ oxidation state, which of the following statements is incorrect?

(1) Because of the large size of the Ln(III) ions, the bonding in its compounds is predominantly ionic in character
(2) The ionic sizes of Ln(III) decrease in general with increasing atomic number
(3) Ln(III) compounds are generally colourless
(4) Ln(III) hydroxides are mainly basic

Q71. Larger number of oxidation states are exhibited by the actinoides than those by the lanthanoids, the main reason being:–

Tests the same fact as Q.18, Q.19, and Q.27.

(1) Lesser energy difference between $5f$ and $6d$ than $4f$ and $5d$ orbitals
(2) More energy difference between $5f$ and $6d$ than between $4f$ and $5d$ orbitals
(3) More reactive nature of the actinoids than the lanthanoids
(4) $4f$ orbitals are more diffused than $5f$ orbitals

Q72. Which of the following oxidation states is the most common among the lanthanoids:–

Same as Q.16.

(1) 2 (2) 5 (3) 3 (4) 4

Q73. The maximum oxidation state exhibited by actinide ions is:

(1) $+5$ (2) $+4$ (3) $+7$ (4) $+8$

Q74. Which of the following transition metals shows only a $+3$ oxidation state?

(1) Ce (2) Pt (3) Nd (4) Gd

Q75. Lanthanide for which +II and +III oxidation states are common is:

Same fact as Q.39 and Q.62.

(1) La (2) Nd (3) Ce (4) Eu

Q76. Cerium ($Z = 58$) is an important member of lanthanides. Which of the following statements about cerium is incorrect?

(1) The common oxidation states of cerium are $+3$ and $+4$

(2) The $+3$ oxidation state of cerium is more stable than the $+4$ oxidation state
(3) The $+4$ oxidation state of cerium is not known in solutions
(4) Cerium (IV) acts as an oxidising agent

Q77. Which is correct:–

(1) Ce^{4+} is an oxidising agent
(2) Yb^{2+} is a reducing agent
(3) Li^{+} is not a reducing agent
(4) All

▶ TYPE 5 : Basicity of Hydroxides & Oxides

Q78. Among lanthanoids, the basic nature of hydroxides gradually [NCERT Pg. 237]

(1) Decreases
(2) Increases
(3) First decreases then increases
(4) First increases then decreases

Q79. Basic properties of hydroxides of lanthanoids is

(1) Greater than $Al(OH)_3$ but less than $Ca(OH)_2$
(2) Greater than $Ca(OH)_2$ but less than $Al(OH)_3$
(3) Greater than $Ca(OH)_2$ and $Al(OH)_3$
(4) Less than $Ca(OH)_2$ and $Al(OH)_3$

Q80. Most acidic among the given compounds is:–

(1) $Pr(OH)_3$ (2) $Gd(OH)_3$ (3) $Sm(OH)_3$ (4) $Er(OH)_3$

Q81. The most basic oxide of lanthanoids is:–

(1) $Pr(OH)_3$ (2) $Eu(OH)_3$ (3) $Gd(OH)_3$ (4) $Lu(OH)_3$

Q82. Which of the following is most basic in nature:–

(1) $Eu(OH)_3$ (2) $Ho(OH)_3$ (3) $Pr(OH)_3$ (4) $Pm(OH)_3$

Q83. Which one is least basic:

(1) $Yb(OH)_3$ (2) $Tb(OH)_3$ (3) $Gd(OH)_3$ (4) $Eu(OH)_3$

▶ TYPE 6 : Colour, Magnetic Properties & Complex Formation

Q84. Identify the paramagnetic lanthanoid ion among the following [NCERT Pg. 236]

(1) Ce^{4+} (2) La^{3+} (3) Eu^{3+} (4) Yb^{2+}

Q85. Which of the following lanthanoid ions is diamagnetic? (At. No. Ce = 58, Sm = 62, Eu = 63, Yb = 70) [NEET-2013]

(1) Sm^{2+} (2) Eu^{2+} (3) Yb^{2+} (4) Ce^{2+}

Q86. Assertion: Magnetic moment values of actinides are lesser than the theoretically predicted values.
Reason: Actinide elements are strongly paramagnetic.

