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CLASS 10 · CHEMISTRY

Organic Chemistry

Chapter 11 · Solved MCQs with Explanations

85	9	✔
Solved MCQs	Topic Sections	Answers Highlighted

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1 Introduction & Historical Background

Section 1 of 9 · 5 Questions

Q1 **Who put forward the "Vital Force Theory"?**

A Lavoisier

B Wohler

C **Jacob Berzelius** ✓

D Kolbe

✓ Correct Answer: C) Jacob Berzelius

Explanation: In the early 19th century, Swedish chemist Jacob Berzelius proposed that organic compounds could only be created by living organisms under the influence of a mysterious "Vital Force."

Q2 **In which year was the Vital Force Theory finally disproved?**

A 1800

B **1828** ✓

C 1845

D 1900

✓ Correct Answer: B) 1828

Explanation: The theory was shattered in 1828 when Friedrich Wohler accidentally synthesized urea in a laboratory, proving that organic compounds could be made from inorganic substances without any "life force."

Q3 **Wohler synthesized urea by heating which inorganic compound?**

- **A** **Ammonium cyanate** ✓
- **B** Ammonium sulphate
- **C** Acetic acid
- **D** Carbon dioxide

✓ Correct Answer: A) Ammonium cyanate

Explanation: Wohler heated ammonium cyanate (NH_4CNO), which rearranged itself to form urea (NH_2CONH_2), an organic compound found in urine.

Q4 **Who synthesized acetic acid in the laboratory in 1845, further disproving the Vital Force Theory?**

- **A** Wohler
- **B** Lavoisier
- **C** **Kolbe** ✓
- **D** Berzelius

✓ Correct Answer: C) Kolbe

Explanation: In 1845, Kolbe successfully prepared acetic acid in a lab, which added to the growing evidence that organic compounds follow the same chemical laws as inorganic ones.

Q5 **What does the word "organic" originally signify?**

- **A** Derived from minerals
- **B** **Derived from life** ✓
- **C** Derived from gases
- **D** Derived from water

✓ Correct Answer: B) Derived from life

Explanation: Historically, the term was used for compounds obtained from plants and animals (living organisms), so the word "organic" means "life."

2 Definitions & Formulas

Section 2 of 9 · 9 Questions

Q6 **Which of the following is the modern definition of organic compounds?**

A Compounds made only of carbon and oxygen

B **Hydrocarbons and their derivatives containing covalently bonded carbon** ✓

C Compounds found only in living organisms

D Compounds containing ionic bonds

✓ Correct Answer: B) Hydrocarbons and their derivatives containing covalently bonded carbon

Explanation: Today, organic chemistry is defined by the presence of covalently bonded carbon atoms, not by its origin. It includes hydrocarbons and all their derivatives.

Q7 **Why are carbonates and bicarbonates NOT considered organic compounds?**

A They lack carbon

B **They have ionic bonds and properties different from organic compounds** ✓

C They are found only in rocks

D They contain oxygen

✓ **Correct Answer: B) They have ionic bonds and properties different from organic compounds**

Explanation: Although they contain carbon, compounds like carbonates, bicarbonates, and oxides of carbon have ionic properties and behave entirely differently from standard organic compounds.

Q8 **The formula that represents the actual number of atoms in one molecule of a compound is called the:**

A Structural formula

B Condensed formula

C **Molecular formula** ✓

D Dot and cross formula

✓ **Correct Answer: C) Molecular formula**

Explanation: The molecular formula (e.g., C_4H_{10}) simply tells you exactly how many of each type of atom are present in a single molecule, without showing how they are connected.

Q9 **Which formula shows the exact arrangement of atoms and the types of bonds between them?**

A Molecular formula

B **Structural formula** ✓

C Condensed formula

D Empirical formula

✓ Correct Answer: B) Structural formula

Explanation: A structural formula visually maps out the molecule, using lines to show single, double, or triple bonds between specific atoms.

Q10 **In a structural formula, what does a double line (=) between two atoms represent?**

A **A double bond** ✓

B Two single bonds

C An ionic bond

D A coordinate covalent bond

✓ Correct Answer: A) A double bond

Explanation: By convention, a single line (-) represents a single bond, while two parallel lines (=) represent a double bond between atoms.

