

PRACTICE PAPER 01 (2026-27)
CHAPTER 04: CARBON AND ITS COMPOUNDS

SUBJECT: SCIENCE

MAX. MARKS : 40

CLASS : X

DURATION : 1½ hrs

General Instructions:

- (i) All questions are compulsory.
- (ii) This question paper contains **20** questions divided into five Sections A, B, C, D and E.
- (iii) **Section A** comprises 10 MCQs and Assertion-Reason questions of **1 mark** each. **Section B** comprises 4 Very Short Answer questions of **2 marks** each. **Section C** comprises 3 Short Answer questions of **3 marks** each. **Section D** comprises 1 Long Answer question of **5 marks**. **Section E** comprises 2 Case Study Based questions of **4 marks** each.
- (iv) There is no overall choice. Internal choice is provided in Section E.
- (v) Use of calculators is not permitted.

SECTION - A

Questions 1 to 10 carry 1 mark each.

1. The total number of covalent bonds present in a molecule of butane (C_4H_{10}) is
(a) 10 (b) 12
(c) 13 (d) 14
2. Which of the following hydrocarbons is unsaturated?
(a) C_3H_8 (b) C_2H_6
(c) C_3H_6 (d) C_4H_{10}
3. The next higher homologue of ethanol (C_2H_5OH) is
(a) CH_3OH (b) C_3H_7OH
(c) C_2H_4OH (d) C_3H_6OH
4. The functional group present in propanone is
(a) $-OH$ (b) $-CHO$
(c) $>C=O$ (ketone) (d) $-COOH$
5. Vegetable oils are converted into vanaspati ghee by heating with hydrogen in the presence of nickel. This reaction is an example of
(a) substitution reaction (b) addition reaction
(c) oxidation reaction (d) saponification
6. When ethanol is heated at 443 K with excess concentrated sulphuric acid, the product formed is
(a) ethane (b) ethene
(c) ethanoic acid (d) ethyl ethanoate
7. When soap is shaken with hard water,
(a) a lot of foam is formed
(b) a white curdy precipitate (scum) is formed
(c) the soap turns blue
(d) no change is observed

8. The number of structural isomers possible for butane is

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

In the following questions 9 and 10, a statement of Assertion (A) is followed by a statement of Reason (R). Mark the correct choice as:

- (a) Both (A) and (R) are true and (R) is the correct explanation of (A).
(b) Both (A) and (R) are true but (R) is not the correct explanation of (A).
(c) (A) is true but (R) is false.
(d) (A) is false but (R) is true.

9. **Assertion (A):** Carbon forms covalent bonds rather than C^{4+} or C^{4-} ions.

Reason (R): It is very difficult for carbon to gain four electrons or to lose four electrons.

10. **Assertion (A):** Pure ethanoic acid is called glacial acetic acid.

Reason (R): Ethanoic acid is a strong acid that is completely ionised in water.

SECTION - B

Questions 11 to 14 carry 2 marks each.

11. Draw the electron dot structures of (a) ethyne, C_2H_2 , and (b) chlorine, Cl_2 . State the type of bond between the two carbon atoms in ethyne. (Atomic numbers: H = 1, C = 6, Cl = 17)
12. Carbon forms millions of compounds, many more than all other elements put together.
(a) State the two properties of carbon responsible for this.
(b) Why are the bonds formed by carbon very strong?
13. The bottoms of cooking vessels in a house are getting blackened, and the gas stove gives a yellow flame.
(a) What does this indicate, and what should be done?
(b) Which type of hydrocarbons generally burn with a clean flame, and which with a yellow sooty flame?
14. Methane reacts with chlorine in the presence of sunlight.
(a) Write the chemical equation for the first step of this reaction.
(b) Why is it called a substitution reaction? Why do saturated hydrocarbons undergo this reaction only under such conditions?

SECTION - C

Questions 15 to 17 carry 3 marks each.

15. About 3 mL of ethanol is warmed in a water bath and a 5% solution of alkaline potassium permanganate is added drop by drop.
(a) Why does the purple colour of $KMnO_4$ disappear at first but persist when excess is added?
(b) Write the equation for the reaction and name the product.
(c) What are oxidising agents? Name one other oxidising agent that can bring about this change.
16. (a) What is a homologous series? State two of its characteristics.
(b) Name the following compounds: (i) CH_3-CH_2-CHO (ii) $CH_3-CH_2-CH_2-Br$
(c) By how much does the molecular mass of successive members of a homologous series differ? (Atomic masses: C = 12 u, H = 1 u)
17. (a) Explain with the help of micelle formation how soap removes oily dirt from clothes.
(b) Why does a soap solution appear cloudy?
(c) Why are detergents preferred to soaps for washing clothes in hard water?

SECTION - D

Question 18 carries 5 marks.

- 18.** 1 mL of absolute ethanol and 1 mL of glacial acetic acid are taken in a test tube with a few drops of concentrated sulphuric acid, warmed in a water bath for five minutes and then poured into water.
- (a) Name the reaction and the type of compound formed. Write the chemical equation and give one use of the product. What is the role of conc. H_2SO_4 ?
- (b) What happens when the product is treated with sodium hydroxide? Write the equation and name the reaction.
- (c) You are given two unlabelled test tubes containing ethanol and ethanoic acid. How would you distinguish between them using sodium hydrogencarbonate? Write the equation.

SECTION - E (Case Study Based Questions)

Questions 19 and 20 carry 4 marks each.

- 19.** Alkanes form a homologous series. The table below shows some members of this series with their boiling points:

Alkane	Molecular formula	Boiling point (K)	State at room temperature ($\approx 298 \text{ K}$)
Methane	CH_4	111	Gas
Ethane	C_2H_6	184	Gas
Propane	C_3H_8	231	Gas
Butane	C_4H_{10}	273	Gas
Pentane	C_5H_{12}	309	Liquid

- (a) What trend do you observe in boiling point as we go down the series? Give a reason. **(1)**
- (b) Predict the physical state of hexane (C_6H_{14}) at room temperature. Justify your answer. **(1)**
- (c) Butane exists in two forms with the same formula. Draw their structural formulae and name the phenomenon. **(2)**

OR

- (c) Write the general formula of alkanes. Ethane has 7 covalent bonds; how many covalent bonds does pentane have? Show your working. **(2)**

- 20.** Read the passage and answer the questions that follow.

Sugarcane juice is used to prepare molasses, which is fermented to give ethanol. Some countries add ethanol to petrol because it is a cleaner fuel. Ethanol is also a good solvent used in medicines such as tincture iodine and cough syrups. To prevent misuse of industrial ethanol, poisonous substances and a blue dye are added to it. In the laboratory, a teacher dropped a small piece of sodium into absolute ethanol and the students observed bubbles of a gas.

- (a) Name the gas evolved when sodium reacts with ethanol and write the balanced equation. **(1)**
- (b) What is denatured alcohol? Why is a blue dye added to it? **(1)**
- (c) Write the balanced equation for the complete combustion of ethanol. Why is ethanol considered a cleaner fuel? **(2)**

OR

- (c) Why is the methanol added to industrial alcohol extremely dangerous if consumed? **(2)**
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