

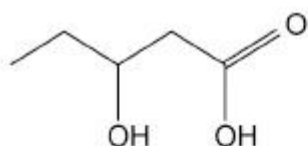
Name of the Student: _____

Max. Marks : 20 Marks

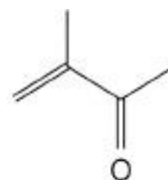
Time : 20 Minutes

Q1.

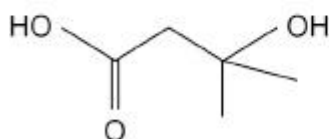
A student plans a series of chemical tests to confirm the identities of four organic liquids.



Liquid J



Liquid K



Liquid L



Liquid M

This is the student's method.

To separate test tubes containing samples of each liquid:

Test 1 add potassium dichromate(VI) solution and warm gently

Test 2 add Fehling's solution and cool in iced water

Test 3 add sodium hydrogencarbonate solution and test any gas produced with a lighted splint

Test 4 add bromine water and shake at room temperature.

(a) Identify the missing reagent needed in **Test 1**.

(1)

(b) In addition to the missing reagent in **Test 1**, there is a mistake in the method for **two** of the other tests.

State the **two** mistakes.

Suggest how each of the mistakes should be corrected.

Mistake 1 _____

Suggestion _____

Mistake 2 _____

Suggestion _____

(2)

- (c) The missing reagent is added and the mistakes are corrected.

Identify the liquid(s), **J**, **K**, **L** and **M**, that would react in each test.

State the expected observation for each reaction.

Liquid(s) that react in **Test 1** _____

Expected observation _____

Liquid(s) that react in **Test 2** _____

Expected observation _____

Liquid(s) that react in **Test 3** _____

Expected observation _____

Liquid(s) that react in **Test 4** _____

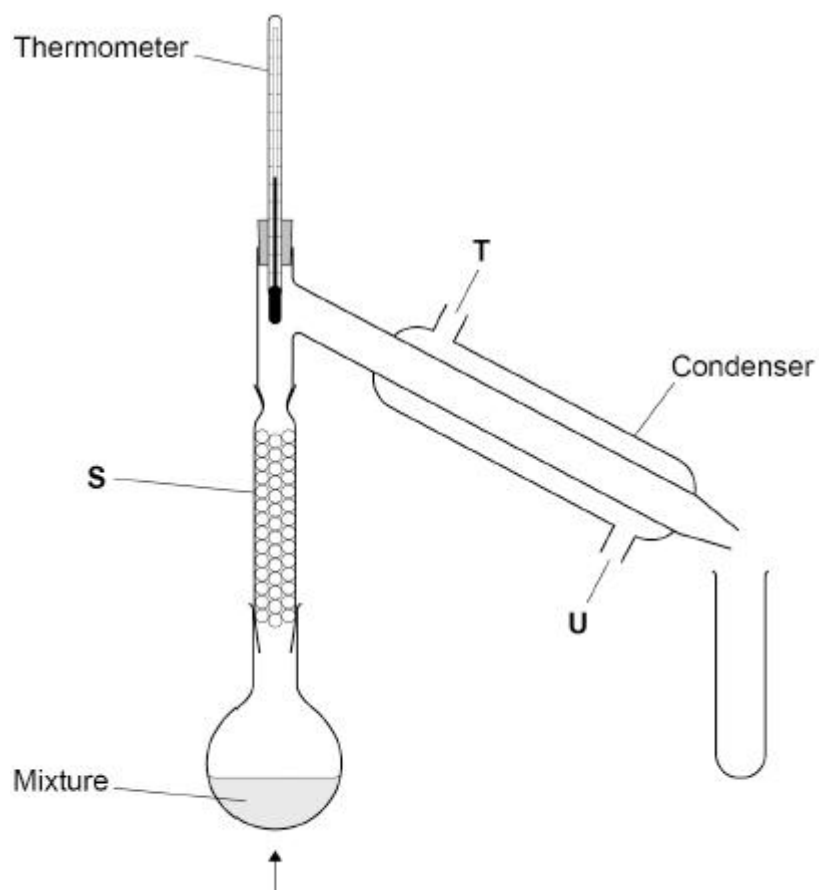
Expected observation _____

(8)

- (d) The figure below shows the apparatus that is used to separate a mixture of liquids **K** and **M** using fractional distillation.

Suggest labels that should be added to positions **S**, **T** and **U** in the figure.

Explain why fractional distillation is preferred to simple distillation to separate liquids **K** and **M**.



Label **S** _____

Label **T** _____

Label **U** _____

Explanation _____

(3)
(Total 14 marks)

Q2.

A student has samples of these four compounds but does not know which is which:

- butanoic acid
- 2-methylpropanal
- 2-methylpropanoic acid
- 2-methylpropan-1-ol

Step 1: Two of these compounds can be identified by simple chemical tests.

Step 2: The other two compounds, that contain the same functional group as each other, can then be distinguished using a spectroscopic technique.

Describe how these two steps could be used to identify which compound is which.

(Total 6 marks)