

Friday Worksheet
Analytical chemistry revision 4

Name:

- 1) The urine of an athlete, named Bob, was examined for the presence of anabolic steroids. A steroid, code named "A" is of particular interest. The area under the peak representing the protein "A" is marked as having a value of 800 units.

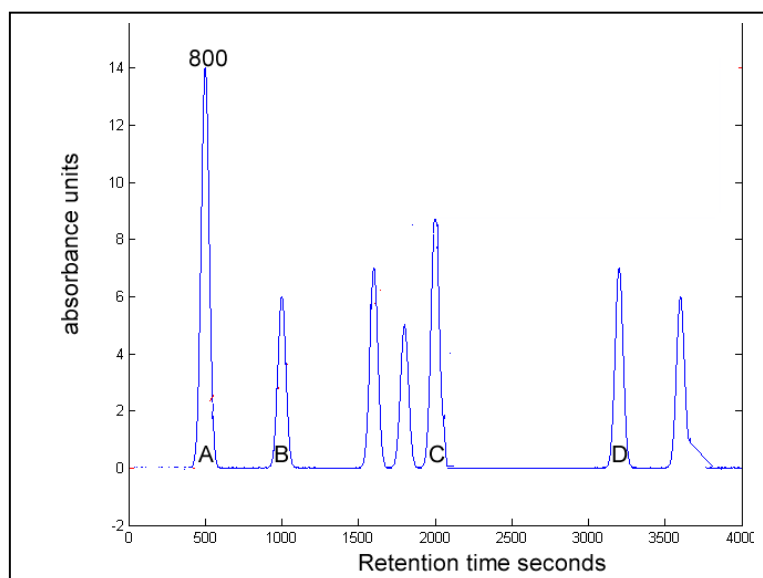
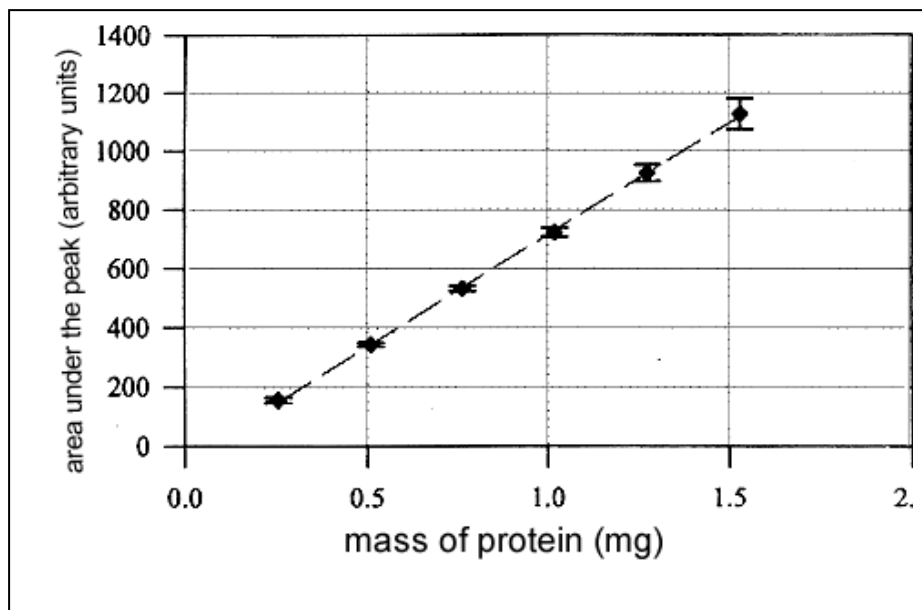


Fig 1

The column is packed with beads covered in a hydrophobic oil while the sample of urine is diluted with water before being injected into the column

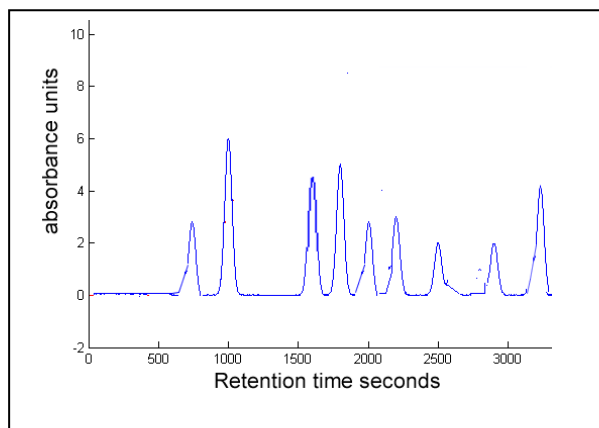
- Which compound is the most polar? Explain
- What information can be derived from the spectrum shown above?
- Explain how each of the following will influence the rate at which a compound moves through the column.
 - The compound's solubility in water
 - The compounds concentration
 - The temperature of the solvent moving through the column.
 - The size of the beads forming the stationary phase.
 - Its molecular mass

- d) A calibration curve was constructed of the relationship of area of peak in the chromatogram and the mass of protein “A”.



If 10.0 mL of urine was used what is the concentration, expressed as $\%(m/v)$, of protein “A” in the urine

- e) Another athlete, Jack, was tested using HPLC and the chromatogram is shown on the right. Conclude which of the following steroids A, B C and D are also found in this athlete’s urine? Explain how you arrived at your conclusion.



- f) In another investigation, thin film chromatography was used to analyse the urine of the same athletes mentioned above. The chromatogram is shown on the right. The image on the right shows the chromatograms of two athletes and a control for protein A shown in the middle. Do the results confirm the findings shown in figure 1, above of the athletes? Explain.

