1.9 A-Level Biology: Required Practicals and Data Analysis: 10-minute Pack

AQA 7402 · Calculator allowed · about 10 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 A student separated leaf pigments from spinach using paper chromatography. The solvent front travelled 9.6 cm. Distances travelled by the pigment spots were: chlorophyll a = 6.5 cm, chlorophyll b = 5.6 cm, carotene = 9.1 cm, xanthophyll = 7.8 cm.

(a) State the formula used to calculate an Rf value. **(1)**

(b) Calculate the Rf value for chlorophyll a, to 2 decimal places. **(2)**

(c) Calculate the Rf value for carotene, to 2 decimal places, and use it to explain the relative solubility of carotene in the solvent compared with chlorophyll a. **(3)**

(d) Explain why the same species of plant might give a different Rf value for chlorophyll a if the practical is repeated using a different solvent. **(2)**

(Total for Question 1 is 8 marks)

© Revision Library | revisionlibrary.co.uk

Mark scheme · 1.9 A-Level Biology: Required Practicals and Data Analysis: 10-minute Pack

Question 1

(a) Rf = distance travelled by pigment / distance travelled by solvent (front) **B1**

(a) Answer: Rf = distance travelled by pigment / distance travelled by solvent

(b) 6.5 / 9.6 **M1**

(b) 0.68 cao **A1**

(b) Answer: 0.68

(c) 9.1 / 9.6 **M1**

(c) 0.95 cao **A1**

(c) carotene has a higher Rf value than chlorophyll a, showing it is more soluble in the (non-polar) solvent and has less affinity for the stationary phase (paper), so it travels further **B1**

(c) Answer: 0.95; carotene is more soluble in the solvent than chlorophyll a

(d) Rf value depends on the solubility of the pigment in the particular solvent used, which differs between solvents **B1**

(d) Rf values can therefore only be reliably compared when the same solvent, temperature and chromatography paper are used **B1**

(d) Answer: Rf depends on the solvent used, so values can only be compared when the same solvent (and conditions) are used

© Revision Library | revisionlibrary.co.uk