THIN LAYER CHROMATOGRAPHY

1. a) A thin layer of either silica gel or alumina coated onto a piece of glass, metal or rigid plastic

   b) A solvent or mixture of solvents

2. a) Draw a pencil line near the bottom of the plate and put a spot of mixture on it. Any labelling must also be in pencil. Stand the plate in a shallow layer of solvent in a covered beaker. The solvent level must be below the pencil line. Then wait!

   b) It stops the solvent from evaporating as it moves up the plate, because the space in the beaker is already saturated with solvent vapour.

   c) The R_f value is calculated by dividing the distance moved by each spot by the distance moved by the solvent. Measurements are all taken from the pencil line drawn on the plate originally.

   d) R_f values are only constant for a given stationary phase, a given mobile phase and a fixed temperature. So you would have to make sure that you didn't change the stationary phase, you used exactly the same solvent or mixture of solvents, and kept the temperature the same.

   e) (i) Ninhydrin

   (ii) Mark the position reached by the solvent.

   f) It contains the amino acids 3, 4 and 5, plus another amino acid which wasn't included in those you were comparing the mixture with (the second spot down doesn't have a matching spot in the amino acids 1 to 5).

3. There will obviously be three spots because of the three components. Since P forms strong hydrogen bonds it is likely to spend most of the time attached to the surface of the silica gel rather than in solution in the solvent. That means that the spot isn't likely to move very far.

   In the case of Q, something similar is true, except that it doesn't hydrogen bond as strongly as P. That means that it will move further than P, but not necessarily very far.

   R doesn't hydrogen bond, but forms the same sort of intermolecular attractions as propanone does. The attractions of R to the solvent molecules are therefore likely to be stronger than to the silica gel, and it will spend more time in the solution than the other two. The spot is likely to carried much further up the plate.