

Concentration, separation and absorbance

AP Chemistry · Test

Name: _____ Date: _____ Class: _____ Mark: ____ / 20

This test lasts 45 minutes and is worth 20 points. Show your working, quote final answers with units and sensible significant figures, and refer to the relevant relationships. Calculators are allowed.

Level: AP Chemistry · **Curriculum:** AP Chem Unit 3

Time: 45 minutes · 8 questions · Total: 20 marks · Calculator allowed

Question 1 Molarity (3 marks)

Calculate the molarity of a solution made by dissolving 4.00 g of NaOH (40.00 g/mol) in water and making the volume 200.0 mL.

Question 2 Dilution (3 marks)

What volume of 6.00 M HCl is needed to prepare 250.0 mL of 1.20 M HCl?

Question 3 Chromatography (2 marks)

On a TLC plate a spot moved 3.2 cm while the solvent front moved 8.0 cm. Calculate R_f and state what it shows.

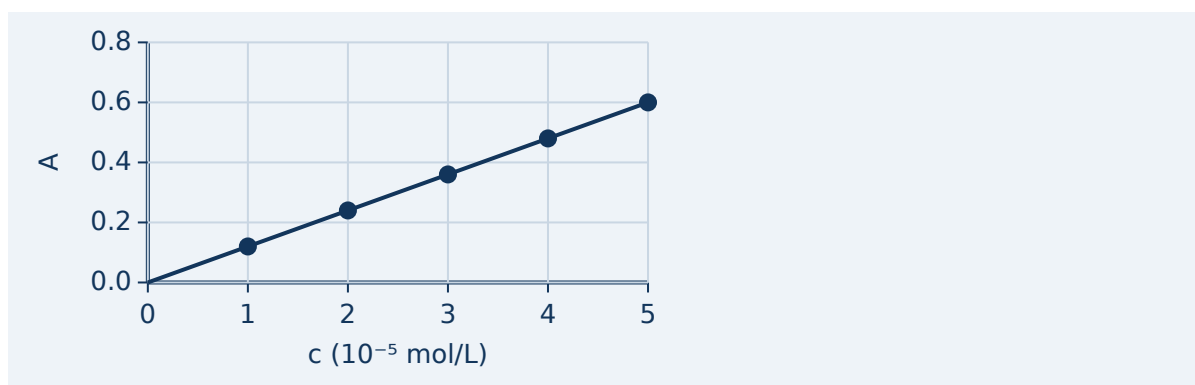
Question 4 Beer-Lambert calculation (3 marks)

A solution of concentration 2.5×10^{-5} mol/L gives $A = 0.375$ in a 1.00 cm cuvette. Calculate the molar absorptivity.

Question 5 Percentage transmittance (2 marks)

A solution has $A = 0.699$. Calculate the percentage of light transmitted.

Question 6 Calibration line (3 marks)



Calibration line for a dye.

- An unknown sample has $A = 0.300$. Use the graph to find its concentration. (1 mark)
- State what the straight line shows about the relationship between A and c . (1 mark)
- Explain why you should not use the line to find c for $A = 2.0$. (1 mark)

Question 7 Separation methods (2 marks)

Name the method that would separate each pair: (i) iodine dissolved in ethanol, getting back the ethanol; (ii) the pigments of a leaf extract.

Question 8 Choosing the wavelength (2 marks)

Explain why a spectrophotometric analysis uses the wavelength of maximum absorbance.