

s-Block Elements

Question1

Which of the following dopant is added in silicon to obtain n-type semiconductor?

MHT CET 2025 5th May Evening Shift

Options:

A.

As

B.

B

C.

Ga

D.

In

Answer: A

Solution:

To obtain an **n-type semiconductor**, we need to dope silicon with a **pentavalent impurity** (an element from group 15), which has 5 valence electrons. Four of them form covalent bonds with surrounding Si atoms, and the extra electron becomes available as a **conduction electron**.

- **As (Arsenic)** → Group 15 (pentavalent) → produces n-type semiconductor
- **B (Boron)** → Group 13 (trivalent) → produces p-type
- **Ga (Gallium)** → Group 13 (trivalent) → produces p-type

- In (Indium) → Group 13 (trivalent) → produces p-type

✓ Correct Answer: Option A (As)

Question2

Which colour is developed to the solution when alkaline earth metals are dissolved in liquid ammonia?

MHT CET 2025 25th April Evening Shift

Options:

- A. Crimson red
- B. Orange
- C. Deep blue black
- D. Faint green

Answer: B

Solution:

Alkaline earth metals are soluble in liquid ammonia and give deep blue black coloured solutions.

Question3

Identify the element forming peroxide on reaction with oxygen.

MHT CET 2025 23rd April Morning Shift

Options:

- A. C



B. Ar

C. Na

D. He

Answer: C

Solution:

We need to identify which element forms a **peroxide** on reaction with oxygen.

- **Carbon (C):** Forms oxides like CO and CO₂, but not peroxides under normal conditions.
- **Argon (Ar):** A noble gas, chemically inert, does not form oxides.
- **Sodium (Na):** Reacts with oxygen to form sodium peroxide (Na₂O₂).
- **Helium (He):** Noble gas, inert, does not form oxides.

So the correct answer is:

Option C: Na

Question4

Which of the following is not an alkali metal?

MHT CET 2025 22nd April Morning Shift

Options:

A. Lithium

B. Potassium

C. Beryllium

D. Caesium

Answer: C

Solution:



The alkali metals are the elements in **Group 1** of the periodic table: Lithium (Li), Sodium (Na), Potassium (K), Rubidium (Rb), Caesium (Cs), and Francium (Fr).

- **Lithium (Li)** → Alkali metal
- **Potassium (K)** → Alkali metal
- **Beryllium (Be)** → *Not* an alkali metal; it belongs to **Group 2 (alkaline earth metals)**
- **Caesium (Cs)** → Alkali metal

✔ Correct Answer: Option C — Beryllium

Question5

Which from following elements form superoxide with air?

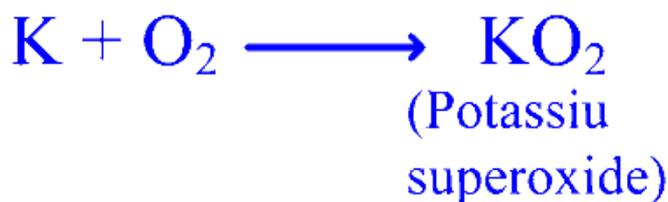
MHT CET 2025 21st April Evening Shift

Options:

- A. Li
- B. Na
- C. K
- D. Mg

Answer: C

Solution:



Question6

Identify the product when magnesium burns in air.

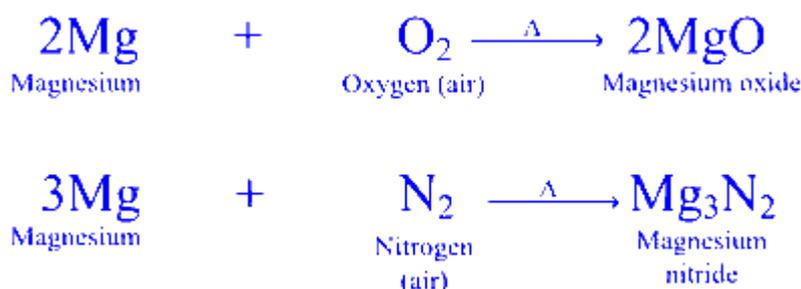
MHT CET 2025 21st April Morning Shift

Options:

- A. MgO only
- B. Mg₃ N₂ only
- C. Mg₂NO₃
- D. MgO and Mg₃ N₂

Answer: D

Solution:



Question7

Which of the following compound is used for preparation of quicklime?

