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CHEMISTRY

ORGANIC CHEMISTRY II

Level & Board	AQA (A-LEVEL)
TOPIC:	CHROMATOGRAPHY
PAPER TYPE:	SOLUTION - 4
TOTAL QUESTIONS	10
TOTAL MARKS	/15

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Chromatography - 4

1.

In column chromatography, the mobile phase is the solvent that flows through the column, carrying the sample mixture with it.

This solvent is added at the top of the column and moves downward through the stationary phase due to gravity or applied pressure.

The mobile phase is responsible for moving the different components of the mixture through the stationary phase at different rates, leading to their separation.

It is also known as the "eluent." The eluent interacts with the sample and the stationary phase, determining how each component is carried through the column.

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3.

R_f value stand for retardation factor:

In chromatography, the R_f value is the ratio of the distance travelled by a compound to the distance travelled by the solvent front.

It is calculated as:

$$R_f = \frac{\text{Distance travelled by the spot}}{\text{Distance travelled by the solvent front}}$$

Distance moved by the spot:

Measure the distance from the initial line (where the mixture was spotted) to the center of the spot.

Distance moved by the solvent front:

Measure the distance from the initial line to the point where the solvent front has reached.

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5.

One common method is to use a developing agent or a staining reagent that reacts with the components of the sample to produce visible spots.

For example:

Ninhydrin:

Reacts with amino acids to produce purple or blue spots.

Iodine vapors:

React with certain compounds to produce brown spots.

UV light:

Some compounds may fluoresce under UV light, making them visible even if they are colorless.

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7.

The advantages of TLC over paper chromatography as:

Faster Separation:

TLC runs faster than paper chromatography due to the thin layer of stationary phase.

Separation of Smaller Amounts:

TLC can separate smaller amounts of a mixture effectively.

Robustness of TLC Plates:

TLC plates are more robust than paper, offering better durability and handling during the chromatographic process.

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9.

Retention time in chromatography refers to the time taken for a compound to travel through the column and reach the detector.

It's used for identifying and quantifying compounds in a sample, with shorter times indicating faster movement.

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