

- 1 Which of these molecules can form hydrogen bonds in their pure liquids?

diethyl ether: $\text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_3$

pentane: $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3$

1-butanol: $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$

- A diethyl ether and 1-butanol
- B 1-butanol
- C all three
- D none

- 2 Which of these molecules can form hydrogen bonds with water?

diethyl ether: $\text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_3$

pentane: $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3$

1-butanol: $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$

- A diethyl ether and 1-butanol
- B 1-butanol
- C all three
- D none

- 3 Which of these compounds is most soluble in water?

diethyl ether: $\text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_3$

pentane: $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3$

1-butanol: $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$

- A diethyl ether
- B pentane
- C 1-butanol

- 4 Which of these compounds is least soluble in water?
diethyl ether: $\text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_3$

pentane: $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3$

1-butanol: $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$

A diethyl ether
B pentane
C 1-butanol
- 5 Which of these compounds is most soluble in mineral oil?
diethyl ether: $\text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_3$

pentane: $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3$

1-butanol: $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$

A diethyl ether
B pentane
C 1-butanol
- 6 Which of these compounds is least soluble in mineral oil?
diethyl ether: $\text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_3$

pentane: $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3$

1-butanol: $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$

A diethyl ether
B pentane
C 1-butanol
- 7 Which compound is more soluble in water?
HO-CH₂CH₂OCH₂CH₂OCH₂CH₂OCH₂CH₂-OH
polyethylene glycol (PEG 200)

HO-CH₂CH₂CH₂CH₂CH₂CH₂CH₂CH₂CH₂CH₂-OH
1,10-decanediol

A polyethylene glycol
B 1,10-decanediol
C neither is soluble

- 8 Which relative solubility (mol/L) order is correct among pentanol, pentane, dimethy ether, and dipropyl ether?
- A $\text{CH}_3(\text{CH}_2)_4\text{-OH} > \text{CH}_3(\text{CH}_2)_3\text{CH}_3 > \text{CH}_3\text{-O-CH}_3 > \text{CH}_3(\text{CH}_2)_2\text{-O-(CH}_2)_2\text{CH}_3$
 - B $\text{CH}_3(\text{CH}_2)_4\text{-OH} > \text{CH}_3\text{-O-CH}_3 > \text{CH}_3(\text{CH}_2)_2\text{-O-(CH}_2)_2\text{CH}_3 > \text{CH}_3(\text{CH}_2)_3\text{CH}_3$
 - C $\text{CH}_3(\text{CH}_2)_4\text{-OH} > \text{CH}_3(\text{CH}_2)_2\text{-O-(CH}_2)_2\text{CH}_3 > \text{CH}_3\text{-O-CH}_3 > \text{CH}_3(\text{CH}_2)_3\text{CH}_3$
 - D $\text{CH}_3(\text{CH}_2)_2\text{-O-(CH}_2)_2\text{CH}_3 > \text{CH}_3(\text{CH}_2)_4\text{-OH} > \text{CH}_3\text{-O-CH}_3 > \text{CH}_3(\text{CH}_2)_3\text{CH}_3$