Q11 **The formula that indicates groups of atoms joined to each carbon atom in a chain is called:**

A Molecular formula

B **Condensed formula** ✓

C Structural formula

D Dot and cross formula

✓ Correct Answer: B) Condensed formula

Explanation: Condensed formulas (like CH_3-CH_2-CH_3) save space by grouping hydrogen atoms with their respective carbon atoms, showing the sequence of the carbon skeleton.

Q12 **Which formula specifically shows the sharing of electrons between atoms?**

A Structural formula

B Molecular formula

C **Electronic (Dot and Cross) formula** ✓

D Condensed formula

✓ Correct Answer: C) Electronic (Dot and Cross) formula

Explanation: The dot and cross formula visually represents valence electrons. Dots represent electrons from one atom, and crosses represent electrons from another, showing how they are shared to form covalent bonds.

Q13 **What is the molecular formula of Butane?**

A C_4H_8

B **C_4H_{10}** ✓

C C_4H_{12}

D C_4H_6

✓ Correct Answer: B) C_4H_{10}

Explanation: Butane is a saturated hydrocarbon (alkane) with 4 carbon atoms. Using the alkane formula C_nH_{2n+2}, it becomes C_4H_{10}.

Q14 **Which of the following represents the condensed formula for normal butane?**

A **CH_3-CH_2-CH_2-CH_3** ✓

B CH_3-$CH(CH_3)$-CH_3

C C_4H_{10}

D CH_3CH_3

✓ Correct Answer: A) CH_3-CH_2-CH_2-CH_3

Explanation: Normal butane is a straight-chain alkane. Its condensed formula shows the continuous chain of four carbon atoms.

3 Classification of Organic Compounds

Section 3 of 9 · 9 Questions

Q15 **Organic compounds are broadly divided into which two main categories based on their carbon skeleton?**

A Aliphatic and Aromatic

B **Open chain and Closed chain** ✓

C Homocyclic and Heterocyclic

D Saturated and Unsaturated

✓ Correct Answer: B) Open chain and Closed chain

Explanation: The broadest classification depends on whether the carbon atoms form an open chain (acyclic) or a closed ring (cyclic).

Q16 **Open chain compounds are also known as:**

A Aromatic compounds

B **Aliphatic compounds** ✓

C Heterocyclic compounds

D Benzenoid compounds

✓ Correct Answer: B) Aliphatic compounds

Explanation: Open-chain compounds, whether straight or branched, are collectively called aliphatic compounds (from the Greek word 'aleiphar', meaning fat).

Q17 **Which of the following is an example of a branched-chain compound?**

A n-Butane
B **Isobutane** ✓
C Cyclohexane
D Benzene

✓ Correct Answer: B) Isobutane

Explanation: Isobutane has a central carbon bonded to three methyl groups, creating a branch, unlike the straight chain of n-butane.

Q18 **Closed chain compounds in which the ring is made up of only carbon atoms are called:**

A Heterocyclic compounds
B **Homocyclic compounds** ✓
C Aliphatic compounds
D Open chain compounds

✓ Correct Answer: B) Homocyclic compounds

Explanation: Homocyclic or carbocyclic compounds contain rings composed exclusively of carbon atoms. (Homo = same).

Q19 **Which of the following is an aromatic compound?**

A Cyclobutane
B **Naphthalene** ✓
C Thiophene
D Pyridine

✓ Correct Answer: B) Naphthalene

Explanation: Aromatic compounds must contain at least one benzene ring. Naphthalene consists of two fused benzene rings.

Q20 **Which of the following is an alicyclic (non-benzenoid) compound?**

A Benzene

B **Cyclohexane** ✓

C Pyridine

D Naphthalene

✓ Correct Answer: B) Cyclohexane

Explanation: Alicyclic compounds are homocyclic but lack the alternating double bonds of a benzene ring. Cyclohexane is a simple carbon ring without aromaticity.