MHT CET 2025 20th April Evening Shift

Options:

- A. Caustic soda
- B. Sodium carbonate

C. Calcium carbonate

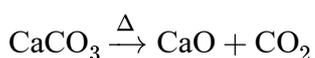
D. Magnesium carbonate

Answer: C

Solution:

We prepare **quicklime (CaO)** by heating calcium carbonate strongly.

Reaction:



Here, calcium carbonate (limestone) decomposes on heating to give **calcium oxide (quicklime)** and carbon dioxide.

Correct Option: C. Calcium carbonate

Question8

Which of the following set of elements is present in apatite?

MHT CET 2025 20th April Morning Shift

Options:

A. Mg, P and S

B. Ca, P and O

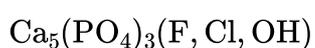
C. Al, Mg and P

D. Ca, S and O

Answer: B

Solution:

Apatite is a mineral made up of the elements calcium (Ca), phosphorus (P), and oxygen (O). Its common chemical formula is:



In this formula:

- Calcium (Ca) is present,
- Phosphorus (P) is present (as phosphate, PO_4),
- Oxygen (O) is present (in the phosphate group).

Therefore, the correct answer is:

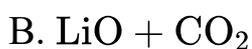
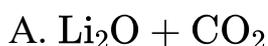
Option B: Ca, P and O

Question9

What are the products formed when Li_2CO_3 undergoes decomposition?

MHT CET 2025 19th April Morning Shift

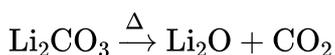
Options:



Answer: A

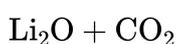
Solution:

When lithium carbonate (Li_2CO_3) is heated, it decomposes to form lithium oxide (Li_2O) and carbon dioxide (CO_2):



So, the correct answer is:

Option A



Question10

What products are obtained when beryllium oxide is treated separately with aq. HCl and aq. NaOH solutions respectively?

MHT CET 2024 16th May Evening Shift

Options:

A. BeCl_2 and $\text{Be}(\text{OH})_2$

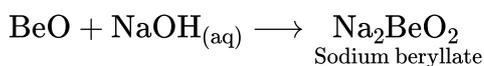
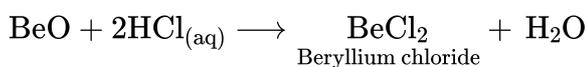
B. BeCl_2 and Na_2BeO_4

C. $\text{Be}(\text{OH})_2$ and BeCl_2

D. BeCl_2 and Na_2BeO_2

Answer: D

Solution:



Question11

Identify basic oxide from following.

MHT CET 2024 16th May Evening Shift

Options:

A. SO_3

B. NO

C. Al_2O_3

D. CaO

Answer: D

Solution:

SO_3 = Acidic oxide, NO = Neutral oxide

Al_2O_3 = Amphoteric oxide, CaO = Basic oxide

Question12

Beryllium shows diagonal relationship with

MHT CET 2024 15th May Evening Shift

Options:

A. Na

B. Mg

C. Al

D. Si

Answer: C

Solution:

Beryllium (Be) exhibits a diagonal relationship with Aluminum (Al). This diagonal relationship is a concept in chemistry where elements in the second period exhibit similarities with elements in the third period, one group to the right, as they show similar charge/radius ratios and hence similar chemical behavior.

Electronic Configuration: Beryllium: $1s^2 2s^2$, Aluminum: $1s^2 2s^2 2p^6 3s^2 3p^1$

Ionic Sizes: The ionic radii are similar, making their behavior in terms of polarizing power comparable.

Chemical Properties:

Both form covalent compounds and exhibit amphoteric behavior (i.e., they can react with both acids and bases).

Both beryllium and aluminum form complexes with ligands, such as in beryllium fluoride (BeF_2) and aluminum chloride (AlCl_3).

The diagonal relationship observed in the periodic table accounts for these shared properties. Therefore, the correct option is **Option C: Al**.



