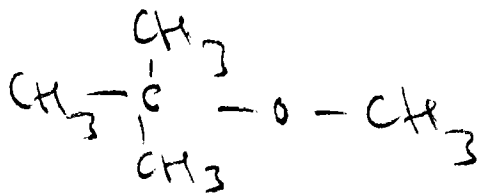


1. Show valid structural formulas for MTBE and biphenyl! (4 pts)



2. Indicate any correct statements: A "Benzoic acid is less soluble in water than sodium benzoate" B "The solubility of benzoic acid in water increases with increasing temperature" C "In any extraction, the organic phase is always the bottom phase in the separatory funnel" D "The density of a fluid is expressed in grams/liter" E "Liquid/liquid partitioning requires two immiscible solvents" (5 pts)

3. References state that the solubility of benzoic acid in water is 35.21 millimoles/liter at 0°C. Atomic weights: C, 12.011; H, 1.008; O, 15.999. Considering this, please answer the following questions:

a. What solubility in grams/liter does that correspond to? (3 pts)

$$\begin{aligned} \text{MW}(\text{C}_7\text{H}_6\text{O}_2) &= 122.12 \\ \frac{122.12 \times 35.21}{1000} &= 4.30 \text{ g/L} \end{aligned}$$

b. If you crystallize benzoic acid from 100 mL of water at 0°, how much stays in solution? (1 pt)

$$0.43 \text{ g} \quad (\text{or: } 3.52 \text{ mmol})$$

4. Provide a molecular formula for biphenyl (2 pts)

