

1. From the following table, select one solvent for the purification of compound X. **Justify your selection!** (4 pts)

Solubility of X at	ethanol	toluene	in butyl ether
0°	150 g/L	2.0 g/L	2.5 g/L
40°	155 g/L	2.5 g/L	20.0 g/L
80°	160 g/L	3.0 g/L	80.0 g/L

largest temperature gradient

2. Assume you recrystallize 6.0 g of compound X in toluene by dissolving all in sufficient toluene at 80°, then chilling in an ice bath and collecting the product by filtration

a) What is the highest possible recovery of X (in grams) that you can obtain? Assume you don't spill anything, and use the table above for solubility data! (3 pts)

$$6.0 - 4.0 = 2.0 \text{ g}$$

b) How many milliliters of toluene do you need for this recrystallization? (2 pts)

$$2000$$

3. Assuming that the solubility of your compound is 0.13 moles/liter and its molecular weight is 89.10, how many mL of solvent do you need to dissolve 5.60 grams of it? (4 pts)

$$89.10 \times 0.13 = 11.58 \text{ g} / 1000 \text{ mL}$$

$$\frac{1000}{11.58} \times 5.60 = 483.44 \approx \underline{483.4 \text{ mL}}$$

4. What is the molecular formula of benzil? (2 pts)