Question13

Which from following compounds is obtained as by product in synthesis of sodium carbonate by Solvay process?

MHT CET 2024 15th May Morning Shift

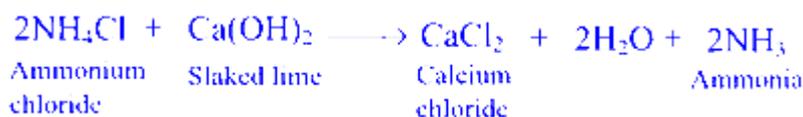
Options:

- A. Ammonium carbonate
- B. Sodium bicarbonate
- C. Calcium Chloride
- D. Ammonium Chloride

Answer: C

Solution:

During the second stage of Solvay process, NH_4Cl is treated with slaked lime to recover NH_3 and CaCl_2 is obtained as a by-product.



Question14

Which of the following element in +1 oxidation state has largest ionic radius?

MHT CET 2024 11th May Evening Shift

Options:

- A. Rb
- B. K
- C. Na
- D. Li

Answer: A

Solution:

The ionic radius of alkali metals increases down the group. The number of occupied shells in Rb^+ (4 shells) is more than that in K^+ (3 shells), Na^+ (2 shells) and Li^+ (1 shell). Thus, it experiences smaller effective nuclear charge.

∴ Rb^+ has largest ionic radius than among other elements.

Question15

Which of the following elements does not react with water to form metal hydroxide?

MHT CET 2024 9th May Evening Shift

Options:

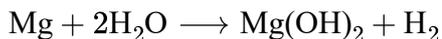
- A. Mg
- B. Ca
- C. Be
- D. Sr

Answer: C

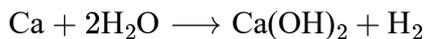
Solution:

The element that does not react with water to form metal hydroxide is beryllium (Be). Here is an explanation of the behavior of each element listed:

Magnesium (Mg): Reacts slowly with water at room temperature, but the reaction is more pronounced with steam, forming magnesium hydroxide (Mg(OH)_2) and hydrogen gas.

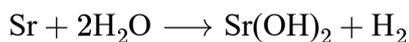


Calcium (Ca): Reacts readily with water to produce calcium hydroxide (Ca(OH)_2) and hydrogen gas.



Beryllium (Be): Does not react with water to form a metal hydroxide due to its high ionization energy and the formation of a stable surface oxide layer that prevents further reactions.

Strontium (Sr): Reacts with water to form strontium hydroxide (Sr(OH)_2) and hydrogen gas.



Therefore, the correct answer is option C: Be.

Question16

Which of the following colours is developed when alkali metal is dissolved in liquid ammonia?

MHT CET 2024 4th May Morning Shift

Options:

- A. dark red
- B. violet
- C. deep blue
- D. green

Answer: C

Solution:

The color that develops when an alkali metal is dissolved in liquid ammonia is **deep blue**. This occurs due to the formation of solvated electrons. When an alkali metal is dissolved in ammonia, it dissociates into positive metal cations and solvated electrons. These free electrons absorb visible light and give the solution a characteristic deep blue color. As the concentration of the metal increases, the color may change, eventually switching to a metallic bronze as the solution becomes more concentrated.



Question17

Which of the following does not react with cold or hot water?

MHT CET 2024 3rd May Evening Shift

Options:

A. Ba

B. Ca

C. Sr

D. Be

Answer: D

Solution:

In the series of alkaline earth metals (Group 2 elements), reactivity with water increases as you move down the group. Therefore, barium (Ba), calcium (Ca), and strontium (Sr) react with water, either cold or hot. However, beryllium (Be) does not react with water under normal conditions, whether cold or hot, due to its stable and resistant oxide layer that prevents reaction.

Therefore, the answer is:

Option D: Be

Question18

Which compound is used in medicine as barium meal for intestinal x-ray?

MHT CET 2024 2nd May Evening Shift

Options:

A. Barium chloride



B. Barium sulphate

C. Barium sulphide

D. Barium nitrate

Answer: B

Solution:

To determine which compound is used as a **barium meal** for intestinal X-ray examinations, we need to understand what a barium meal is and the properties required for the compound used in this medical procedure.

