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Assignment

1: i CH_3OCH_3 → Methoxymethane (di-methyl ether).
ii $CH_3CH_2OCH_2CH_3$ → Ethoxyethane (di-ethyl ether)
iii $(CH_3CH_2CH_2CH_2)_2O$ → Butoxybutane (di-butyl ether)
iv $CH_3CH_2OCH_3$ → Methoxy ethane
v $CH_3CH_2CH_2OCH_2CH_3$ → Ethoxypropane

2a Density - Most of the simple ethers are less dense than water, although density increases with increasing relative molecular mass.
b Physical State - At room temperature, ethers are colourless, neutral liquids with pleasant odours.
c Solubility: Ethers are less soluble in water than the corresponding alcohols. Lower molecular weight ethers such as methoxyethane and methoxymethane are fairly soluble in water.

3a from haloalkanes and dry silver(I) oxide

$$2RX + Ag_2O \longrightarrow R-O-R' + 2AgX$$

$$2CH_3CH_2CH_2Cl + Ag_2O \rightarrow (CH_3CH_2CH_2)_2O + 2AgCl$$

Chloropropane — Propoxypropane

b Partial dehydration of alcohols

$$2ROH \longleftrightarrow R-O-R + H_2O$$

$$2CH_3CH_2OH \xleftrightarrow[140°C]{H_2SO_4} CH_3CH_2OCH_2CH_3 + H_2O$$

Ethanol — Ethoxyethane

4. a) Ethylene Oxide Sterilization processes can sanitize medical and pharmaceutical products.

b) Ethylene glycol, derived from ethylene oxide is used to manufacture from fiber glass.

c) It is used in the production of chemicals used for making cosmetics and shampoos.