

7. A student conducts a chromatography experiment and needs to prepare 100.0 mL of 0.340 *M* NaCl(*aq*) to use as the solvent.

(a) Calculate the mass of solid NaCl (molar mass 58.44 g/mol) needed to prepare the 100.0 mL of 0.340 *M* NaCl(*aq*).

(b) In the following table, briefly list the additional steps necessary to prepare the 100.0 mL of 0.340 *M* NaCl(*aq*) solution using only materials selected from the choices given. Assume that all appropriate safety measures are already in place. Not all materials in the list may be needed.

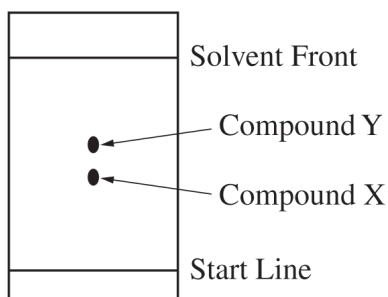
- | | | |
|--------------|-----------------------------|------------------------------|
| • Solid NaCl | • Distilled water | • Weighing paper and scoop |
| • Balance | • 100.0 mL volumetric flask | • 50.0 mL graduated cylinder |
| • Pipet | • 150 mL beakers | • Chromatography paper |

Step	Step Description and Materials Used
1.	Use the weighing paper and scoop to measure the correct mass of solid NaCl on the balance.
2.	
3.	Swirl the mixture to dissolve the solid NaCl.
4.	
5.	Stopper and invert the mixture several times to ensure that the mixture is homogeneous.

GO ON TO THE NEXT PAGE.

Continue your response to **QUESTION 7** on this page.

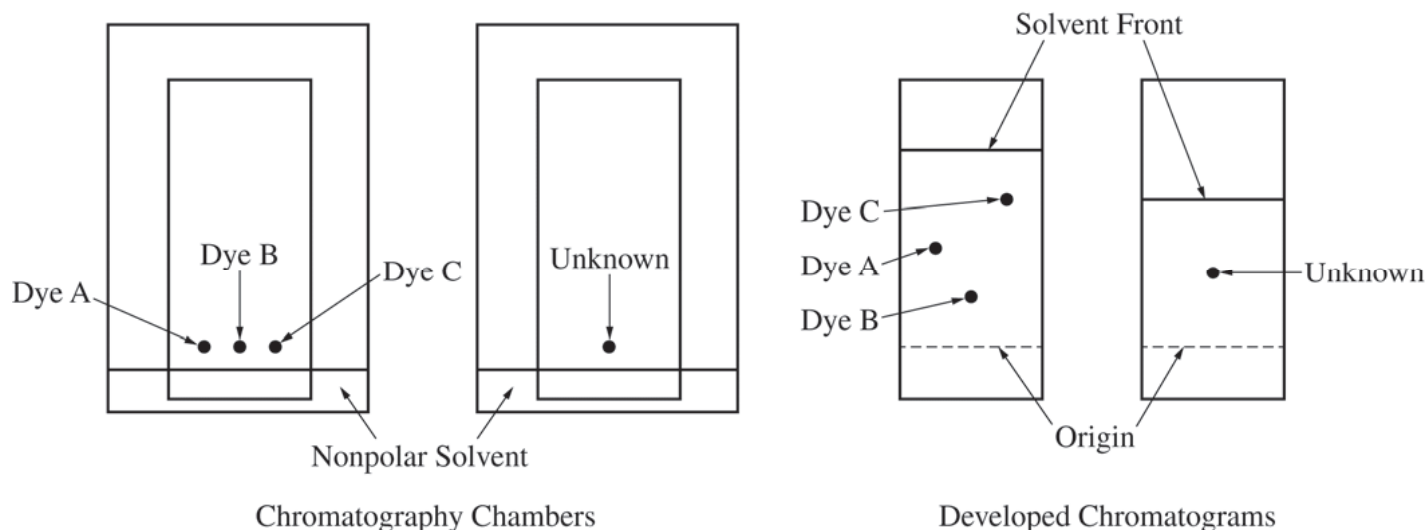
The student uses the $\text{NaCl}(aq)$ solvent to separate a mixture of compounds X and Y in a chromatography experiment. After 30 minutes, the student removes the chromatography paper from the chamber. The results of the experiment are shown.



- (c) A second student conducts the same chromatography experiment but removes the chromatography paper from the chamber after 15 minutes instead of 30 minutes. Predict the effect, if any, this would have on the separation distance between compounds X and Y in the new experiment. Explain your reasoning.

STOP

END OF EXAM



4. A student investigates various dyes using paper chromatography. The student has samples of three pure dyes, labeled A, B, and C, and an unknown sample that contains one of the three dyes. The student prepares the chromatography chambers shown above on the left by putting a drop of each dye at the indicated position on the chromatography paper (a polar material) and standing the paper in a nonpolar solvent. The developed chromatograms are shown above on the right.
- (a) Which dye (A, B, or C) is the least polar? Justify your answer in terms of the interactions between the dyes and the solvent or between the dyes and the paper.
- (b) Which dye is present in the unknown sample? Justify your answer.