What is a Barium Meal?

A **barium meal** is a diagnostic test used in radiology to visualize the **esophagus, stomach, and small intestine** on X-ray images. The patient ingests a preparation containing a barium compound, which coats the lining of the gastrointestinal (GI) tract, making it visible under X-ray due to the high atomic number of barium, which effectively absorbs X-rays.

Requirements for the Barium Compound:

Radiopacity:

The compound must be opaque to X-rays to provide a clear contrast between the GI tract and surrounding tissues.

Barium, with an atomic number of 56, is highly effective at absorbing X-rays.

Insolubility in Water:

The compound should be **insoluble** in water to prevent absorption into the bloodstream.

Soluble barium compounds are **toxic**, as barium ions can interfere with muscle function, including the heart.

Chemical Stability:

The compound must be chemically stable and not react with substances in the GI tract.

Non-Toxicity:

It should be non-toxic when ingested, considering its passage through the digestive system.

Analysis of Given Options:

Option A: Barium Chloride (BaCl_2)

Solubility: Soluble in water.

Toxicity: Highly toxic if ingested due to the release of free barium ions.

Conclusion: Not suitable for use as a barium meal.

Option B: Barium Sulphate (BaSO_4)

Solubility: Insoluble in water (very low solubility).

Toxicity: Non-toxic when ingested in this form because it does not dissolve and release barium ions.

Radiopacity: Highly opaque to X-rays.

Conclusion: Ideal for use as a barium meal.

Option C: Barium Sulphide (BaS)

Solubility: Soluble in water.

Toxicity: Toxic due to the release of barium ions and formation of hydrogen sulfide gas in the stomach.

Conclusion: Not suitable for use as a barium meal.

Option D: Barium Nitrate ($\text{Ba}(\text{NO}_3)_2$)

Solubility: Soluble in water.

Toxicity: Toxic if ingested; soluble barium compounds release harmful barium ions.

Conclusion: Not suitable for use as a barium meal.

Why Barium Sulphate is Used:

Insolubility Ensures Safety:

The **insolubility** of barium sulphate prevents it from being absorbed into the bloodstream, thus avoiding systemic toxicity.

Effective Contrast Agent:

Provides a clear contrast on X-ray images due to its high atomic number.

Passes Through the GI Tract:

It moves through the digestive system without being metabolized, eventually excreted unchanged.

Conclusion:

Among the given options, **barium sulphate** (BaSO_4) is the compound used in medicine as a barium meal for intestinal X-ray examinations. Its insolubility and radiopacity make it safe and effective for this purpose.

Answer: Option B

Question19



Which element from following is used in photoelectric cells?

MHT CET 2024 2nd May Morning Shift

Options:

A. Li

B. Be

C. Cs

D. Mg

Answer: C

Solution:

Cesium (Cs) is the element commonly used in photoelectric cells. Cesium has a relatively low ionization energy, which makes it easy for electrons to be emitted when exposed to light. This property is crucial for the photoelectric effect, where light is used to knock electrons off a material to generate an electric current.

In summary, the element from the options provided that is used in photoelectric cells is:

Option C: Cs (Cesium)

Question20

Which element from following rapidly loses its luster in air and tarnishes?

MHT CET 2023 14th May Evening Shift

Options:

A. Ba

B. Be

C. K



D. Mg

Answer: C

Solution:

The correct answer is Option C, K, which stands for potassium.

Potassium is an alkali metal and is highly reactive, especially with oxygen in the air. It reacts rapidly with atmospheric oxygen to form potassium oxide and other compounds, which causes the metal to tarnish or lose its luster quickly. This reaction can be so rapid that potassium must be stored under oil or in an inert atmosphere to prevent it from tarnishing or becoming a fire hazard.

In contrast, some of the other elements mentioned have a slower reaction with air:

Option A, Ba (Barium), is an alkaline earth metal and does oxidize in air, but not as rapidly as potassium.

Option B, Be (Beryllium), is a relatively inert metal and does not tarnish quickly. It forms an oxide layer that protects it from further corrosion.