Q21 **What is the defining characteristic of a heterocyclic compound?**

A It contains a benzene ring

B It is a straight chain

C **It contains at least one atom other than carbon in its ring** ✓

D It is only made of hydrogen and carbon

✓ Correct Answer: C) It contains at least one atom other than carbon in its ring

Explanation: "Hetero" means different. Heterocyclic rings contain elements like Nitrogen, Oxygen, or Sulfur in addition to carbon (e.g., Pyridine has Nitrogen).

Q22 **Which of the following molecules contains a heterocyclic ring?**

A Benzene
B Cyclobutane
C **Thiophene** ✓
D Isobutane

✓ Correct Answer: C) Thiophene

Explanation: Thiophene is a five-membered ring containing four carbon atoms and one sulfur atom, making it heterocyclic.

Q23 **Aromatic compounds are also known as:**

A Aliphatic compounds
B **Benzenoid compounds** ✓
C Cycloalkanes
D Heterocyclic compounds

✓ Correct Answer: B) Benzenoid compounds

Explanation: Because they all contain the fundamental benzene ring structure, aromatic compounds are referred to as benzenoid compounds.

4 Diversity, Isomerism & General Characteristics

Section 4 of 9 · 10 Questions

Q24 **What is the primary reason for the existence of over 10 million organic compounds?**

A They contain oxygen

B **Catenation and Isomerism** ✓

C They are found in living things

D They are ionic in nature

✓ Correct Answer: B) Catenation and Isomerism

Explanation: Carbon's unique ability to form long chains (catenation) and the phenomenon where the same formula can have different structures (isomerism) creates limitless possibilities.

Q25 **The ability of carbon atoms to link with one another to form long chains or rings is called:**

A Isomerism

B **Catenation** ✓

C Polymerization

D Allotropy

✓ Correct Answer: B) Catenation

Explanation: Catenation is the self-linking property of an element. Carbon forms very strong C-C bonds, allowing it to form stable long chains.

Q26 **Why does Silicon (Si) not exhibit catenation as extensively as Carbon (C)?**

A Si-Si bonds are stronger than C-C bonds

B **Si-Si bonds are weaker than C-C bonds** ✓

C Silicon cannot form covalent bonds

D Silicon is a metal

✓ Correct Answer: B) Si-Si bonds are weaker than C-C bonds

Explanation: The bond energy of a Si-Si bond (200 kJ/mol) is much lower than a C-C bond (355 kJ/mol). Thus, silicon chains break easily, especially in the presence of oxygen.

Q27 **Compounds that have the same molecular formula but different structural arrangements are called:**

A Isotopes

B **Isomers** ✓

C Allotropes

D Homologues

✓ Correct Answer: B) Isomers

Explanation: Isomers share the same molecular formula (e.g., C_5H_{12}) but have different physical and chemical properties because their atoms are connected differently.

Q28 **How many structural isomers does the molecular formula C_5H_{12} have?**

A 2

B **3** ✓

C 4

D 5

✓ Correct Answer: B) 3

Explanation: C_5H_{12} (pentane) has three isomers: n-pentane (straight chain), iso-pentane (branched), and neo-pentane (highly branched).

Q29 **Which of the following is NOT a general characteristic of organic compounds?**

A They are generally poor conductors of electricity

B **They have high melting and boiling points** ✓

C They are generally combustible

D They exhibit covalent bonding

✓ Correct Answer: B) They have high melting and boiling points

Explanation: Organic compounds are molecular and have weak intermolecular forces, leading to low melting and boiling points. They are highly volatile.

Q30 **Why are organic compounds generally poor conductors of electricity?**

A They contain ionic bonds

B **They contain covalent bonds and lack free ions** ✓

C They have high molecular weight

D They contain carbon

✓ **Correct Answer: B) They contain covalent bonds and lack free ions**

Explanation: Electrical conductivity requires freely moving charged particles (ions or electrons). Organic compounds form neutral molecules with covalent bonds, so they do not conduct electricity.

