

**O Level Pure Chemistry MCQs**

**Separation Techniques Test 2.0**

Q1

Camphor is a substance used in skin ointments and a natural sample of it is found to contain impurities like iron(III) oxide, iron and sodium chloride.

The effects of these substances with three different types of liquids are shown below.

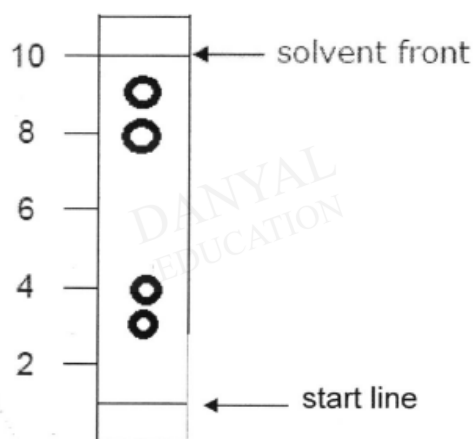
substance	water	ethanol	dilute nitric acid
camphor	no effect	dissolves	no effect
iron	no effect	no effect	reacts to give a solution
iron(III) oxide	no effect	no effect	reacts to give a solution
sodium chloride	dissolves	no effect	dissolves

Which is the best method to obtain pure camphor?

- A Add dilute nitric acid, filter and crystallise.
- B Add dilute nitric acid, filter, rinse and dry.
- C Add ethanol, filter, rinse and dry.
- D Add water, filter, add dilute nitric acid to filtrate and crystallise.

Q2

A food dye is suspected to contain components which are harmful to the human body. The chromatogram of the food dye is obtained, as shown below. A reference table of  $R_f$  values of harmful components is provided.



$R_f$ values of harmful components	
component	$R_f$ value
K101	0.8
K110	0.6
K151	0.3
K122	0.1

Identify the harmful components present in the food dye.

- A K101, K122
- B K101, K151
- C K101, K151, K122
- D K101, K151, K122, K110

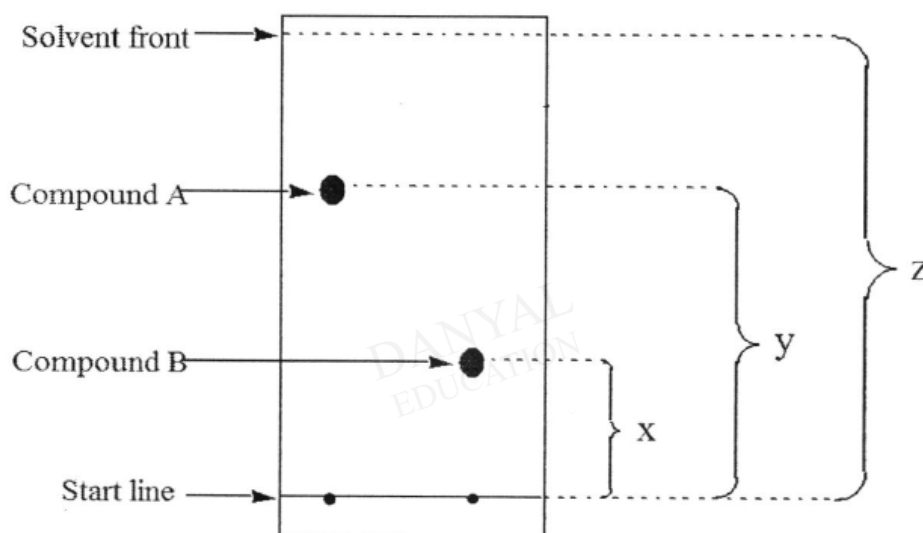
Q3

Why is the commercial preparation of pure oxygen from air possible?

- A Oxygen has a different boiling point from nitrogen.
- B Oxygen is denser than nitrogen.
- C Oxygen is more soluble in water than nitrogen.
- D Oxygen reacts more quickly than nitrogen.

