Chhattisgarh Board Class 12 2026 Chemistry Question Paper with Solutions

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1. Which of the following is a colligative property?

(a) Osmotic pressure
(b) Vapour pressure
(c) Boiling point
(d) All of the above

Correct Answer: (a) Osmotic pressure

Solution:

Step 1: Understanding the Concept:
Colligative properties depend on the number of solute particles in a solution and not on their nature. Osmotic pressure is one of these properties. It depends on the number of solute particles present in the solution. The other options, vapor pressure and boiling point, are also affected by concentration but are not classified as colligative properties.

Step 2: Detailed Explanation:
- Osmotic pressure is directly related to the concentration of solute particles in a solution, making it a colligative property. - Vapor pressure and boiling point are influenced by solute concentration but are not typically categorized as colligative properties.
Step 3: Final Answer:
Thus, the correct answer is (a) Osmotic pressure.

Quick Tip

Osmotic pressure is considered a colligative property because it depends solely on the number of solute particles in the solution, not their type.

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2. The unit of specific conductivity is:

(a) ohm^{-1}
(b) $\text{ohm}^{-1}\ \text{cm}^{-1}$
(c) ohm cm
(d) ohm cm^{-1}

Correct Answer: (b) $\text{ohm}^{-1}\ \text{cm}^{-1}$

Solution:

Step 1: Understanding the Concept:
Specific conductivity (also called molar conductivity) is a property of a solution that measures its ability to conduct electricity. It is defined as the conductivity of a solution per unit length and cross-sectional area. The unit of conductivity is ohm^{-1} cm^{-1} because conductivity is inversely related to resistance, and resistance has units of ohms.
Step 2: Detailed Explanation:
- The unit of conductivity is ohm^{-1}, but specific conductivity takes into account the length of the conductor (in centimeters), hence it is expressed as ohm^{-1} cm^{-1}. - Other options listed, such as ohm cm and ohm cm^{-1}, are incorrect because they don't correspond to the definition of specific conductivity.
Step 3: Final Answer:
Thus, the correct answer is (b) ohm^{-1} cm^{-1}.

Quick Tip

Specific conductivity is measured in ohm^{-1} cm^{-1} because it reflects the solution's ability to conduct electricity per unit length and area.

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3. The correct form of the Arrhenius equation is:

(a) $k = e^{-E_a/RT}$
(b) $k = \frac{E_a}{RT}$
(c) $k = \log_e \frac{E_a}{R}$
(d) $k = Ae^{-E_a/RT}$

Correct Answer: (d) $k = Ae^{-E_a/RT}$

Solution:

Step 1: Understanding the Concept:
The Arrhenius equation describes the temperature dependence of reaction rates. It is given by the formula:

$$k = Ae^{-\frac{E_a}{RT}}$$

Where: - k is the rate constant. - A is the pre-exponential factor (frequency factor). - E_a is the activation energy. - R is the universal gas constant. - T is the temperature in Kelvin.
Step 2: Detailed Explanation:
- The correct form of the Arrhenius equation, option (d), expresses the rate constant k in terms of the exponential function, with A being a constant and E_a being the activation energy. -

Option (a) is incorrect because it lacks the pre-exponential factor A. - Option (b) is incorrect because it does not have the exponential form. - Option (c) is incorrect as it is not a valid expression for the Arrhenius equation.
Step 3: Final Answer:
Thus, the correct answer is (d) $k = Ae^{-E_a/RT}$.

Quick Tip

The Arrhenius equation describes how the rate constant k changes with temperature, where the exponential term accounts for the activation energy and temperature dependence.

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4. Chromium belongs to which block?