Option D, Mg (Magnesium), is another alkaline earth metal that is more reactive than beryllium but forms a protective oxide layer which somewhat slows down further oxidation.

The reactivity of these metals with air increases from beryllium (least reactive), to magnesium, to barium, and then to potassium (most reactive).

Question21

Which element from following exhibits common oxidation state +2 ?

MHT CET 2023 14th May Morning Shift

Options:

A. Sr

B. Rb

C. Na

D. Li

Answer: A

Solution:



The element from the options provided that commonly exhibits an oxidation state of +2 is Strontium (Sr). Let's elaborate on this answer.

Strontium belongs to the group 2 elements of the periodic table, which are also known as the alkaline earth metals. Elements in this group typically lose two electrons to form ions with a +2 charge in order to achieve a noble gas configuration. This means that Sr^{2+} is the common ion formed by strontium when it reacts with nonmetals or in other chemical reactions where it is oxidized.

Now, let's consider the other options:

- Rubidium (Rb) - This is an alkali metal that belongs to group 1 of the periodic table. Alkali metals typically have an oxidation state of +1 due to the loss of their single valence electron to form a cation (Rb^+).
- Sodium (Na) - Similar to rubidium, sodium is also an alkali metal and typically loses one electron to form an Na^+ ion with a +1 oxidation state.
- Lithium (Li) - Lithium is the lightest metal and the first element in the alkali metals group. Like the other group 1 elements, it exhibits an oxidation state of +1 when it forms a Li^+ ion.

In summary, Sr most commonly exhibits the +2 oxidation state, making option A (Sr) the correct answer to the question.

Question22

Identify alkaline earth metal from following.

MHT CET 2023 13th May Evening Shift

Options:

- A. Rb
- B. Sr
- C. Fr
- D. Cs

Answer: B

Solution:

Group 2 elements are commonly called as alkaline earth metals. Among the given options only strontium (Sr) belongs to group 2. So, Sr is an alkaline earth metal.



Question23

Which from following properties is exhibited by group 2 elements?

MHT CET 2023 13th May Morning Shift

Options:

- A. Act as inert elements in +1 state.
- B. Form MH_2 type hydrides with hydrogen on heating.
- C. Elements at the top in the group catch fire when kept on water.
- D. Reducing power of these elements is more than group I elements.

Answer: B

Solution:

All the metals of group 2, except beryllium, when heated with hydrogen form MH_2 type hydrides. Hence, statement (B) is correct. Elements of group 2 elements act as inert elements in +2 state. Elements at the top in the group 2 do not catch fire when kept on water. Reducing power of group 2 elements is less than group 1 elements. Hence, statements (A), (C) and (D) are incorrect.

Question24

Which element from following exhibits diagonal relationship with Mg ?

MHT CET 2023 12th May Morning Shift

Options:

- A. Be
- B. Li



C. Na

D. B

Answer: B

Solution:

Correct option: B — Li

Reason: Magnesium (**Mg** , Group 2, Period 3) shows a **diagonal relationship with Lithium (Li)** (Group 1, Period 2). Diagonal pairs like **Li–Mg** , **Be–Al** , and **B–Si** have similar ionic size/charge density and hence similar chemical behavior.

Question25

Identify the element having general electronic configuration ns^1 from following.

MHT CET 2023 11th May Evening Shift

Options:

A. Ca

B. Sr

C. Ba

D. Fr

Answer: D

Solution:

The general electronic configuration ns^1 is of group 1 elements. Among the given elements, francium (Fr) belongs to group 1.

Question26



Which of the following is a property of alkali metals?

MHT CET 2023 11th May Morning Shift

Options:

- A. High density
- B. Compounds are paramagnetic
- C. Form dipositive ions only
- D. Most electropositive elements

Answer: D

Solution:

Alkali metals are the most electropositive elements and have low density. Alkali metals can lose their one valence shell electron and form unipositive ions with no unpaired electrons. Hence, they form diamagnetic compounds.

Question27

Which from following compounds is obtained when carbon dioxide gas bubbled through slaked lime solution?

