CBSE CLASS X

Science (086)

QUESTION PAPER

AI-generated question paper

Code: 9D95V9 **Questions: 29** **Maximum Marks: 57** **Generated: 2026-06-25 17:44**

SELECTIONS USED

Subject	Science
Lessons	4 Carbon and its Compounds
Level of understanding	Initial understanding
Question selection	Curated chapter coverage (~3 questions per section)
Model	claude-sonnet-4-6

Composition — Difficulty: 13 straightforward · 16 medium | Types: 16 Short · 9 Very short · 4 MCQ

Q1. medium · initial-understanding · § Introduction **[3]**

Carbon is found in very small amounts in the earth's crust and atmosphere, yet it is considered one of the most important elements. (i) In what two forms does carbon occur in the earth's crust? (ii) Give two reasons why carbon is considered so significant despite its limited abundance in nature.

◆ **Carbon and its Compounds**

Q2. straightforward · initial-understanding · § 4.1 BONDING IN CARBON – THE COVALENT BOND **[1]**

Carbon has an atomic number of 6. How many valence electrons does a carbon atom have, and what is its valency?

◆ **Carbon and its Compounds**

Q3. medium · initial-understanding · § 4.1 BONDING IN CARBON – THE COVALENT BOND **[3]**

Carbon has an atomic number of 6 and needs 4 more electrons to achieve a noble gas configuration. Why does carbon form covalent bonds instead of gaining or losing electrons to form ionic bonds?

◆ **Carbon and its Compounds**

Q4. medium · initial-understanding · § 4.1 BONDING IN CARBON – THE COVALENT BOND **[2]**

Carbon compounds generally have low melting and boiling points compared to ionic compounds. What does this tell us about the forces between molecules in covalent compounds?

◆ **Carbon and its Compounds**

Q5. straightforward · initial-understanding · § 4.1 BONDING IN CARBON – THE COVALENT BOND **[1]**

Most carbon compounds are poor conductors of electricity. Explain why covalent bonding results in the absence of free ions or electrons in these compounds.

◆ **Carbon and its Compounds**

Q6. medium | initial-understanding | § 4.1 BONDING IN CARBON – THE COVALENT BOND **[1]**

Consider the following statements about covalent compounds and select the one that is correct.

(A) Covalent compounds conduct electricity because electrons are shared between atoms.
(B) Covalent compounds have high melting points because covalent bonds within molecules are strong.
(C) Covalent compounds are generally poor conductors of electricity because no ions are formed during bond formation.
(D) Covalent compounds have high boiling points because intermolecular forces are very strong.

A Covalent compounds conduct electricity because electrons are shared between atoms.
B Covalent compounds have high melting points because covalent bonds within molecules are strong.
C Covalent compounds are generally poor conductors of electricity because no ions are formed during bond formation.
D Covalent compounds have high boiling points because intermolecular forces are very strong.

◆ **Carbon and its Compounds**

Q7. medium | initial-understanding | § 4.2 VERSATILE NATURE OF CARBON **[3]**

What is catenation? Why is carbon able to form long chains and rings with other carbon atoms, while silicon shows this property to a much lesser extent?

◆ **Carbon and its Compounds**

Q8. straightforward | initial-understanding | § 4.2 VERSATILE NATURE OF CARBON **[1]**

Which of the following pairs correctly distinguishes saturated from unsaturated carbon compounds?

(A) Saturated compounds contain only carbon and hydrogen; unsaturated compounds contain other elements too.
(B) Saturated compounds have only single bonds between carbon atoms; unsaturated compounds have one or more double or triple bonds between carbon atoms.
(C) Saturated compounds are more reactive than unsaturated compounds.
(D) Saturated compounds always have a ring structure; unsaturated compounds always have a chain structure.

A Saturated compounds contain only carbon and hydrogen; unsaturated compounds contain other elements too.
B Saturated compounds have only single bonds between carbon atoms; unsaturated compounds have one or more double or triple bonds between carbon atoms.
C Saturated compounds are more reactive than unsaturated compounds.
D Saturated compounds always have a ring structure; unsaturated compounds always have a chain structure.

◆ **Carbon and its Compounds**

Q9. medium | initial-understanding | § 4.2 VERSATILE NATURE OF CARBON **[3]**

Methanol, ethanol, propanol, and butanol belong to the same homologous series. (i) What is the structural difference between any two successive members of this series? (ii) Why do all members of this series show very similar chemical properties despite having different physical properties?

◆ **Carbon and its Compounds**

Q10. straightforward | initial-understanding | § 4.2.1 Saturated and Unsaturated Carbon Compounds **[2]**

Ethane (C_2H_6) and ethene (C_2H_4) are both compounds of carbon and hydrogen. Which one is saturated and which is unsaturated? Give a reason for your answer.

◆ **Carbon and its Compounds**

Q11. medium | initial-understanding | § 4.2.1 Saturated and Unsaturated Carbon Compounds **[1]**

Which of the following statements correctly explains why unsaturated carbon compounds are more reactive than saturated carbon compounds?

(A) Unsaturated compounds have more hydrogen atoms, which makes them more chemically active.
(B) Unsaturated compounds contain double or triple bonds between carbon atoms, which can participate in addition reactions.
(C) Saturated compounds have only single bonds, which makes them more reactive than double bonds.
(D) Unsaturated compounds have a higher boiling point, which increases their tendency to react.

A Unsaturated compounds have more hydrogen atoms, making them lighter and easier to break apart.
B Unsaturated compounds contain double or triple bonds between carbon atoms, which can participate in addition reactions.
C Saturated compounds contain double bonds that make them rigid and resistant to reactions.
D Saturated compounds have fewer carbon atoms and therefore fewer sites available for reaction.