Q4

A paper chromatogram of two compounds **A** and **B** is shown in the diagram below:



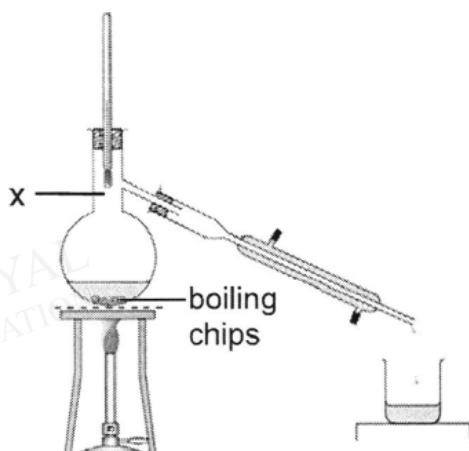
Which statement regarding the paper chromatogram must be correct?

- A Compound **A** has a lower  $R_f$  value than compound **B**.
- B Compound **A** is less soluble in the solvent than compound **B**.
- C The  $R_f$  value of **A** is  $\frac{y}{z}$ .
- D The solvent level is placed above the starting line.

Q5

The diagram below shows the distillation of a mixture of two liquids A and B.

The liquid A has a boiling point of  $80^{\circ}\text{C}$  and the liquid B has a boiling point of  $110^{\circ}\text{C}$ .



Which statement about the experiment is correct?

- A The boiling chips are added to increase the rate of reaction.
- B The liquid left in the flask contains more A than B.
- C The thermometer records a constant temperature as each liquid is collected.
- D The vapour at point X always contains more B than A.

Q6

The solubilities of three solids in water and tetrachloromethane are given in the table below.

solid	solubility in water	solubility in tetrachloromethane
sand	nil	nil
sodium chloride	good	nil
sulfur	nil	good

Which method would be suitable for obtaining **pure sand** from a mixture of sand, sodium chloride and sulfur?

- A Add tetrachloromethane and stir; then filter.
- B Add tetrachloromethane and stir; then filter, then add the residue to water and stir; and then filter this mixture and collect the residue.
- C Add water and stir; then filter; then evaporate the filtrate to dryness.
- D Add water and stir; then filter; then add tetrachloromethane to the filtrate and stir; then evaporate the solvent.

Q7

Some information on three solids is given below.

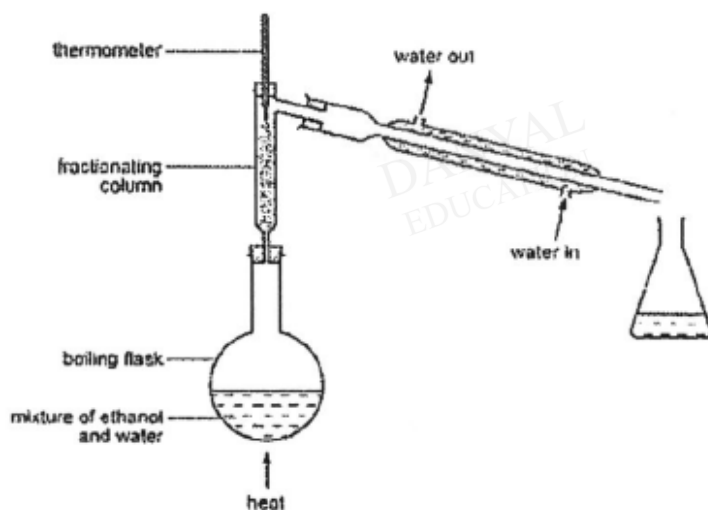
solid	solubility in water	solubility in ethanol	action of heat
X	soluble	insoluble	no effect
Y	insoluble	soluble	no effect
Z	soluble	soluble	sublimes

Which of the following procedures could be carried out to obtain a pure sample of Z from a mixture of the three solids?