MHT CET 2023 10th May Evening Shift

Options:

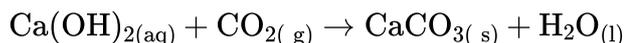
- A. $\text{CaCO}_3(s)$
- B. $\text{CaCl}_2(aq)$
- C. $\text{CaSO}_4(s)$
- D. $\text{NaCl}(aq)$



Answer: A

Solution:

When carbon dioxide is bubbled through solution of calcium hydroxide (slaked lime), water insoluble solid calcium carbonate is formed.



Question28

Which among the following statements of group-1 elements is NOT true?

MHT CET 2023 10th May Morning Shift

Options:

- A. Unipositive ions have inert gas configuration.
- B. Compounds of unipositive ions are paramagnetic.
- C. These form colourless compounds in +1 state.
- D. These have high negative values of standard reduction potential.

Answer: B

Solution:

The statement that is NOT true among the choices given for group-1 elements is:

Option B: Compounds of unipositive ions are paramagnetic.

Explanation:

Group 1 elements, also known as the alkali metals, include lithium, sodium, potassium, rubidium, cesium, and francium. These elements are characterized by having a single valence electron in their outer shell which they can lose easily to form cations with a +1 charge, known as unipositive ions.

Let's review each statement:

Option A: Unipositive ions have inert gas configuration.

This statement is true. When group-1 elements lose one electron, they form ions with the same electron configuration as the nearest noble gas (inert gas) in the periodic table. For example, when sodium (Na) loses an electron, it forms a Na^+ ion, which has the same electron configuration as neon (Ne), a noble gas.

Option B: Compounds of unipositive ions are paramagnetic.

This statement is not true and is the incorrect option in context. Paramagnetism arises due to the presence of unpaired electrons in the atomic or molecular electron configuration. Group 1 ions in the +1 oxidation state have full electron shells with no unpaired electrons, so they are diamagnetic rather than paramagnetic. Compounds formed by these ions, such as sodium chloride (NaCl), also do not exhibit paramagnetism because the ions involved have all paired electrons in their structure.

Option C: These form colorless compounds in +1 state.

This statement is generally true. The compounds formed by group 1 elements in the +1 oxidation state are typically colorless when dissolved in water or in the solid state. This is because the energy levels required to excite the electrons to higher energy states – and thus absorb visible light – are too high to be affected by visible light.

Option D: These have high negative values of standard reduction potential.

This statement is true. Group 1 elements have high negative standard reduction potentials, which means that they readily lose electrons to form cations. This is consistent with their position in the reactivity series of metals, where they are known to be highly reactive and easily oxidized.

Question29

Which element from following exhibits diagonal relationship with beryllium?

MHT CET 2023 9th May Evening Shift

Options:

- A. B
- B. Na
- C. Mg
- D. Al

Answer: D

Solution:

Diagonal relationship



Group	2	13
Period 2	Be ←	B
Period 3	Mg	→ Al

Question30

What different elements are found in baryte?

MHT CET 2023 9th May Evening Shift

Options:

- A. Ca, S, O
- B. Zn, S, O
- C. Ba, S, O
- D. Mg, S, H, O

Answer: C

Solution:

Baryte, a mineral composed of barium sulfate (BaSO_4), falls under the study of s-block elements because barium is an s-block element. This chapter would typically cover the properties, compounds, and uses of s-block elements, including barium, and how they form various compounds like barium sulfate.

Question31

Which from following statements is NOT correct?

MHT CET 2023 9th May Morning Shift

Options:

- A. All alkali metals are silvery white.
- B. Density of potassium is less than sodium.
- C. Compounds of group-1 elements are diamagnetic.
- D. Melting point of group-1 elements increase down the group.

Answer: D

Solution:

Melting point of group-1 elements decreases down the group.

Question32

Identify the products obtained when chlorine reacts with hot and conc. NaOH.

MHT CET 2022 11th August Evening Shift

Options:

- A. NaClO₃, NaCl and H₂O
- B. NaCl and HOCl
- C. Na₂O and NaCl
- D. NaOCl and H₂O

Answer: A

Solution:



Question33

Which from following elements does NOT react with water?