◆ **Carbon and its Compounds**

Q12. straightforward | initial-understanding | § 4.2.2 Chains, Branches and Rings **[1]**

Two compounds both have the molecular formula C_4H_{10} but have different structures. What are such compounds called? Draw or describe the structures of both compounds to show how they differ.

◆ **Carbon and its Compounds**

Q13. medium | initial-understanding | § 4.2.3 Will you be my Friend? **[3]**

What is a functional group in a carbon compound? How does the functional group determine the chemical properties of a carbon compound?

◆ **Carbon and its Compounds**

Q14. straightforward | initial-understanding | § 4.2.4 Homologous Series **[3]**

What is a homologous series? State two characteristics that all members of a homologous series share.

◆ **Carbon and its Compounds**

Q15. straightforward | initial-understanding | § 4.2.5 Nomenclature of Carbon Compounds **[1]**

Write the IUPAC name and structural formula of the simplest ketone that has three carbon atoms in its chain.

◆ **Carbon and its Compounds**

Q16. medium | initial-understanding | § 4.3 CHEMICAL PROPERTIES OF CARBON COMPOUNDS **[3]**

Saturated hydrocarbons burn with a clean blue flame while unsaturated hydrocarbons burn with a sooty yellow flame. (i) Why do unsaturated hydrocarbons produce a sooty flame during combustion? (ii) What does this tell us about their carbon-to-hydrogen ratio compared to saturated hydrocarbons?

◆ **Carbon and its Compounds**

Q17. straightforward | initial-understanding | § 4.3.1 Combustion **[1]**

When a saturated hydrocarbon burns in a limited supply of air, what kind of flame is produced and what deposit forms on a surface held above the flame?

◆ **Carbon and its Compounds**

Q18. straightforward | initial-understanding | § 4.3.1 Combustion **[1]**

Which of the following correctly describes why fuels such as coal and petroleum are considered environmental pollutants when burned?

(A) They release only carbon dioxide, which is harmless.

(B) They contain nitrogen and sulphur, whose combustion produces oxides that pollute the air.

(C) They produce water vapour that causes acid rain.

(D) They burn with a clean blue flame that depletes oxygen rapidly.

A They release only carbon dioxide, which is harmless.

B They contain nitrogen and sulphur, whose combustion produces oxides that pollute the air.

C They produce water vapour that causes acid rain.

D They burn with a clean blue flame that depletes oxygen rapidly.

◆ **Carbon and its Compounds**

Q19. medium | initial-understanding | § 4.3.1 Combustion **[3]**

A student burns two different hydrocarbons in air and observes that one produces a clean blue flame while the other produces a sooty, yellow flame. (i) Which type of hydrocarbon — saturated or unsaturated — is more likely to produce each kind of flame? Give a reason for your answer. (ii) Under what condition could even the hydrocarbon that normally burns cleanly begin to produce a sooty flame?

◆ **Carbon and its Compounds**

Q20. medium | initial-understanding | § 4.3.2 Oxidation **[3]**

Ethanol is converted to ethanoic acid using alkaline potassium permanganate. (i) What type of chemical reaction is this? Give one reason to justify your answer. (ii) What is the role of alkaline potassium permanganate in this reaction?

◆ **Carbon and its Compounds**

Q21. straightforward | initial-understanding | § 4.3.3 Addition Reaction **[1]**

What type of compound is formed when hydrogen is added to an unsaturated hydrocarbon? Name one catalyst used for this reaction.

◆ **Carbon and its Compounds**

Q22. straightforward | initial-understanding | § 4.3.4 Substitution Reaction **[1]**

Methane reacts with chlorine in the presence of sunlight to form chloromethane (CH_3Cl) and HCl. What type of reaction is this? Give a reason for your answer.

◆ **Carbon and its Compounds**

Q23. medium | initial-understanding | § 4.4 SOME IMPORTANT CARBON COMPOUNDS – ETHANOL AND ETHANOIC ACID **[3]**

Ethanol reacts with sodium metal to release hydrogen gas. Based on this observation, what can you say about the O–H bond in ethanol? How is this reaction similar to or different from the reaction of water with sodium?

◆ **Carbon and its Compounds**

Q24. straightforward | initial-understanding | § 4.4.1 Properties of Ethanol **[1]**

When ethanol reacts with sodium metal, what are the two products formed?

◆ **Carbon and its Compounds**

Q25. medium | initial-understanding | § 4.4.1 Properties of Ethanol **[2]**

What is the role of concentrated sulphuric acid when ethanol is heated with it at a high temperature? Name the organic product formed and give the name of this type of reaction.

◆ **Carbon and its Compounds**

Q26. medium | initial-understanding | § 4.4.2 Properties of Ethanoic Acid **[2]**

Both ethanoic acid and hydrochloric acid are acids, yet they differ in strength. Explain why ethanoic acid is classified as a weak acid while hydrochloric acid is a strong acid.

◆ **Carbon and its Compounds**

Q27. medium | initial-understanding | § 4.4.2 Properties of Ethanoic Acid **[3]**

When ethanoic acid reacts with ethanol in the presence of a few drops of concentrated sulphuric acid, a new compound is formed. (i) Name this type of reaction and identify the product formed. (ii) What happens when this product is treated with sodium hydroxide solution?

◆ **Carbon and its Compounds**

Q28. medium | initial-understanding | § 4.5 SOAPS AND DETERGENTS **[3]**

What is a micelle? Describe how the structure of a micelle helps soap to clean oily dirt from clothes.

◆ **Carbon and its Compounds**

Q29. straightforward | initial-understanding | § 4.5 SOAPS AND DETERGENTS **[1]**

Why does soap fail to produce a good lather and instead form a white curdy precipitate when used with hard water?

◆ **Carbon and its Compounds**

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