The d and f-Block Elements

1. **Assertion (A):** 1^{st} ionisation potential of mercury is greater than cadmium

   Reason (R): Hg has stable electronic configuration ($5d^{10}$ $6s^2$)

   (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

   (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

   (3) (A) is true but (R) is false

   (4) Both (A) and (R) are false

2. **Assertion (A):** Zr and Hf have about the same atomic radius.

   Reason (R): Zr and Hf lies in the same group

   (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

   (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

   (3) (A) is true but (R) is false

   (4) Both (A) and (R) are false

3. **Assertion (A):** Zn, Cd, Hg are non-transition elements while Cu, Ag, Au are transition element

   Reason (R): In Zn, Cd, Hg (n–1) d orbitals are completely filled in their atomic state where as in Cu, Au they are incomplete.

   (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

   (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

   (3) (A) is true but (R) is false

   (4) Both (A) and (R) are false

4. **Assertion (A):** Cu^+ is more stable than Cu^{+2}

   Reason (R): ΔIP is greater than 16 eV

   (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

   (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

   (3) (A) is true but (R) is false

   (4) Both (A) and (R) are false

5. **Assertion (A):** $KMnO_4$ is dark pink coloured compound

   Reason (R): In the $KMnO_4$ charge transfer spectrum occurs.

   (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

   (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

   (3) (A) is true but (R) is false

   (4) Both (A) and (R) are false

6. **Assertion (A):** Hg is the only metal which is liquid at 0°C.

   Reason (R): It has very high IP and weak metallic bond

   (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

   (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

   (3) (A) is true but (R) is false

   (4) Both (A) and (R) are false

7. **Assertion (A):** Valency of transition elements is variable

Reason (R): Energy of ns and (n–1)d orbital is almost same

(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

8. **Assertion (A):** Melting point of Mn less than that of Fe

Reason (R): Mn has less number of unpaired e^- than Fe in atomic state

(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

9. **Assertion (A):** Solution of Na_2CrO_4 in water is intensely colored.

Reason (R): Ox. State of Cr in Na_2CrO_4 is +6.

(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

10. **Assertion (A):** Ce^{+4} acts as oxidizing agent in aqueous medium

Reason (R): +4 is common oxidation state of lanthanides

(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

11. **Assertion (A):** Neptunium is transuranic element

Reason (R): It is heavier than uranium

(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

12. **Assertion (A):** $La(OH)_3$ is more basic than $Lu(OH)_3$

Reason (R): Lanthanum is d-block element

(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

13. **Assertion (A):** Actinides show much higher range of oxidation states

Reason (R): Energy difference between 5f and 6d orbitals is large

(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

14. **Assertion (A):** All the lanthanide elements exhibits a common oxidation state of +3 in their compounds

Reason (R): The atoms of the lanthanide elements contains three electron in their outermost

(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

15. **Assertion (A):** $K_2Cr_2O_7$ is used as a primary standard in volumetric analysis.

Reason (R): It has a good solubility in water.

(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

16. **Assertion (A):** Change in colour of acidic solution of potassium dichromate by breath is used to test drunk drivers.

Reason (R): Change in colour is due to the complexation of alcohol with potassium dichromate.

(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

17. **Assertion (A):** Eu^{2+} & Yb^{2+} are reducing agents for their ions.

Reason (R): Both ions have stable half filled configuration.

(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

18. **Assertion (A):** MnO_2 is anti ferromagnetic in nature.

Reason (R): In MnO_2, equal number of domain are aligned with parallel and antiparallel spin.

(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

19. **Assertion (A):** La_2O_3 is basic nature.

Reason (R): La in aqueous solution gives $La(OH)_3$.

(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

20. **Assertion (A):** $FeCl_3$ does not affect iodemetric titration of $CuSO_4$ solution.

Reason (R): FeI_3 is formed.

(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

21. **Assertion (A):** Actinoids can posses +4 O.S. more easily then lanthanoid.

Reason (R): 4f, 5d, 6s have almost same energy levels.

(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

22. **Assertion (A):** UF_6 is more covalent than UF_4.

Reason (R): Fluorine is smaller in size.

(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

23. **Assertion (A):** When $AgCl_{(s)}$ is dissolved in NH_3 solution, then its solubility is greater in comparison to that in water.

Reason (R): Ag^+ forms complex with NH_3

(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ans.	2	2	3	4	1	1	1	3	2	3	1	2	3	3	3	3	3	1	1	4
Que.	21	22	23																	
Ans.	2	2	1																	