DATE: 16TH MAY 2025 TIME: 9.30 A.M. – 12.30 P.M.

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

**Answer all the questions.**

1.

1.1 Give one (01) example for each of the following mixers used in solid mixing. (02 marks)

1.1.1 Agitator mixer:.....

1.1.2. Tumbling mixer:.....

1.2 List the four (04) main mechanisms involved in liquid mixing. (04 marks)

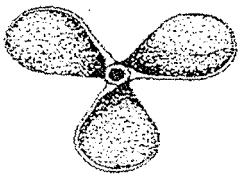
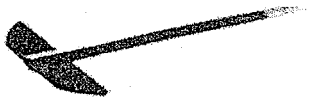
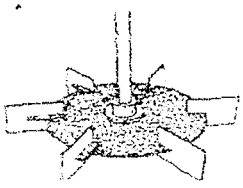
I.....

II.....

III.....

IV.....

1.3 Different impeller types can produce different flow patterns in mixing vessels. Identify the following impeller types used in liquid mixing and write the flow pattern/s that they produce. (04 marks)

| Impeller | Impeller Type | Flow Pattern / s |
|---|---|---|
|  | | |
|  | | |
|  | | |

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2.

2.1 Define the following terms in the context of drying of wet solids. (02 marks)

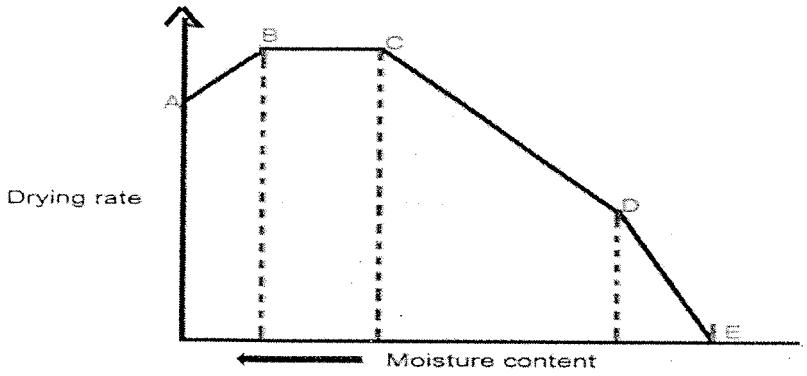
2.1.1 Free moisture content:.....

.....

2.1.2. Equilibrium moisture content:.....

.....

2.2 The drying curve of a pharmaceutical wet granule mass is given below. Name the four (04) drying stages indicated in the figure. (04 marks)




B – C :- .....

C – D :- .....

D – E :- .....

E :- .....

2.3 State the drying behavior in the following regions of the drying curve. (02 marks)

2.3.1 B – C:.....

.....

2.3.2 C – D:.....

.....

2.4 State the mechanism of supercritical drying. (02 marks)

.....

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

**Answer all the questions.**

1.

1.1 Define the term "polymorphism" in the context of crystallization. (02 marks)

1.2 Classify the crystalline solids based on the type of attractive forces involved in the formation of the crystal structure. (04 marks)

1.3 Briefly explain the sequential steps involved in the formation of crystals from a supersaturated solution. (09 marks)

2.

2.1 Define the term "azeotrope". (03 marks)

2.2 Give two (02) characteristic features of each of the following mixtures. (04 marks)

2.2.1 Mixtures showing positive deviation from Raoult's law

2.2.2 Mixtures showing negative deviation from Raoult's law

2.3 Compare and contrast molecular distillation and extractive distillation. (08 marks)

3.

3.1 List two (02) types of dehumidifiers. (02 marks)

3.2 Write a brief account on "Karl Fischer titration". (05 marks)

3.3 Compare and contrast the drying process of "Continuous Tunnel Dryer" and "Turbo Tray Dryer". (08 marks)

4.

4.1 Define the term "Elutriation". (02 marks)

4.2 List three (03) sieving methods used for particle size separation. (03 marks)

4.3 Configuration of the hammers is an important factor in particle size reduction using a hammer mill. Explain the statement. (10 marks)