Which of the following alkanes cannot be prepared by Wurtz reaction?

(A) Methane

(B) Ethane

(C) Propane

(D) 2-Methylpropane

(A) Methane:

- Would require coupling of **methyl halide (CH_3–X)** with itself.
- This gives **ethane (CH_3–CH_3)**, **not** methane.
- So **methane cannot be prepared** by Wurtz reaction.

(B) Ethane:

- Formed by coupling of two methyl halide molecules (CH_3–X).
- Ethane **can** be prepared.

(C) Propane:

- Would require coupling of **methyl halide (CH_3–X)** and **ethyl halide (C_2H_5–X)**.
- This is **unsymmetrical**, and Wurtz reaction gives a mixture (ethane, propane, butane).
- Propane **cannot be prepared cleanly**.

(D) 2-Methylpropane (isobutane):

- Can be obtained by coupling of **isopropyl halide (CH_3–$CHBr$–CH_3)** and methyl halide.
- Again, leads to **mixtures** — not ideal.
- Cannot be prepared selectively.

Final Correct Answer:

(A) Methane — it **cannot be prepared** by the Wurtz reaction.