

1.

- (a) blue
- (b) E
- (c) A and D
- (d) $\frac{39}{51} = 0.76$ (accept 0.7 – 0.8)
- (e) The blue dye has the highest R_f value / moved furthest up the plate. This means it was most attracted to the polar mobile phase / solvent, therefore is the most polar.

2.

- (a) The mark scheme below is inappropriate as it assumes a lot more work than 3 marks
 - (1) Equipment
 - (1) Complete, followable method, with diagram
 - (1) Plausible method as solution to the problem
- (b) (1) correctly drawn, clearly labelled chromatogram
 - (1) one component shown per dye
- (c) (1) component in same places horizontally as for (b)
 - (1) multiple components shown for at least one dye

3.

- (a) Ethanal is less polar than ethanol, due to the carbonyl group being less polar than the hydroxyl group, and therefore adsorbed less strongly to the polar stationary phase. This means it moved through the column more quickly.
- (b) The area underneath the peak is greater than the area underneath any other peak shown.

2(a) example:

Equipment:

- M&Ms
- Test tubes, one for each colour of M&M
- A suitable solvent for dissolving M&M colouring agents
- Thin layer chromatography plate
- Beaker
- Dropping pipette

Method:

1. Add one of each colour of M&M to separate test tubes, each containing the solvent.
2. Stir each test tube so that some of the colouring agent dissolves in the solvent.
3. On a thin layer chromatography plate, mark a base line.
4. Using a dropping pipette, place one drop from each test tube evenly spaced along the base line.
5. Place the thin layer chromatography plate in a beaker and add enough solvent that the level of solvent almost reaches the base line.
6. The solvent should adsorb up the plate. When the solvent nears the top of the plate, remove the plate from the beaker and mark the final solvent level 'solvent front'.