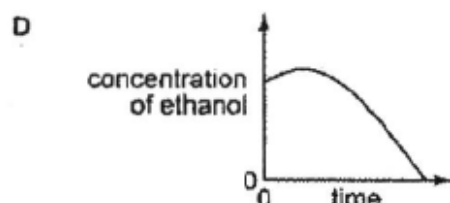
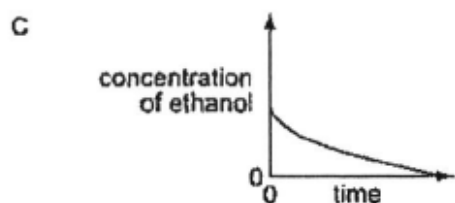
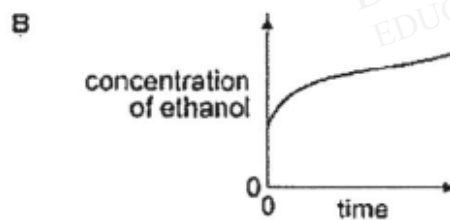
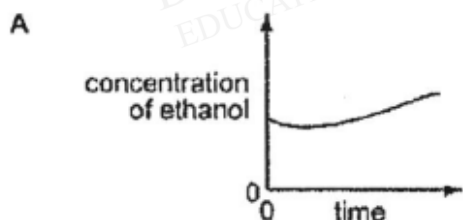
- A Add ethanol to the mixture, filter and collect the residue.
- B Add water to the mixture and filter to collect the residue.
- C Add ethanol to the mixture, filter and evaporate the filtrate.
- D Heat the mixture and condense the gases.

Q8

The apparatus shown is used to distil a dilute solution of ethanol in water.  
 [boiling point: ethanol, 78 °C; water, 100 °C]



Which graph shows the change in concentration of the ethanol in the boiling flask as the distillation proceeds?



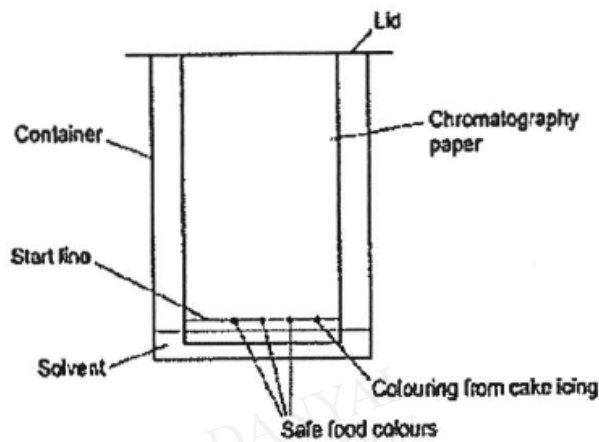
Q9

Which of the following is a method to separate a mixture of iodine and solid sodium iodide?

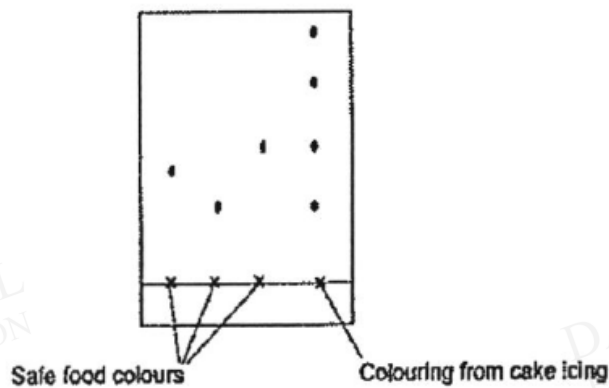
- A sublimation
- B adding water, stirring and filtering
- C adding water and carrying out simple distillation
- D adding water, stirring and using a separating funnel

Q10

The diagram shows an experimental set-up to check whether the colouring from the cake icing is safe for consumption.



The results of the paper chromatography experiment are shown.



Which of the following statements is not true?

- A The icing is considered as safe for consumption.
- B There are five different types of colours on the chromatogram.
- C The experiment set-up has a lid to reduce the evaporation of solvent.
- D The icing on cake is made up of four colours with different solubility.

**Answers**

**Separation Techniques Test 2.0**

Q1 B

Q2 B

Q3 A

Q4 C

Q5 C

Q6 B

Q7 D

Q8 C

Q9 A

Q10 A

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