THE OPEN UNIVERSITY OF SRI LANKA
FACULTY OF HEALTH SCIENCES
DEPARTMENT OF PHARMACY
THE ACADEMIC YEAR 2023/2024 – SEMESTER I

**BACHELOR OF PHARMACY HONOURS**
**FMU5403 – PHARMACEUTICAL TECHNOLOGY I – LEVEL 5**
**FINAL EXAMINATION**
**DURATION: THREE (03) HOURS**

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**DATE: 03RD APRIL 2024** **TIME: 9.30 P.M. – 12.30 P.M.**

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**Part B – Short Answer Questions (20 Marks)**

1.

1.1 Define the term "Dew point." (02 marks)

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.....

.....

1.2 What is the relationship between dew point, dry bulb temperature, and wet bulb temperature? (01 mark)

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.....

1.3 In a pharmaceutical quality control laboratory, Loss on Drying (LOD) analysis was performed for a sample with initial weight of 50 g. The weight of the sample was measured in 30 min intervals and recorded as follows.

| Time (min) | Weight (g) |
|---|---|
| 30 | 49 |
| 60 | 48 |
| 90 | 48 |

1.3.1 Calculate the percentage loss on drying. (02 marks)

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1.3.2 Calculate the percentage of moisture content present in the sample. (02 marks)

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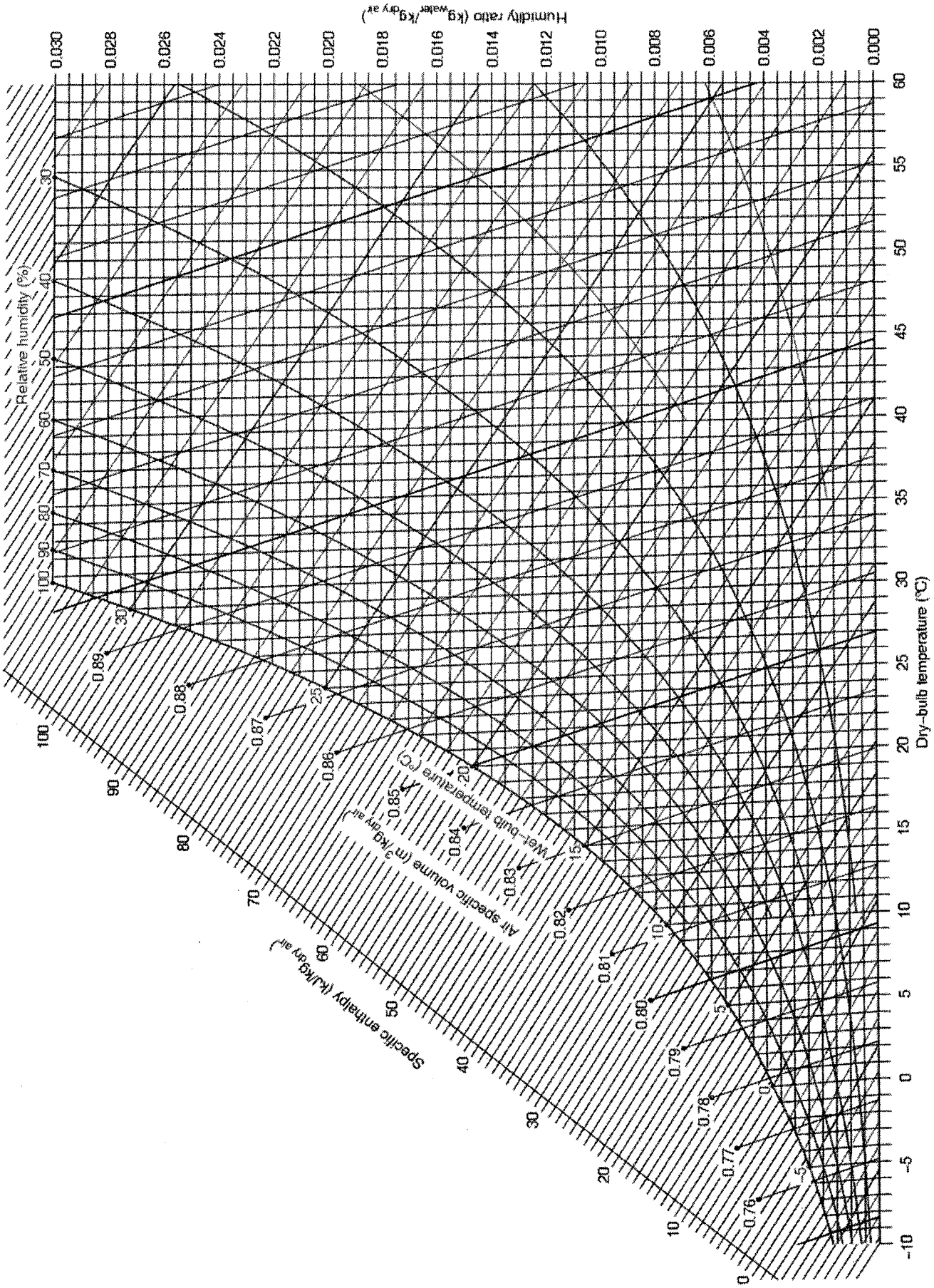
1.4 If the dry bulb temperature is $35^{o}$ C and wet bulb temperature is $30^{o}$ C, determine the following using the given psychrometric chart. (03 marks)