MHT CET 2022 11th August Evening Shift

Options:

A. Ca

B. Sr

C. Be

D. Mg

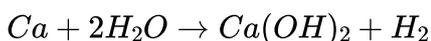
Answer: C

Solution:

The element that does not react with water at room temperature among the options provided is Beryllium (Be), option C. Calcium (Ca), Strontium (Sr), and Magnesium (Mg) can all react with water, though Magnesium's reaction is very slow and often requires heat to be noticeable at room temperature.

Beryllium is an alkaline earth metal, and it is the least reactive among the group 2 elements. While other alkaline earth metals like calcium and strontium will react with water to form hydroxides and release hydrogen gas, beryllium does not react with water even when heated. It is protected by an oxide layer that forms on the surface, which prevents it from reacting with water. The reactions for Ca and Sr with water are as follows:

For Calcium (Ca):



For Strontium (Sr):



For Magnesium (Mg), the reaction with water is slower, and it usually occurs with hot water or steam:



Consequently, the correct answer to the question is Option C, Beryllium (Be).

Question34

Which of the following is an alkali metal?

MHT CET 2021 24th September Evening Shift

Options:

A. Ba

B. Cs

C. Ca

D. Sr

Answer: B

Solution:

The correct answer is Option B: Cs.

Let's elaborate on why Cesium (Cs) is an alkali metal. The periodic table is divided into various groups, and the alkali metals belong to Group 1. Alkali metals are characterized by having a single electron in their outermost shell, which makes them highly reactive. They are typically soft and have low melting points compared to most other metals.

Here is a brief about the given options:

Option A: Ba (Barium) - This is an alkaline earth metal and belongs to Group 2 of the periodic table. It is not an alkali metal.

Option B: Cs (Cesium) - This is indeed an alkali metal and belongs to Group 1 of the periodic table. It is the correct answer.

Option C: Ca (Calcium) - This is also an alkaline earth metal and belongs to Group 2 of the periodic table. It is not an alkali metal.

Option D: Sr (Strontium) - This is yet another alkaline earth metal and belongs to Group 2 of the periodic table. It is not an alkali metal.

Therefore, among the given options, Cesium (Cs) is the alkali metal.

Question35

Which of the following is an alkali metal?

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Options:

A. Barium

B. Rubidium

C. Strontium

D. Gallium

Answer: B

Solution:

The correct answer is:

B. Rubidium

Explanation:

Alkali metals belong to **Group 1** of the periodic table (Li, Na, K, Rb, Cs, Fr). Among the options given, **Rubidium (Rb)** is the only alkali metal.

- Barium → alkaline earth metal (Group 2)
- Strontium → alkaline earth metal (Group 2)
- Gallium → Group 13 metal

✓ **Rubidium**

Question36

All the elements of group 2 react with water to form metal hydroxide and hydrogen, except the element

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Options:

A. Barium

B. Calcium

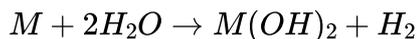
C. Magnesium

D. Beryllium

Answer: D

Solution:

In Group 2 of the periodic table, the elements are known as the alkaline earth metals. They generally react with water to form metal hydroxides and hydrogen gas:



where M represents a Group 2 metal.

The reactivity of these metals with water increases as you move down the group. Here is a breakdown of their behavior:

- **Barium (Ba):** Reacts vigorously with water.
- **Calcium (Ca):** Reacts readily with water.
- **Magnesium (Mg):** Reacts slowly with cold water but rapidly with boiling water.
- **Beryllium (Be):** Does not react with water under normal conditions.

The element that does not react with water among the options given is **Option D: Beryllium**.

Question37

Which of the following is NOT true for alkaline earth metals?

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Options:

- A. Their divalent ions have inert gas configuration.
- B. They are more electropositive than alkali metals
- C. Alkaline earth metals are silvery white and soft.
- D. Their compounds are diamagnetic and colourless.

Answer: B

Solution:

For the alkaline earth metals :



Option A is true. When alkaline earth metals lose their two outermost electrons to form divalent ions, they attain an inert gas configuration.

Option B is NOT true. Alkali metals are more electropositive than alkaline earth metals.

Option C is true. Alkaline earth metals are generally silvery-white and somewhat soft (though harder than alkali metals).