Q31 **Organic compounds are generally soluble in:**

A Water

B **Organic solvents like ether and benzene** ✓

C Acidic solutions

D Polar solvents

✓ **Correct Answer: B) Organic solvents like ether and benzene**

Explanation: "Like dissolves like." Since most organic compounds are non-polar, they dissolve well in non-polar organic solvents, not in polar water.

Q32 **The reactions of organic compounds are generally:**

A Extremely fast

B Instantaneous

C **Slow and require specific conditions** ✓

D Explosive

✓ Correct Answer: C) Slow and require specific conditions

Explanation: Because organic reactions involve the breaking and making of strong covalent bonds, they often require heat, pressure, or catalysts to proceed at a reasonable rate.

Q33 **Compared to inorganic compounds, organic compounds are generally:**

A More stable

B **Less stable** ✓

C Non-combustible

D Ionic

✓ Correct Answer: B) Less stable

Explanation: Due to their covalent nature and lower melting points, organic compounds are thermally less stable and decompose more easily than inorganic ionic compounds.

5 Sources of Organic Compounds

Section 5 of 9 · 14 Questions

Q34 What is the process of converting dead plants into coal called?

A Destructive distillation

B **Carbonization** ✓

C Fractional distillation

D Photosynthesis

✓ Correct Answer: B) Carbonization

Explanation: Carbonization is the slow, natural biochemical process where plant matter buried under the Earth's crust loses volatile components and becomes enriched in carbon over millions of years.

Q35 Which type of coal has the highest carbon content?

A Peat

B Lignite

C Bituminous

D **Anthracite** ✓

✓ Correct Answer: D) Anthracite

Explanation: Anthracite is the highest quality of coal, containing about 90% carbon, making it hard and highly efficient for industrial use.

Q36 **Which type of coal is considered inferior quality and has about 60% carbon content?**

- **A** **Peat** ✓
- **B** Lignite
- **C** Bituminous
- **D** Anthracite

✓ Correct Answer: A) Peat

Explanation: Peat is the earliest stage of coal formation, containing only about 60% carbon, and is often used in kilns.

Q37 **What is the process of strongly heating coal in the absence of air called?**

- **A** Fractional distillation
- **B** **Destructive distillation** ✓
- **C** Carbonization
- **D** Combustion

✓ Correct Answer: B) Destructive distillation

Explanation: Heating coal without oxygen prevents it from burning. Instead, it breaks down into various useful products like coal gas, coal tar, and coke.

Q38 **Which product of the destructive distillation of coal is a mixture of hydrogen, methane, and carbon monoxide?**

- **A** Coal tar
- **B** Ammonical liquor
- **C** **Coal gas** ✓
- **D** Coke

✓ Correct Answer: C) Coal gas

Explanation: Coal gas is a gaseous fuel used in industry for heating and providing an inert atmosphere in metallurgical processes.

Q39 **Which byproduct of coal is a thick black liquid containing over 200 different organic compounds?**

A Coke
B **Coal tar** ✓
C Ammonical liquor
D Peat

✓ Correct Answer: B) Coal tar

Explanation: Coal tar is a rich source of aromatic compounds like benzene and phenol, which are used to make drugs, dyes, and explosives.

Q40 **What is the solid residue left behind after the destructive distillation of coal?**

A **Coke** ✓
B Pitch
C Bituminous
D Ammonium sulphate

✓ Correct Answer: A) Coke

Explanation: Coke is about 98% carbon and is primarily used as a reducing agent in the extraction of metals like iron.

Q41 **Ammonical liquor is a solution of ammonia gas in water. It is used to prepare:**

A Plastics
B **Nitrogenous fertilizers** ✓
C Paints
D Synthetic fibers

✓ Correct Answer: B) Nitrogenous fertilizers

Explanation: When treated with sulfuric acid, ammonical liquor produces ammonium sulfate, a common and important nitrogenous fertilizer.

Q42 **Petroleum is a complex mixture of:**

A Only solid hydrocarbons

B **Hydrocarbons mixed with salts and earth particles** ✓

C Only gaseous hydrocarbons

D Carbohydrates and proteins

✓ **Correct Answer: B) Hydrocarbons mixed with salts and earth particles**

Explanation: Crude petroleum is a viscous liquid containing various solid, liquid, and gaseous hydrocarbons, along with impurities like salts and earth.