1.4.1 Relative humidity :-.....

1.4.2 Humidity ratio :-.....

1.4.3 Specific enthalpy :- .....

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Humidity ratio (kg$_{water}$/kg$_{dry\ air}$)
0.030
0.028
0.026
0.024
0.022
0.020
0.018
0.016
0.014
0.012
0.010
0.008
0.006
0.004
0.002
0.000
Relative humidity (%)
Dry-bulb temperature (°C)
Wet-bulb temperature (°C)
Air specific volume (m$^3$/kg$_{dry\ air}$)
Specific enthalpy (kJ/kg$_{dry\ air}$)

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2.

2.1 What is meant by powder segregation? (01 mark)

.....

.....

.....

2.2 List two (02) powder segregation types based on the particle size. (02 marks)

I.....

II.....

2.3 State three (03) methods to prevent powder segregation. (03 marks)

I.....

.....

.....

II.....

.....

.....

III.....

.....

.....

2.4 State one (01) test method for each of the following powder characteristics.

(02 marks)

I. Evaluation of flow properties :.....

II. Evaluation of compressibility :.....

2.5 State the equation that is used to calculate any of the above characteristics, according to your test method. (02 marks)

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**Part C – Structured Essay Questions (60 Marks)**

1.

1.1 Define the term "unit cell of a crystal lattice". (03 marks)

1.2 State two (02) characteristic features for each of the following. (04 marks)

I. Crystalline solids

II. Amorphous solids

1.3 How does the evaporating process in a "Falling Film Evaporator" differ from a "Climbing Film Evaporator"? (08 marks)

2.

2.1 State Raoult's law. (02 marks)

2.2 A and B are the two components of a liquid mixture. Mole fraction of A in the liquid mixture is 0.8.The mixture is distilled at 60° C. The vapor pressure exerted by A and B in their pure state at 60° C is 10 mmHg and 30 mmHg respectively. Assuming this mixture follows Raoult's law and answer the following questions.

2.2.1 Calculate the partial pressure ($P_A$) exerted by A. (02 marks)

2.2.2 Calculate the partial pressure ($P_B$) exerted by B. (02 marks)

2.2.3 Calculate the mole fraction of A and B in the vapor. (05 marks)

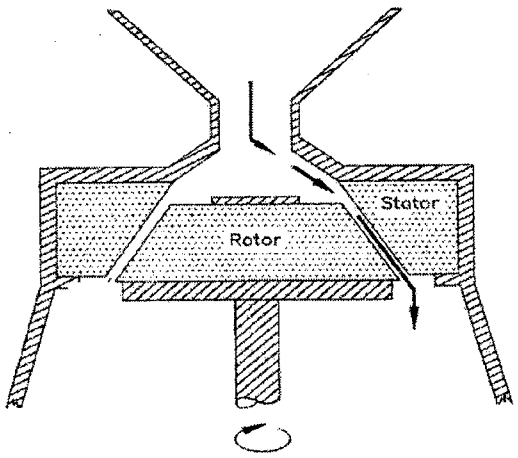
2.2.4 Out of A and B, which component has the lowest boiling point? Explain. (04 marks)

3.

3.1 List three (03) mechanisms of filtration. (03 marks)

3.2 Describe three (03) factors influencing filtration rate and outline how these factors can be optimized for effective filtration. (06 marks)

3.3 Identify the given mill and briefly explain the mixing mechanism of it on semi-solid mixing. (06 marks)



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4.

4.1 State three (03) key components of a "Spray Dryer". (03 marks)

4.2 Compare and contrast the drying process of "Continuous Tunnel Dryer" and "Turbo Tray Dryer". (06 marks)

4.3 Briefly explain three (03) advantages and three (03) disadvantages of "Perforated Basket Centrifuge". (06 marks)