

Summary Quiz (Chapter 47)

Section A: Multiple Choice

- Propanal is added to Tollens' reagent. Which of the following statements are correct?
 - Tollens' reagent is a solution of silver nitrate in excess ammonia solution.
 - Propanal acts as a reducing agent.
 - A silver mirror forms.

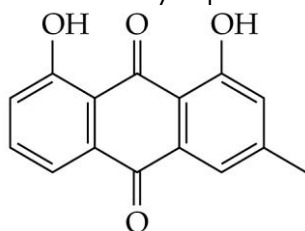
A. (1) and (2) only B. (1) and (3) only
 C. (2) and (3) only D. (1), (2) and (3)
- Which of the following compounds does NOT react with 2,4-dinitrophenylhydrazine?

A. Pentanal B. Pentan-1-ol
 C. Pentan-2-one D. Pentan-3-one
- A student is designing an experiment for the esterification between ethanol and propanoic acid. Which of the following information should be recorded in the risk assessment form?
 - Ethanol is flammable.
 - Concentrated sulphuric acid is corrosive.
 - Propanoic acid is oxidizing.

A. (1) and (2) only B. (1) and (3) only
 C. (2) and (3) only D. (1), (2) and (3)
- In recrystallization, the products are collected by suction filtration. Which of the following statements about suction filtration is INCORRECT?

A. It is faster than simple filtration.
 B. A Buchner funnel is used.
 C. It is a chemical process.
 D. During the process, the pressure in the filtering flask is reduced.
- Which of the following methods is the most suitable for separating a mixture of water and chloroform?

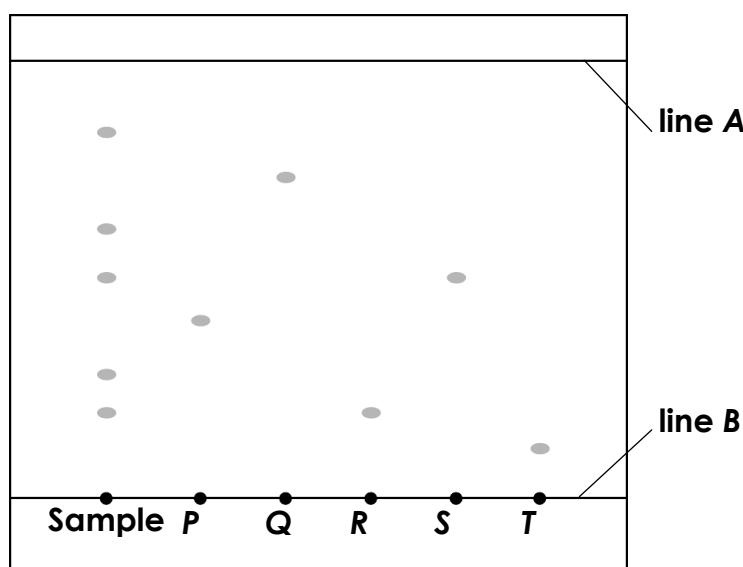
A. Simple distillation B. Thin layer chromatography
 C. Fractional distillation D. Solvent extraction
- Chrysophanic acid is a naturally occurring pigment that can be isolated from the rhubarb roots. The structure of chrysophanic acid is shown below.



Which of the following methods is the most suitable for separating chrysophanic acid from the other components in the rhubarb roots?

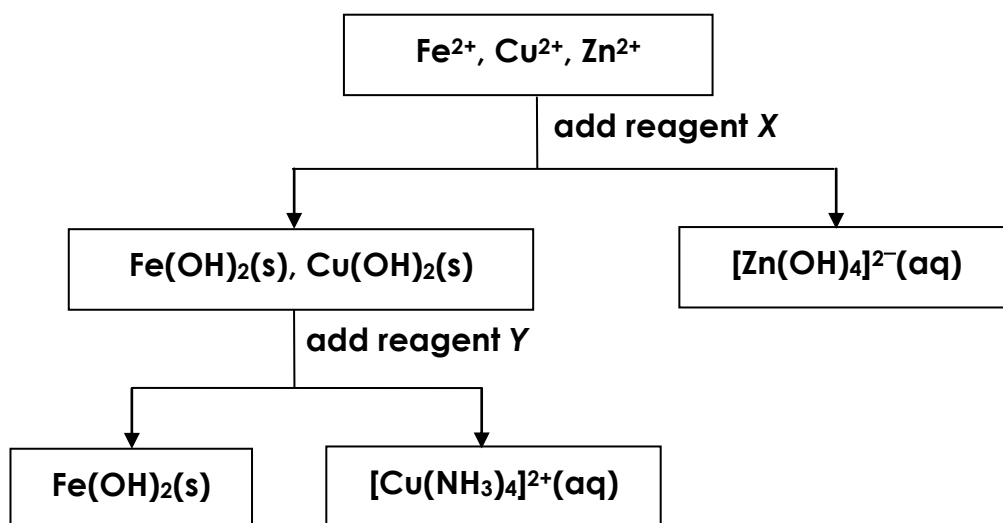
- A. Crystallization
 B. Column chromatography
 C. Fractional distillation
 D. Liquid-liquid extraction

Questions 7 and 8 refer to the following experiment. A sample of orange juice containing some food colourings and several pure food colourings (*P*, *Q*, *R*, *S* and *T*) were analysed by thin-layer chromatography. The chromatogram was obtained as follows:



7. Which of the following combinations is correct?
- | <u>Line A</u> | <u>Line B</u> |
|---------------------|------------------|
| A. Solvent front | Baseline |
| B. Baseline | Solvent front |
| C. Mobile phase | Stationary phase |
| D. Stationary phase | Mobile phase |
8. What food colourings does the sample contain?
- | | |
|--------------------------|-------------------------------------|
| A. <i>P</i> and <i>R</i> | B. <i>P</i> , <i>Q</i> and <i>T</i> |
| C. <i>R</i> and <i>S</i> | D. <i>S</i> and <i>T</i> |
9. Which of the following tests shows that a sample of calcium chloride is pure?
- A. It gives a brick-red flame in the flame test.
 B. It has a sharp melting point.
 C. It has a high melting point.
 D. It is highly soluble in water.