Q43 **How are the components of petroleum separated?**

A By destructive distillation

B **By fractional distillation** ✓

C By filtration

D By crystallization

✓ **Correct Answer: B) By fractional distillation**

Explanation: Because the different hydrocarbons in petroleum have different boiling points, they can be separated into fractions by heating them in a fractional distillation column.

Q44 **What is the main component of natural gas (about 85%)?**

A Ethane
B Propane
C **Methane** ✓
D Butane

✓ Correct Answer: C) Methane

Explanation: Natural gas is primarily composed of methane, along with smaller amounts of ethane, propane, and butane. It is used as a fuel and to make carbon black.

Q45 **Which of the following is NOT a macronutrient synthesized by living plants?**

A Carbohydrates
B Proteins
C **Plastics** ✓
D Oils

✓ Correct Answer: C) Plastics

Explanation: Plants naturally synthesize carbohydrates, proteins, oils, and vitamins. Plastics are synthetic organic compounds created in laboratories and factories.

Q46 **The basic unit of all types of carbohydrates is:**

A Fructose
B **Glucose** ✓
C Sucrose
D Starch

✓ Correct Answer: B) Glucose

Explanation: Plants produce glucose through photosynthesis. Glucose molecules then polymerize to form larger carbohydrates like sucrose, starch, and cellulose.

Q47 **Which element is essential for the fixation of nitrogen by bacteria found on plant roots?**

A Carbon

B Oxygen

C **Nitrogen** ✓

D Phosphorus

✓ Correct Answer: C) Nitrogen

Explanation: Nitrogen-fixing bacteria on the roots of plants (like pulses and beans) convert atmospheric nitrogen into a usable form, which the plant uses to synthesize proteins.

6 Uses & Homologous Series

Section 6 of 9 · 5 Questions

Q48 **The food we eat contains which organic compounds?**

A Carbohydrates and proteins

B Fats

C Vitamins

D **All of the above** ✓

✓ Correct Answer: D) All of the above

Explanation: All primary macronutrients (carbs, proteins, fats) and micronutrients (vitamins) found in food are organic compounds essential for life.

Q49 **The general formula for alkanes is:**

A C_nH_{2n}
B C_nH_{2n-2}
C **C_nH_{2n+2}** ✓
D C_nH_n

✓ **Correct Answer: C) C_nH_{2n+2}**

Explanation: Alkanes are saturated hydrocarbons, meaning they have the maximum number of hydrogen atoms possible for a given number of carbons, following the rule C_nH_{2n+2}.

Q50 **A series of organic compounds with similar chemical properties and a general formula is called a:**

A Functional group
B **Homologous series** ✓
C Radical series
D Isomeric series

✓ **Correct Answer: B) Homologous series**

Explanation: In a homologous series (like the alkanes), each successive member differs by a -CH_2- group and shares similar chemical behavior.

Q51 **Successive members of a homologous series differ by what mass?**

A 12 units
B **14 units** ✓
C 16 units
D 28 units

✓ **Correct Answer: B) 14 units**

Explanation: The difference between two adjacent homologues is a -CH_2- group. The mass of Carbon is 12 and Hydrogen is 2 (1×2), so 12 + 2 = 14 units.

Q52 **Which of the following is used as a fuel and is a mixture of low molecular mass hydrocarbons?**

A Coal tar

B **Natural gas** ✓

C Coke

D Ammonical liquor

✓ Correct Answer: B) Natural gas

Explanation: Natural gas is primarily methane, a low molecular weight hydrocarbon, making it an excellent, clean-burning fuel for homes and vehicles (as CNG).

7 Alkyl Radicals & Functional Groups

Section 7 of 9 · 12 Questions

Q53 **Alkyl radicals are derivatives of alkanes formed by the removal of:**

A **One hydrogen atom** ✓

B One carbon atom

C Two hydrogen atoms

D A methyl group

✓ Correct Answer: A) One hydrogen atom

Explanation: When a single hydrogen atom is removed from an alkane, it leaves an unpaired electron, creating a highly reactive alkyl radical.

