First Hope

COMPLETE NOTES

Click here to visit our website

PHARMACY PRACTICAL NOTES

Complete subject and semesters are available on FirstHope app only.

Scan or click here

Click here to get the app >

Available on Google Play

JOIN THE FIRSTHOPE COMMUNITY

Join our Telegram channel

Click here to join Telegram >

Scan or click here

@FirstHopeNotes

Instagram

@firsthope.official

Click here to follow >

YouTube channel

FirstHope-Pharmacy / Live streams

Click here to watch >

WhatsApp channel

Follow FirstHope on WhatsApp

Click here to join >

FirstHope website

firsthope.co.in

Click here to visit >

B.Pharm / D.Pharm / M.Pharm / Pharm.D

Complete subjects and semesters are available in the FirstHope app.

Critical Solution Temperature and Composition of Phenol-Water

Experiment 13 - Practical Notes

Name: _____ Roll no.: _____ Date: _____

Aim

To construct a miscibility curve and estimate the upper critical solution temperature and composition.

Principle

A partially miscible binary system can form two liquid phases below its coexistence boundary. The upper critical solution temperature is the maximum of the miscibility curve, where the two coexisting phases become indistinguishable. Impurities and composition errors can shift the curve.

Requirements

- Instructor-prepared phenol-water composition series in the designated supervised setup, or supplied transition records.
- Controlled water bath, temperature probe, gentle mixing method and plotting worksheet.

Procedure

1. Record composition

Use mass percent phenol: 100 mphenol/(mphenol+mwater). Do not replace mass percent with volume percent.

2. Heat slowly

Staff supervise controlled bath heating and mixing. Record the temperature at which a cloudy two-phase mixture becomes one clear phase.

3. Cool slowly

Record the temperature of renewed turbidity while cooling under the method's mixing conditions. Repeat as prescribed.

4. Transition value

Use the defined heating/cooling evaluation method and note hysteresis. A mean is only used where that is the prescribed treatment.

5. Plot

Plot transition temperature against phenol mass percent and draw a smooth supported coexistence boundary.

6. Estimate apex

Read the highest temperature and its composition. Mark the one-phase and two-phase regions and do not force a sparse dataset to an exact literature number.

Observations and Record

Phenol mass %	Heating / cooling transition (°C)	Evaluated transition
_____	_____	_____
_____	_____	_____
_____	_____	_____

Worked Example

The numbers below are illustrative; enter your own observations in the record.

- A constructed plot with a maximum at about 66.8°C and roughly one-third phenol by mass illustrates an upper CST. Actual composition and temperature are read from the measured curve.
- For 3.40 g phenol plus 6.60 g water, composition = 34.0% w/w phenol.

Result

Record the observed outcome and calculated value, with units. State whether the stated laboratory specification was met; do not copy the worked example as your result.

Precautions

- Phenol is corrosive and systemically hazardous. Use only the supervised staff-approved setup and avoid skin contact.
- No open flame, improvised sealed heating or unsupervised mixture preparation.
- Allow thermal equilibration and record both heating and cooling behaviour.

Viva Questions and Answers

1. What is an upper CST?

The maximum coexistence temperature above which the two liquids are miscible at all compositions within the system.

2. Why measure composition by mass?

The required phase diagram uses mass fraction, which differs from volume fraction.

3. Why can impurities shift the curve?

They change component interactions and phase equilibria.

First Hope

COMPLETE NOTES

Click here to visit our website

PHARMACY PRACTICAL NOTES

Complete subject and semesters are available on FirstHope app only.

Scan or click here

Click here to get the app >

Available on Google Play

JOIN THE FIRSTHOPE COMMUNITY

Join our Telegram channel

Click here to join Telegram >

Scan or click here

@FirstHopeNotes

Instagram

@firsthope.official

Click here to follow >

YouTube channel

FirstHope-Pharmacy / Live streams

Click here to watch >

WhatsApp channel

Follow FirstHope on WhatsApp

Click here to join >

FirstHope website

firsthope.co.in

Click here to visit >

B.Pharm / D.Pharm / M.Pharm / Pharm.D

Complete subjects and semesters are available in the FirstHope app.