A level Biology A

H420/03 Unified biology

Question Set 1

1 Fig. 1.1 shows the structure of the amino acid leucine.

(a) (i) On Fig. 1.1, draw a circle around the R group of leucine.

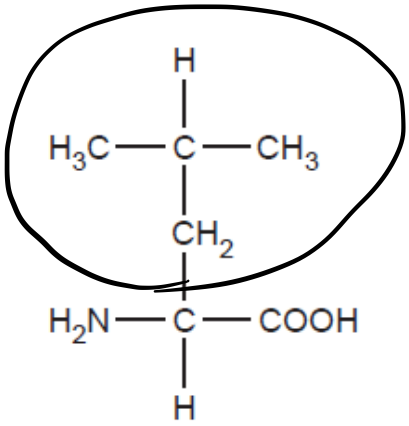

Fig. 1.1

[1]

(ii) Students used thin layer chromatography to separate leucine from other amino acids. The chromatogram they produced is shown in Fig. 1.2.

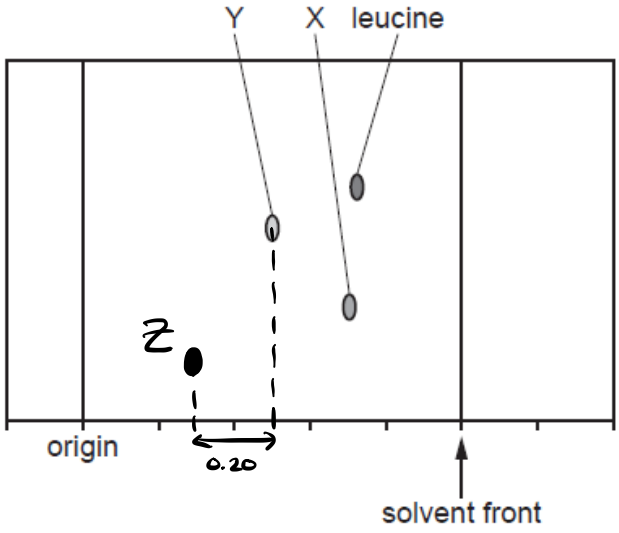

Fig. 1.2

What can you conclude about the chemical properties of leucine and amino acid X?

- both have similar chemical properties as similar Rf value, distance travelled **[1]**
- both have similar solubilities but leucine is slightly more soluble

(iii) Amino acid Z was in the mixture analysed by the students. It is not shown on the chromatogram in Fig. 1.2. Amino acid Z has an R_f value that is 0.20 lower than that of amino acid Y.

Place a dot on the chromatogram in Fig. 1.2 to show the distance moved by amino acid Z.

Show your working.

R_f of Y : $\frac{50}{100} = 0.5$ R_f of Z : $0.5 - 0.2 = 0.3$ **[3]**

$\frac{x}{100} = 0.3$ $x = 30$

(b) Thin layer chromatography can also be used to separate photosynthetic pigments.

(i) State a material that can be used as the stationary phase in thin layer chromatography.

silica gel **[1]**

(ii) State the precise location of photosynthetic pigments in a chloroplast.

- chlorophyll a is located at the base of photosystem **[2]**
- accesory pigments are around the outside on outer thylakoid membrane

(c) When sequencing DNA, fragments of DNA are separated by electrophoresis.

Describe **three** differences between the process of thin layer chromatography and the form of electrophoresis used to sequence DNA.

- electrophoresis uses electricity but not TLC **[3]**
- electrophoresis separates molecules by size but TLC, by adsorption with stationary phase
- electrophoresis only separates charged particles but TLC separates non-charged particles

Total Mark for Questions Set 1: 11