

Structural Formulas and Isomers

Aim

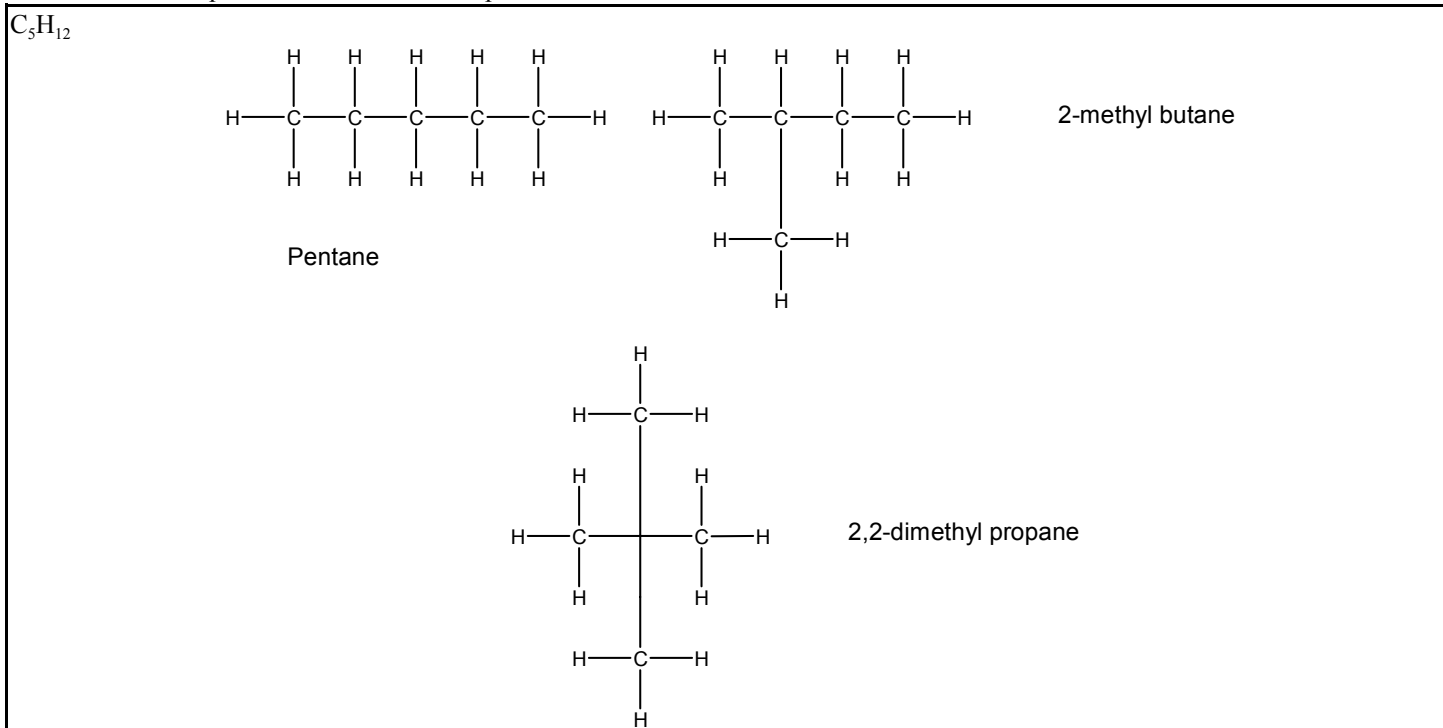
- to interpret organic formulas

Notes

Types of formulas

Type of Compound	Simple formula	Structural formula	Graphic formula
Alkanes	CH ₄		CH ₄
	C ₂ H ₆		CH ₃ CH ₃
	C ₃ H ₈		CH ₃ CH ₂ CH ₃
Alkenes	C ₂ H ₄		CH ₂ CH ₂
	C ₃ H ₆		CH ₂ CHCH ₃
	C ₄ H ₈		CH ₂ CHCH ₂ CH ₃
Alkynes	C ₂ H ₂		CHCH
	C ₃ H ₄		CHCCH ₃
	C ₄ H ₆		CHCCH ₂ CH ₃