Q54 **What is the general formula for an alkyl radical?**

A C_nH_{2n+2}
B C_nH_{2n}
C C_nH_{2n+1} ✓
D C_nH_n

✓ Correct Answer: C) C_nH_{2n+1}

Explanation: Since an alkane is C_nH_{2n+2}, removing one hydrogen leaves C_nH_{2n+1}. Alkyl radicals are represented by the symbol 'R'.

Q55 **What is the name of the alkyl radical formed by removing a hydrogen from methane (CH_4)?**

A Ethyl
B **Methyl** ✓
C Propyl
D Methane radical

✓ Correct Answer: B) Methyl

Explanation: The 'ane' suffix of the parent alkane is replaced by 'yl'. Thus, methane becomes the methyl radical ($-CH_3$).

Q56 **What is the functional group of alcohols?**

A -CHO
B -COOH
C **-OH** ✓
D -O-

✓ Correct Answer: C) -OH

Explanation: The hydroxyl group (-OH) is the defining functional group that gives alcohols their characteristic properties, like solubility and reactivity.

Q57 **The functional group –COOH is characteristic of which class of compounds?**

A Aldehydes
B Ketones
C Esters
D **Carboxylic acids** ✓

✓ Correct Answer: D) Carboxylic acids

Explanation: The carboxyl group (-COOH) contains both a carbonyl (C=O) and a hydroxyl (-OH) group, making it acidic.

Q58 **In which class of organic compounds is the functional group –O– found between two alkyl groups?**

A Alcohols
B **Ethers** ✓
C Esters
D Aldehydes

✓ Correct Answer: B) Ethers

Explanation: Ethers have the general formula R-O-R', where an oxygen atom bridges two carbon-containing groups.

Q59 **Which functional group contains a carbon double-bonded to an oxygen (C=O) and at least one hydrogen attached to the carbon?**

A Ketone
B **Aldehyde** ✓
C Carboxylic acid
D Ester

✓ Correct Answer: B) Aldehyde

Explanation: The aldehydic group is -CHO. The C=O is bonded to at least one H. In ketones, the C=O is bonded to two carbon groups.

Q60 **What is the general formula for ketones?**

A R-CHO
B R-COOH
C **R-CO-R'** ✓
D R-COO-R'

✓ Correct Answer: C) R-CO-R'

Explanation: Ketones have a carbonyl group (C=O) bonded to two alkyl or aryl groups (R and R'). Neither R group can be hydrogen.

Q61 **The functional group -COO- is known as the:**

A Ether linkage
B **Ester linkage** ✓
C Ketonic group
D Amino group

✓ Correct Answer: B) Ester linkage

Explanation: Esters have the general formula R-COO-R' and are known for their pleasant, fruity smells.

Q62 **The functional group $-NH_2$ is present in which class of organic compounds?**

A Alcohols
B **Amines** ✓
C Amides
D Carboxylic acids

✓ Correct Answer: B) Amines

Explanation: The amino group ($-NH_2$) is the defining characteristic of amines, which behave like organic ammonia.

Q63 **Which functional group is responsible for the characteristic smell of sweat, according to the text?**

A Alcohol

B **Carboxylic acid** ✓

C Aldehyde

D Ketone

✓ Correct Answer: B) Carboxylic acid

Explanation: The interesting information section notes that each person's sweat contains a unique blend of carboxylic acids, which a sniffing dog can recognize.

Q64 **What is the functional group of an ester?**

A -COOH

B -OH

C **-COO-** ✓

D -CHO

✓ Correct Answer: C) -COO-

Explanation: The ester functional group is formed by the reaction of a carboxylic acid and an alcohol and is represented as -COO-.

8 Chemical Tests for Functional Groups

Section 8 of 9 · 11 Questions

Q65 What is the result of Baeyer's test for an unsaturated organic compound (alkene/alkyne)?

- **A** Pink color disappears ✓
- **B** Red precipitate forms
- **C** White precipitate forms
- **D** Fruity smell is given out

✓ Correct Answer: A) Pink color disappears

Explanation: Baeyer's test uses alkaline $KMnO_4$ (which is pink). When added to an alkene/alkyne, the double/triple bond is oxidized, and the pink color decolorizes.