(1) If both Assertion & Reason are True & the Reason is a correct explanation of the Assertion.
(2) If both Assertion & Reason are True but Reason is not a correct explanation of the Assertion.
(3) If Assertion is True but the Reason is False.
(4) If both Assertion & Reason are False.

Q87. Which of the following species has maximum tendency to form a complex?

(1) La^{+3} (2) Gd^{+3} (3) Lu^{+3} (4) Ce^{+3}

Q88. Which of the following lanthanide ions is paramagnetic?

(1) La^{3+} (2) Ce^{4+} (3) Gd^{3+} (4) Lu^{3+}

Q89. Which has the maximum number of unpaired e^-:–

(1) Gd^{2+} (2) Sm^{2+} (3) Pm^{2+} (4) Eu^{2+}

Q90. Which of the following ions will exhibit colour in aqueous solution?

(1) La^{3+} $(Z = 57)$ (2) Ti^{3+} $(Z = 22)$ (3) Lu^{3+} $(Z = 71)$ (4) Sc^{3+} $(Z = 21)$

▶ TYPE 7 : Comparison Between Lanthanoids & Actinoids

Q91. The point of dissimilarity between lanthanoids and actinoids is

(1) Outermost shell configuration (2) General oxidation state (+3) (3) Group number (4) Radioactive nature

Q92. Which of the following elements has a very close similarity with lanthanoids?

(1) Lr (2) Ce (3) Lu (4) La

Q93. Which of the following is a similarity seen in lanthanoids and actinides?

(1) Electronic configuration (2) Oxidation states (3) Ionisation energy (4) Formation of complexes

Q94. Lanthanides and actinides resemble in:

(1) Electronic configuration (2) Oxidation state (3) Ionisation state (4) Formation of complexes

▶ TYPE 8 : Uses & Miscellaneous

Q95. Ln $\xrightarrow{\text{Combusting in O}}$ X. What is X.

(1) LnO_3 (2) Ln_2O (3) Ln_3O_2 (4) Ln_2O_3

Q96. Which of the following is used in gas lighters?

(1) CeO_2 (2) Pyrophoric Misch metal (3) Gadolinium sulphate (4) Ceric compounds

Q97. Which of the following is the use of mischmetal?

(1) In bullets
(2) In lighter flint
(3) As catalyst in petroleum cracking
(4) Both (1) and (2)

Q98. A : Mercurous ion is Hg^{2+}
B : Mercuric ion is Hg_2^{2+}
C : General electronic configuration of lanthanoids is $(n-2)f^{1-14}(n-1)d^{0-1}ns^2$
D : Dy^{+3} is paramagnetic
E : $K_2Cr_2O_7$ is an orange coloured compound
Which of the following statements are correct.

This question mixes unrelated chemistry (mercury ions, $K_2Cr_2O_7$) with lanthanoid facts – kept as a single item since that's how it appears in the source.

(1) C, E (2) Only C (3) A, B, C (4) B, C, E

Q99. A : Cr_2O_3 is amphoteric
B : In CrO_5 the oxidation state of Cr is $+6$

C : Iodide of Million's base is $NH_2HgO{\cdot}HgI$
D : Gd is an actinoid element
E : Zn^{+2} has pseudo inert gas configuration
Which of the following are correct.

(1) A, B, C, E (2) All are correct (3) B, C, F (4) Only C is correct

Q100. How many statements are correct?

A: Mn^{+2} and Fe^{2+} are isoelectronic
B: Ni^{2+} has 2 unpaired e^-
C: $AgNO_3$ is soluble in water
D: The smallest lanthanoid is Eu

(1) 1 (2) 2 (3) 3 (4) 4

Q101. Which of the following order of the given property is correct:–

(1) Oxidising – $Mn^{+3} > Cr^{3+}$
(2) Reducing – $Mn^{2+} > Cr^{2+}$
(3) Stability – $Cu^{+}(d^{10}) > Cu^{2+}(d^{9})$
(4) Ionic radius – $Lu^{3+} > La^{3+}$