

Class 12 Chemistry Chapter 8 The d & f Block Elements MCQs

1. As an electroplated protective covering, what metal is used?

- a) Plutonium
- b) Chromium
- c) Nickel
- d) Iron

Answer: b

Explanation: Chrome plating (or chromium plating, as it's more generally known) is the process of electroplating a thin layer of chromium onto a metal item. The chromed coating might be attractive, provide corrosion protection, make cleaning easier, or increase the hardness of the surface.

2. _____ possesses the properties of both alkali metals and halogens.

- a) Helium
- b) Hydrogen
- c) Sodium
- d) Chlorine

Answer: b

Explanation: Because hydrogen's outer shell configuration (that is $1s^1$) contains only one electron in the s-orbital, it qualifies as an Alkali metal. A noble gas structure, which is a feature of halogen, can be obtained with only one electron.

3. As we proceed from left to right in groups, what happens to the non-metallic nature?

- a) Remains constant
- b) Decreases
- c) Increases
- d) Irregular

Answer: c

Explanation: The 18th group has no reactivity, but its non-metallic character is defined as a tendency to gain electrons, resulting in significant negative electron gain enthalpies. So the non-metallic nature increases from left to right in groups leaving noble gases.

4. Which of the following statements concerning transuranium elements is incorrect?

- a) Atomic number > 92
- b) Example is Thorium
- c) Decay radioactively as they are unstable
- d) Elements after Uranium

Answer: b

Explanation: Transuranium elements are those that come after Uranium ($Z = 92$), are unstable, and decay radioactively into other elements. However, because Thorium has an atomic number of 90, it is not a transuranium element.

5. Select the appropriate statement.

- a) Both actinoids and lanthanoids are less basic
- b) Both actinoids and lanthanoids are electropositive
- c) Both actinoids and lanthanoids do not exhibit magnetic and spectral properties
- d) Both actinoids and lanthanoids do not show same oxidation of +3

Answer: b

Explanation: In many ways, lanthanides and actinides are similar since they both entail the filling of f-orbitals. For both lanthanides and actinides, the most frequent oxidation state is +3. Both are electropositive and, as a result, very reactive. Both lanthanides and actinides have magnetic and spectroscopic characteristics.

6. What happens to the atomic size of lanthanides as the atomic number increases?

- a) The radius remains unchanged
- b) The radius first increases and then decreases
- c) The radius increases

d) The radius decreases

Answer: d

Explanation: Lanthanide contraction is the steady decrease in the atomic and ionic radii of lanthanides as the atomic number increases. It happens because the 4f electrons have a weak shielding effect.

7. Which of the following is not a lanthanide property?

a) They are soft metals with white silvery colour

b) They tarnish rapidly by air

c) The hardness of the metals increases with increase in the atomic number

d) The melting point of the metal ranges from 500-1000K

Answer: d

Explanation: Lanthanides are soft metals that are silvery white in appearance. They discolour quickly when exposed to air. As the atomic number of these metals rises, so does their ability to be harnessed. Lanthanides have melting points ranging from 1000 to 1200 degrees Celsius, whereas samarium melts at 1623 degrees Celsius.

8. What is the lanthanide's final element?

a) Ytterbium

b) Erbium

c) Thulium

d) Lutetium

Answer: d

Explanation: Erbium, Thulium, Ytterbium, and Lutetium have atomic numbers of 68, 69, 70, and 71, respectively. Lutetium, the final element in the lanthanide family, has the electrical configuration $[\text{Xe}]4f^{14}5d^16s^2$.

9. Baeyer's reagent is which of the following?

a) Acidified KMnO_4

b) Aqueous KMnO_4

c) Acidified $\text{K}_2\text{Cr}_2\text{O}_7$

d) Alkaline KMnO_4

Answer: d

Explanation: Baeyer's reagent is an alkaline KMnO_4 solution. This is a redox reaction because Baeyer's reagent is an alkaline solution of cold potassium permanganate, which is a potent oxidant. The colour of an organic material fades from purplish-pink to brown as it reacts with double or triple bonds ($-\text{C}=\text{C}-$ or $-\text{CC}-$). It's a reaction of synergistic addition.

10. AgCl fails to pass which of the following tests?

a) Alkaline test

b) Acidic test

c) Chromyl chloride test

d) Baeyer's reagent test

Answer: c

Explanation: The presence of Cl^- ions is detected using the chromyl chloride assay. Silver, lead, mercury, and antimony chlorides are covalent in nature and do not produce Cl^- ions, hence they do not pass the chromyl chloride test. Heavy metal chlorides, on the other hand, do not pass this test because they are not ionic.