Questions 10 and 11 refer to the following flow diagram:



10. What are reagent X and reagent Y respectively?

- | | <u>Reagent X</u> | <u>Reagent Y</u> |
|----|--|--|
| A. | Excess $\text{NaOH}(\text{aq})$ | Excess $\text{NH}_3(\text{aq})$ |
| B. | Excess $\text{NH}_3(\text{aq})$ | Excess $\text{NaOH}(\text{aq})$ |
| C. | Small amount of $\text{NaOH}(\text{aq})$ | Small amount of $\text{NH}_3(\text{aq})$ |
| D. | Small amount of $\text{NH}_3(\text{aq})$ | Small amount of $\text{NaOH}(\text{aq})$ |

11. Which of the following methods can be used to regenerate Zn^{2+} from $[\text{Zn}(\text{OH})_4]^{2-}(\text{aq})$?

- Heat the solution to dryness
- Add excess hydrochloric acid
- Add excess aqueous ammonia
- Add excess sodium hydroxide solution

Section B: Structured question

Cyclohexene (C_6H_{10}) can be prepared from cyclohexanol ($C_6H_{11}OH$). The following table shows parts of the experimental procedure.

| | |
|---------------|---|
| Step 1 | Add 0.1 mol of cyclohexanol to a pear-shaped flask. |
| Step 2 | Add 85% phosphoric acid, drop by drop, to the flask with shaking. |
| Step 3 | Heat the reaction mixture and collect the distillate with a boiling point range from 78–86°C. |
| Step 4 | Add the distillate to saturated sodium chloride solution. |
| Step 5 | Shake the mixture and then allow the layers to separate. Discard the aqueous layer. |

- (a) State the type of reaction involved when cyclohexanol is converted into cyclohexene.
- (b) Draw a labelled diagram of experimental set-up used in step 3.
- (c) (i) Name the apparatus used to shake the mixture in step 5.
(ii) State ONE precaution that should be taken when shaking the mixture in step 5.
- (d) Describe how to obtain cyclohexene from the organic layer after shaking.

The End

Suggested Answer

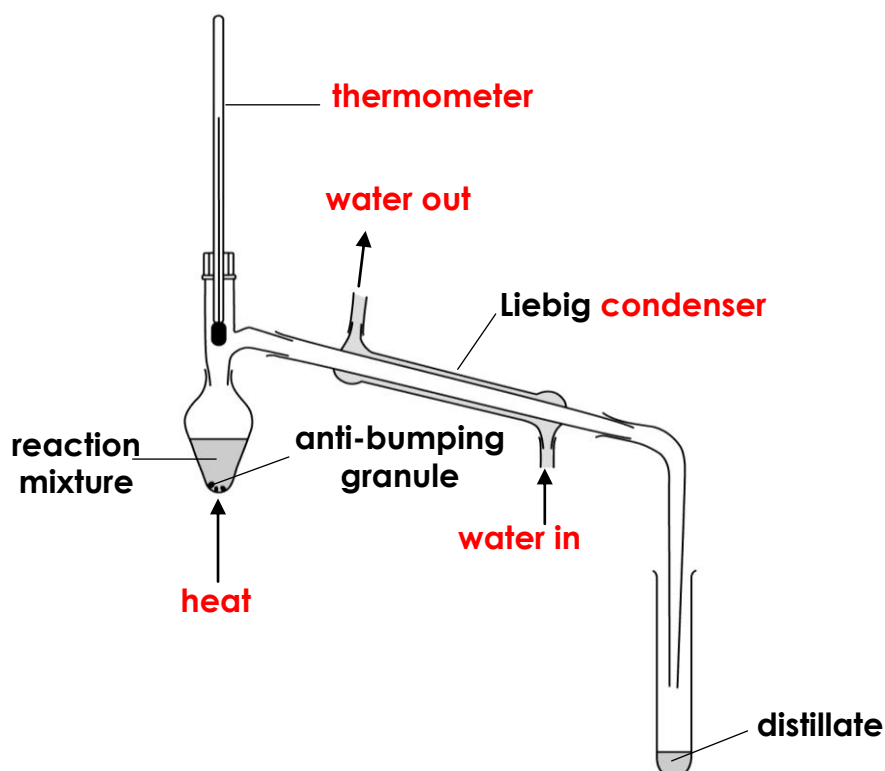
Section A

| | | | |
|----|---|-----|---|
| 1. | D | 7. | A |
| 2. | B | 8. | C |
| 3. | A | 9. | B |
| 4. | C | 10. | A |
| 5. | D | 11. | B |
| 6. | B | | |

Section B

(a) Dehydration

(b)



(c) (i) Separating funnel

(ii) Open the tap of separating funnel occasionally to release the gas pressure.

(d) Add anhydrous calcium chloride to the organic layer. Filter the organic layer. Carry out distillation of the filtrate. The distillate is cyclohexene.