Option D is true. Compounds of alkaline earth metals are usually colorless and diamagnetic due to the absence of unpaired electrons.

So, the correct answer to the question is :

Option B : They are more electropositive than alkali metals.

Question38

**Identify metal halide from following having highest ionic character?
(M = metal atom)**

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Options:

A. MF

B. MBr

C. MI

D. MCl

Answer: A

Solution:

Ionic character of metal halides decreases in the order : $MF > MCl > MBr > MI$

Question39

Which among the following statements is NOT true?

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Options:

- A. Compounds of unipositive ions of alkali metals are paramagnetic.
- B. Alkali metals have low density.
- C. All alkali metals are silvery white and soft.
- D. Alkali metals are most electropositive elements.

Answer: A

Solution:

Compounds of unipositive ions of alkali metals are diamagnetic.

Question40

How many water molecules are present in formula of crystalline chloride of lithium?

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Options:

- A. 4
- B. 3
- C. 1
- D. 2

Answer: D

Solution:

Formula of Crystalline chloride of lithium \Rightarrow $\text{LiCl} \cdot 2\text{H}_2\text{O}$

Question41

What is the formula of hydrolith?

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Options:

A. MgH_2

B. BaH_2

C. BeH_2

D. CaH_2

Answer: D

Solution:

CaH_2 is the formula of hydrolith. It is a salt like binary compound (CaH_2) used as a reducing agent and source of hydrogen and also known as calcium hydride.

Question42

The diagonal relationship in Be and Al is due to

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Options:

A. similar ionisation enthalpy

B. similar metallic character



C. similar ionic size and charge/radius ratio

D. similar electronegativity

Answer: C

Solution:

The diagonal relationship in Be and Al is due to similar ionic size and charge/radius ratio. Generally, on moving from left to right across a period, the ionic charge increases to maximum and then decreases, while the ionic size decreases, causing an increase in its polarising power (Fajan's rule). On the other hand, on moving down a group the ionic charge remains the same while ionic size increases. Therefore, polarising power decreases. On moving diagonally, these two effects partly balance each other and therefore, there is no marked change in their properties.

Question43

Which of following elements does not form amide when reacted with ammonia?

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Options:

A. Li

B. Na

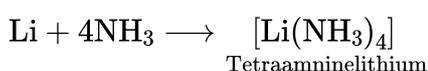
C. K

D. Rb

Answer: A

Solution:

Lithium doesn't form amide when reacted with ammonia. It forms tetraamminelithium, $\text{Li}(\text{NH}_3)_4$. The equation for the reaction is as follows:



Question44

Which among the following sets of compounds is used as raw material for the preparation of sodium carbonate by Solvay process?

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Options:

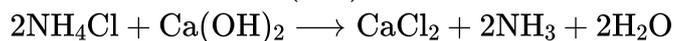
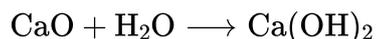
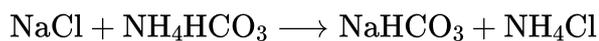
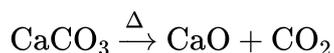
- A. NaOH, HCl, CO₂
- B. NH₄Cl, H₂O, NaCl
- C. NaCl, NH₃, Ca(OH)₂
- D. NaCl, CaCO₃, H₂SO₄

Answer: C

Solution:

For the preparation of sodium carbonate by Solvay process, raw materials used are NaCl, NH₃ and Ca(OH)₂ (for CO₂).

The process involves the following reactions.



Most of the NH₃ can be recovered in the process.

Question45

What happens when ionic hydrides of *s*-block elements in molten state are electrolysed?

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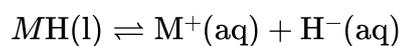
Options:

- A. Hydride ion migrates at cathode
- B. Dihydrogen is liberated at cathode
- C. Hydride ion reforms metal hydride
- D. Dihydrogen is liberated at anode

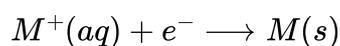
Answer: D

Solution:

When ionic hydrides of *s*-block elements are subjected to electrolysis, dihydrogen gas is liberated at anode which confirms the existence of hydrogen in the form of hydride ion (H^-). Following reactions takes place:



At cathode



At anode

