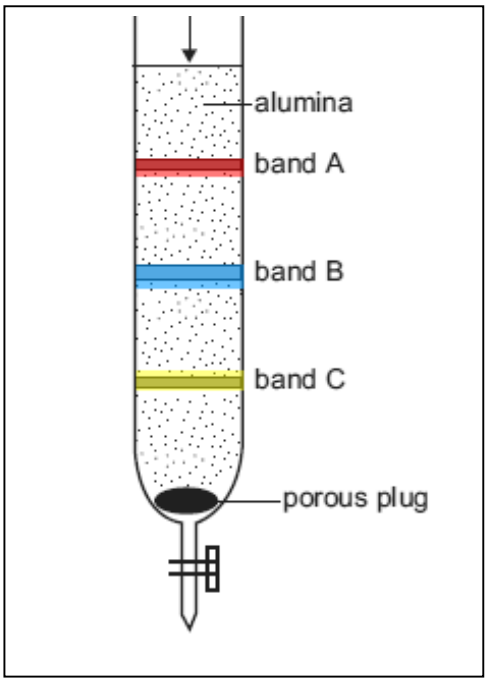
Friday Worksheet **Name: …….**
Chromatography 4

1) A burette packed with finely divided alumina powder (Al_2O_3) was used to separate the components in a plant extract by chromatography. The alumina acts as the stationary phase and water was used as the mobile phase.
A solution of the plant extract was placed at the top of the alumina and water was continually added and drained.
The components separated as three coloured bands, as shown in the diagram on the right



a) In which one of the three bands, A, B or C, were the components least strongly adsorbed to the stationary phase?
Band C.
It travels the fastest through the column indicating that it is not well adsorbed to the stationary phase.

b) Band B starts to show signs of separating into two different bands just before it emerges from the bottom of the burette. Give one possible modification that could be made to this experiment to more effectively separate band B into its separate component.
Any one of the following
Make the column longer to allow more time for the separation to occur.
Cool the column down so molecules travel slowly through the column and hence have a greater chance of being adsorbed onto the stationary phase.

c) In another experiment, the components in the plant extract were separated in a similar way to paper chromatography, using a glass sheet coated with alumina and water as the mobile phase. Which one of the three bands, A, B or C, contains the component that would be most likely to have the smallest Rf value? Explain your answer
Band A.
It is this component that is most strongly adsorbed to the stationay pahse and hence more likely to have the smallest Rf value.

d) Which one of the three bands, A, B or C, contains the component that would have the highest retention time if this separation was conducted using a high-performance liquid chromatograph with beads covered with a hydrophobic covering? Explain your answer.
Band C.
It is the fastest band when using Al_2O_3 beads indicating it has low interaction with the stationary phase hence it is likely to be a molecule with non-polar characteristics and hence more likely to be adsorbed more strongly onto a non polar stationary surface.