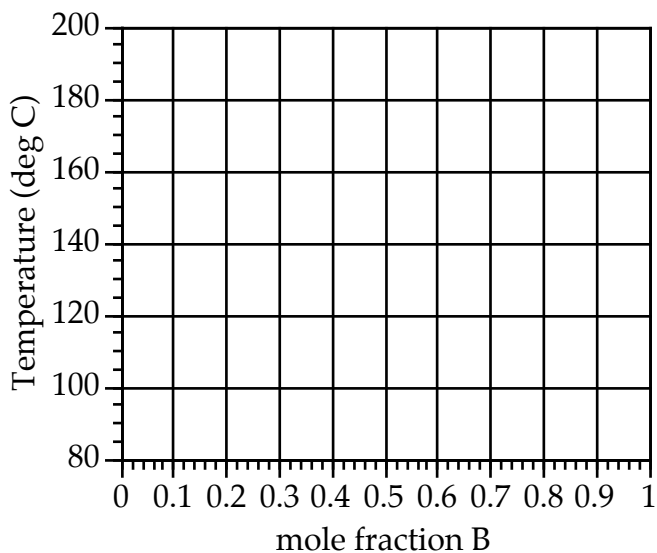


5. What effect will a nonvolatile solute dissolved in a volatile solvent have on the BP of the volatile solvent? (4 pt)
- the BP will always decrease
 - the BP will always increase
 - the BP will not change
 - the BP effect depends on the solute
6. Using the following phase composition diagram, a) Determine the mole fraction of B in a liquid with a boiling point of 160 °C. b) Calculate the composition of the condensate obtained from a simple distillation process. c) Determine the temperature at the still head for the distillate. Show how these values are obtained by clearly labeling the diagram. (6 pt total)



7. What was the purpose of adding Na_2CO_3 to the water when extracting caffeine from tea? (Also, write the reaction that is occurring.) (4 pt)
8. What is the meaning of the term *salting out* as applied to liquid/liquid extraction? (4 pt)
9. Why should the vacuum be applied before adding ice to the condenser in the sublimation of caffeine procedure? (4 pt)

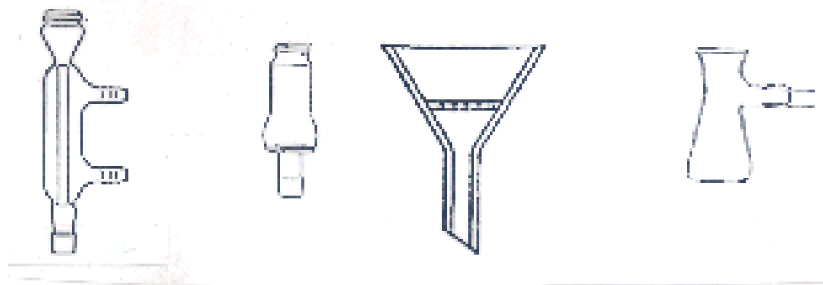
10. Could ethanol be substituted for CH_2Cl_2 in the liquid/liquid extraction step for caffeine? Explain. (4 pt)
11. What are the two main methods for spot visualization in TLC? (4 pt)
12. What is the most likely cause of tailing (elongated) spots after a TLC procedure? (4 pt)
13. In a TLC experiment on SiO_2 plates, substances A and B gave R_f values of 0.80 and 0.85, respectively. How could the separation best be improved? (3 pt)
- use less solvent
 - use more solvent
 - use a less polar solvent
 - use a more polar solvent
 - continue development until the solvent has climbed higher on the plate

For the following solvent pairs, circle the most polar solvent. (2 pt ea)

14. water and methanol
15. dichloromethane and ethyl acetate
16. toluene and hexane
17. Why should the BP of the solvent be less than the MP of the solid compound in recrystallization? Explain (4 pt)

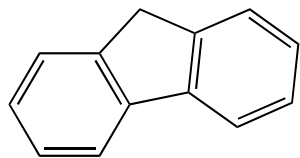
18. For a compound, the solubility in water is 1 gm in 120 ml at 25 °C and 1 gm in 30 ml at 100 °C. Calculate the maximum percent recovery of the compound in a recrystallization, assuming the minimum volume of water was used to dissolve a 1 gm sample at 100 °C, and crystals were recovered at 25 °C. Show all calculations. (6 pt)

19. Give the proper name for the glassware items pictured below. (8 pt)

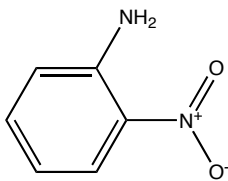


20. Give two reasons why an Erlenmeyer flask is better than a beaker for preparing a hot saturated solution in a recrystallization procedure. (4 pt)

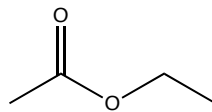
21. Give names for the following compounds. (2 pt ea)



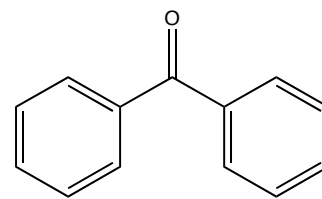
a.



b.



c.



d.

22. On the lab floor plan, label the location of all of the following safety items. (6 pt)

- A) Safety Shower B) Fire Blanket C) Personal Eye Wash Station
D) Eye Wash Fountain E) Eye Wash Bottles F) Fire Extinguisher