(a) s-block
(b) p-block
(c) d-block
(d) f-block

Correct Answer: (c) d-block

Solution:

Step 1: Understanding the Concept:
Chromium (Cr) is an element in the periodic table with atomic number 24. It is a transition metal, which means it belongs to the d-block of the periodic table. The d-block elements are those elements where the penultimate electron enters the d-orbital.
Step 2: Detailed Explanation:
- Chromium belongs to the d-block because it is a transition metal, and transition metals are located in the d-block of the periodic table. - The s-block elements are those in which the last electron is added to the s-orbital, while the p-block contains elements with the last electron in the p-orbital. Chromium does not belong to either of these blocks, as it has electrons in the d-orbital.
Step 3: Final Answer:
Thus, the correct answer is (c) d-block.

Quick Tip

The d-block contains the transition metals, which include elements like Chromium, Iron, and Copper. These elements have partially filled d-orbitals in their ground state or in their common oxidation states.

5. The oxidation number of nickel in $[Ni(CO)_4]$ will be:

(a) 1
(b) 0
(c) 2
(d) 3

Correct Answer: (b) 0

Solution:

Step 1: Understanding the Concept:
In the complex $[Ni(CO)_4]$, nickel (Ni) is coordinated with four carbon monoxide (CO) ligands. CO is a neutral ligand, meaning it does not contribute any charge to the overall charge of the complex.
Step 2: Detailed Explanation:
- In a neutral molecule like $[Ni(CO)_4]$, the sum of the oxidation states of all components must be zero. - The CO ligands are neutral, so they do not affect the oxidation number of Ni. - Therefore, the oxidation number of nickel (Ni) in this complex must be 0 to balance the charge of the neutral complex.
Step 3: Final Answer:
Thus, the oxidation number of nickel in $[Ni(CO)_4]$ is 0. Hence, the correct answer is (b) 0.

Quick Tip

In coordination compounds, neutral ligands like CO do not affect the oxidation state of the central metal ion. Therefore, the oxidation number of nickel in $[Ni(CO)_4]$ is zero.

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6. Ethylidene dichloride is a:

(a) vic-dihalide
(b) gem-dihalide
(c) allylic dihalide
(d) vinylic halide

Correct Answer: (b) gem-dihalide

Solution:

Step 1: Understanding the Concept:
Ethylidene dichloride is a compound where two chlorine atoms are attached to the same carbon atom of an ethyl group (C_2H_5). This structure is called a gem-dihalide.
Step 2: Detailed Explanation:
- Vic-dihalide refers to a compound where the two halogen atoms are attached to adjacent carbon atoms in the molecule. - Gem-dihalide refers to a compound where the two halogen atoms are attached to the same carbon atom. - Allylic dihalide and vinylic halide describe specific types of halide compounds with respect to their positions relative to double bonds, but they are not applicable in this case.
Step 3: Final Answer:
Thus, the correct answer is (b) gem-dihalide.

Quick Tip

Gem-dihalides have two halogen atoms attached to the same carbon atom, whereas vic-dihalides have them attached to adjacent carbon atoms.

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7. Which is used for poisoning the alcohol?

(a) Methyl alcohol
(b) Ethyl alcohol
(c) Glycerine
(d) Acetic acid

Correct Answer: (a) Methyl alcohol

Solution:

Step 1: Understanding the Concept:
Methyl alcohol, also known as methanol (CH_3OH), is toxic and is commonly used to poison alcohol. It is often added to industrial alcohol to prevent its consumption, hence the term "methylated spirits" for these mixtures.
Step 2: Detailed Explanation:
- Methyl alcohol (methanol) is toxic when consumed and causes poisoning, leading to symptoms like headache, dizziness, and even blindness if ingested in large amounts. - Ethyl alcohol (ethanol), on the other hand, is the alcohol typically consumed in beverages and is not poisonous in moderate amounts. - Glycerine is a non-toxic alcohol used in various pharmaceutical products and cosmetics. - Acetic acid is a weak acid commonly found in vinegar and does not cause alcohol poisoning.
Step 3: Final Answer:
Thus, the correct answer is (a) Methyl alcohol.