- Isomers - compounds with the same simple formula but different structures



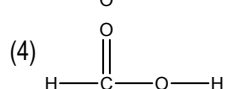
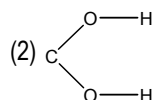
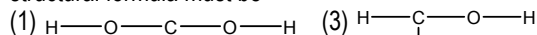
- structures must actually be different (looking different on paper is not always enough)
- branches of different isomers are attached on non-equivalent carbons

Answer the questions below by circling the number of the correct response

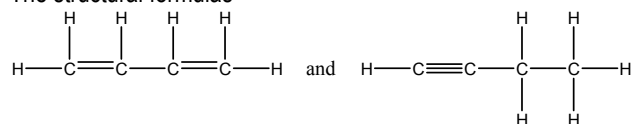
1. The compounds $\text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_3$ and $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$ are (1) hydrocarbons (2) isomers (3) allotropes (4) carbohydrates

2. The compound $\text{C}_4\text{H}_9\text{OH}$ is an isomer of (1) $\text{C}_3\text{H}_7\text{COCH}_3$ (2) $\text{CH}_3\text{COOC}_2\text{H}_5$ (3) $\text{C}_2\text{H}_5\text{OC}_2\text{H}_5$ (4) CH_3COOH

3. If a compound has a molecular formula of CH_2O_2 , then its structural formula must be



4. The structural formulas



represent molecules which both are (1) halogen addition products (2) unsaturated hydrocarbons (3) members of alkynes (4) isomers of butane

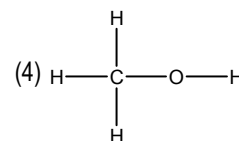
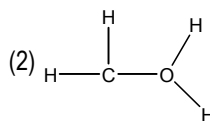
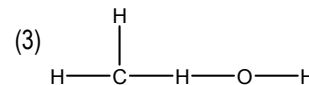
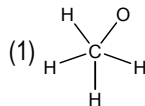
5. Compounds which have the same molecular formula but different molecular structures are called (1) isomers (2) allotropes (3) isotopes (4) homologs

6. Which compound is an isomer of $\text{CH}_3\text{CH}_2\text{OH}$? (1) CH_3CHO (2) CH_3COCH_3 (3) CH_3OCH_3 (4) $\text{CH}_3\text{CH}_2\text{COOH}$

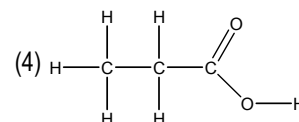
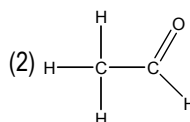
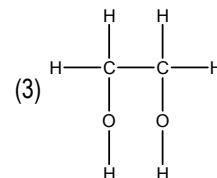
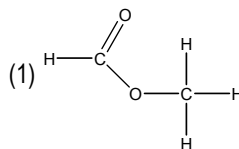
7. Which compound is an isomer of $\text{CH}_3\text{COOCH}_3$? (1) CH_3OCH_3 (2) CH_3COCH_3 (3) $\text{CH}_3\text{CH}_2\text{COOH}$ (4) $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$

8. Which compound is an isomer of CH_3COOH ? (1) HCOOCH_3 (2) $\text{CH}_3\text{CH}_2\text{COOH}$ (3) $\text{CH}_3\text{CH}_2\text{OH}$ (4) $\text{CH}_3\text{COOCH}_3$

9. Which is the correct structural formula of a compound whose molecular formula is CH_4O ?



10. Which compound is an isomer of $\begin{array}{c} \text{H} & \text{O} \\ | & // \\ \text{H}-\text{C} & - & \text{C} \\ | & \backslash \\ \text{H} & \text{O}-\text{H} \end{array}$?



11. Which is the structural formula for an unsaturated compound?