Q66 In the sodium metal test for the alcoholic group, what gas is evolved?

- **A** Oxygen gas
- **B** Carbon dioxide gas
- **C** Hydrogen gas ✓
- **D** Chlorine gas

✓ Correct Answer: C) Hydrogen gas

Explanation: Alcohols react with reactive metals like sodium to produce hydrogen gas and a metal alkoxide, similar to how water reacts with sodium.

Q67 **What is the result of the Ester formation test for an alcohol?**

A Red precipitate

B **Fruity smell** ✓

C Unpleasant odor

D White crystalline precipitate

✓ **Correct Answer: B) Fruity smell**

Explanation: When an alcohol is heated with a carboxylic acid (like acetic acid) and a catalyst (H_2SO_4), it forms an ester, which has a characteristic fruity scent.

Q68 **Which test is used to detect the Carboxyl (-COOH) group using a pinch of the compound and a drop of litmus solution?**

A Sodium metal test

B **Litmus test** ✓

C Baeyer's test

D Carbyl amine test

✓ **Correct Answer: B) Litmus test**

Explanation: Carboxylic acids are acidic. Therefore, they will turn blue litmus paper red, confirming the presence of the carboxyl group.

Q69 **What gas evolves with effervescence when a carboxylic acid reacts with $NaHCO_3$ solution?**

A Hydrogen gas
B Oxygen gas
C **Carbon dioxide gas** ✓
D Nitrogen gas

✓ Correct Answer: C) Carbon dioxide gas

Explanation: Acids react with bicarbonates to release CO_2 gas, which causes the visible bubbling (effervescence).

Q70 **Which of the following tests is used to detect the Aldehyde group?**

A **Sodium bisulphite test** ✓
B Phenyl hydrazine test
C Carbyl amine test
D Sodium metal test

✓ Correct Answer: A) Sodium bisulphite test

Explanation: Aldehydes react with saturated sodium bisulphite to form a crystalline white precipitate.

Q71 **What is the result of Fehling's solution test for an aldehyde?**

A White precipitate
B **Red precipitate** ✓
C Orange red precipitate
D Pink color disappears

✓ Correct Answer: B) Red precipitate

Explanation: Aldehydes reduce the copper(II) ions in Fehling's solution to copper(I) oxide, which appears as a brick-red precipitate upon boiling.

Q72 **What is the result of the phenyl hydrazine test for a ketone?**

A Red precipitate

B **Orange-red precipitate** ✓

C White precipitate

D Fruity smell

✓ **Correct Answer: B) Orange-red precipitate**

Explanation: Ketones react with phenyl hydrazine to form compounds called hydrazones, which appear as an orange-red precipitate.

Q73 **Which of the following tests will give a "No reaction" result when performed on a ketone?**

A Sodium nitroprusside test

B Phenyl hydrazine test

C **Fehling's solution test** ✓

D Sodium metal test

✓ **Correct Answer: C) Fehling's solution test**

Explanation: Unlike aldehydes, ketones are not easily oxidized by mild oxidizing agents like Fehling's solution, so no red precipitate forms.

Q74 **The Carbyl amine test produces an extremely unpleasant odor. Which functional group is being tested?**

- **A** **Primary amino group (-NH_2)** ✓
- **B** Carboxyl group (-COOH)
- **C** Ketonic group (C=O)
- **D** Alcoholic group (-OH)

✓ **Correct Answer: A) Primary amino group (-NH_2)**

Explanation: Heating a primary amine with chloroform and alcoholic KOH produces an isocyanide, which is infamous for its extremely foul, intolerable smell.

Q75 **Esters are generally recognized by:**

- **A** Their bitter taste
- **B** Their strong acidic nature
- **C** **Their fruity smell** ✓
- **D** Their red color

✓ **Correct Answer: C) Their fruity smell**

Explanation: Unlike many organic compounds, low molecular weight esters have very pleasant, fruity odors and are often used in perfumes and artificial flavorings.