Quick Tip

Methyl alcohol (methanol) is poisonous, and it is often added to industrial alcohol to prevent its consumption due to its toxic effects.

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8. IUPAC name of CH_3COOH is:

(a) Ethanol
(b) Ethanoic acid
(c) Ethanal
(d) Ethane

Correct Answer: (b) Ethanoic acid

Solution:

Step 1: Understanding the Concept:
The IUPAC name of CH_3COOH is determined based on the structure and functional group present in the compound. CH_3COOH represents acetic acid, where the molecule consists of a two-carbon chain (ethane) with a carboxyl group (-COOH) attached to one of the carbons.
Step 2: Detailed Explanation:
- Ethanol (Option a) is an alcohol with the formula C_2H_5OH, not acetic acid. - Ethanoic acid (Option b) is the correct IUPAC name for acetic acid, where the carboxyl group is attached to an ethyl group (C_2H_5). - Ethanal (Option c) is the IUPAC name for acetaldehyde (CH_3CHO), which is different from acetic acid. - Ethane (Option d) is a simple alkane (C_2H_6) and does not represent acetic acid.
Step 3: Final Answer:
Thus, the correct answer is (b) Ethanoic acid.

Quick Tip

Ethanoic acid, commonly known as acetic acid, has the IUPAC name derived from the parent hydrocarbon "ethane" with a carboxyl group (-COOH) attached.

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9. Hinsberg reagent is:

(a) $C_6H_5SO_2Cl$
(b) $C_6H_5N_2Cl$
(c) C_6H_5NO

(d) $C_6H_5SO_3H$

Correct Answer: (a) $C_6H_5SO_2Cl$

Solution:

Step 1: Understanding the Concept:
Hinsberg reagent is a chemical used in the identification of primary, secondary, and tertiary amines. The reagent is benzenesulfonyl chloride ($C_6H_5SO_2Cl$), which reacts with amines to form sulfonamide derivatives, helping in distinguishing between different types of amines.
Step 2: Detailed Explanation:
- $C_6H_5SO_2Cl$ (Option a) is benzenesulfonyl chloride, which is the Hinsberg reagent used in the test for amines. - $C_6H_5N_2Cl$ (Option b) is diazonium chloride, which is not the Hinsberg reagent. - C_6H_5NO (Option c) is nitrosobenzene, unrelated to the Hinsberg test. - $C_6H_5SO_3H$ (Option d) is benzenesulfonic acid, not used in the Hinsberg test.
Step 3: Final Answer:
Thus, the correct answer is (a) $C_6H_5SO_2Cl$.

Quick Tip

Hinsberg reagent (benzenesulfonyl chloride) is used to distinguish primary, secondary, and tertiary amines by reacting with them to form sulfonamide derivatives.

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10. The value of temperature coefficient is usually between:

(a) 1 to 4
(b) 2 to 3
(c) 1 to 3
(d) 2 to 4

Correct Answer: (b) 2 to 3

Solution:

Step 1: Understanding the Concept:
The temperature coefficient refers to the change in a physical property (such as resistance) per degree change in temperature. For most materials, the temperature coefficient lies between 2 to 3, meaning that for every degree Celsius change in temperature, the physical property changes by 2 to 3 times its value at a reference temperature.
Step 2: Detailed Explanation:
- The temperature coefficient of resistance for conductors typically lies between 2 and 3, meaning

that the resistance of most conductors increases by a factor of 2 to 3 with every degree rise in temperature. - Option (a), "1 to 4", is too broad and does not accurately reflect the typical range for most substances. - Option (c), "1 to 3", is also incorrect as the lower range (1) does not reflect the typical values for conductors. - Option (d), "2 to 4", overestimates the upper limit for most materials.

Step 3: Final Answer:

Thus, the correct answer is (b) 2 to 3.

Quick Tip

For most materials, especially metals, the temperature coefficient lies between 2 to 3, meaning their resistance increases by a factor of 2 to 3 with each degree Celsius increase in temperature.