9 Advanced / Miscellaneous

Section 9 of 9 · 10 Questions

Q76 **Which of the following compounds is an exception and is NOT considered organic despite containing carbon?**

A Methane

B Ethanol

C **Calcium Carbonate** ✓

D Acetic Acid

✓ Correct Answer: C) Calcium Carbonate

Explanation: Carbonates, bicarbonates, and oxides of carbon (like CO and CO_2) have distinct ionic properties and are classified as inorganic.

Q77 **Which of the following is used as a reducing agent in the extraction of metals, especially iron?**

A Coal tar

B **Coke** ✓

C Natural gas

D Petroleum

✓ Correct Answer: B) Coke

Explanation: Coke, being 98% carbon, is highly effective at removing oxygen from iron ore (reducing it) to yield pure iron in metallurgical processes.

Q78 **What is the common name of the simplest aldehyde (HCHO)?**

A Acetaldehyde

B **Formaldehyde** ✓

C Acetone

D Formic acid

✓ Correct Answer: B) Formaldehyde

Explanation: The simplest aldehyde is HCHO, commonly known as formaldehyde (IUPAC name: methanal).

Q79 **Which of the following is true about the boiling points of organic compounds?**

A **They increase with an increase in molecular mass.** ✓

B They decrease with an increase in molecular mass.

C They are all higher than those of inorganic salts.

D They are completely independent of molecular mass.

✓ Correct Answer: A) They increase with an increase in molecular mass.

Explanation: As the molecular mass of organic compounds increases, the size of the molecule and the surface area for intermolecular forces (like Van der Waals forces) increase, leading to higher boiling points.

Q80 **Which type of formula uses dots and crosses to represent electrons?**

A Molecular formula
B Structural formula
C **Electronic formula** ✓
D Condensed formula

✓ Correct Answer: C) Electronic formula

Explanation: The electronic, or dot and cross, formula visually demonstrates covalent bonding by showing the shared valence electrons between atoms.

Q81 **The general formula R–OH represents which class of organic compounds?**

A Aldehydes
B **Alcohols** ✓
C Ethers
D Ketones

✓ Correct Answer: B) Alcohols

Explanation: In the general formula R-OH, 'R' stands for an alkyl group, and '-OH' is the hydroxyl functional group that defines alcohols.

Q82 **What is the term for compounds like n-butane and isobutane that have the same molecular formula but different structures?**

A Homologues
B Isotopes
C **Isomers** ✓
D Allotropes

✓ Correct Answer: C) Isomers

Explanation: Both have the molecular formula C_4H_{10}, but n-butane is a straight chain while isobutane is branched, making them structural isomers.

Q83 **Which of the following is an aromatic compound containing two fused benzene rings?**

A Benzene

B **Naphthalene** ✓

C Cyclohexane

D Thiophene

✓ Correct Answer: B) Naphthalene

Explanation: As shown in the text, naphthalene consists of two benzene rings sharing a common side, and is used in mothballs.

Q84 **What is the main structural difference between an aldehyde and a ketone?**

A Aldehydes have an -OH group, ketones do not

B **Aldehydes have a C=O bond at the end of the chain, ketones have it in the middle** ✓

C Ketones contain nitrogen

D Aldehydes are ionic, ketones are covalent

✓ Correct Answer: B) Aldehydes have a C=O bond at the end of the chain, ketones have it in the middle

Explanation: In aldehydes (-CHO), the carbonyl carbon is bonded to at least one hydrogen (terminal position). In ketones (>C=O), the carbonyl carbon is bonded to two carbon atoms (internal position).

Q85 **Which of the following is a characteristic of a homologous series?**

- **A** **Members differ by 14 atomic mass units** ✓
- **B** Members have completely different chemical properties
- **C** Members must be ring-shaped
- **D** Members cannot be prepared by general methods

✓ **Correct Answer: A) Members differ by 14 atomic mass units**

Explanation: Members of a homologous series differ by a -CH_2- group. The mass of -CH_2- is (12 + 1 + 1) = 14 units, leading to a regular change in physical properties.

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