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**B PHARM**  
**(SEM-III) THEORY EXAMINATION 2018-19**  
**PHARMACEUTICAL ENGINEERING**

**Time: 3 Hours****Total Marks: 75****Note: 1.** Attempt all Sections.

**SECTION A**

**1. Attempt all questions in brief. 10 x 2 = 20**

- a. Why there is a need for size separation?
- b. What is boundary layer?
- c. Give some real examples for heat transfer process (conduction, convection & radiation)
- d. What is the relation among boiling point, vapor pressure & evaporation?
- e. Differentiate between surface filtration and depth filtration.
- f. Which equipment is suitable for filtration of slurry containing high solid content and why?
- g. Write the principle of vacuum dryer.
- h. Mention equipment suitable for semisolid mixing.
- i. What is molecular distillation?
- j. Give the properties of Chromium and Nickel.

**SECTION B**

**2. Attempt any twoparts of the following: 2 x 10 = 20**

- a. Write in detail about factors influencing rate of filtration.
- b. Write the applications of filtration, size reduction, mixing and distillation in pharma.
- c. Elaborate the factors influencing evaporation rate. Write the principle, construction, working and advantages of forced circulation evaporators.

**SECTION C**

**3. Attempt any fiveparts of the following: 7 x 5 = 35**

- a. Write construction and working of Orifice meter and Rotometer.
- b. Write the principle, construction, working, uses, merits and demerits of Ball mill.
- c. What the principle of simple distillation. Write in detail about steam distillation.
- d. Write the principle, construction, working, uses, merits and demerits of sigma blade mixer.
- e. Write the principle, construction, working, uses, merits and demerits of Spray dryer.
- f. Write in detail about the factors affecting selection of a material.
- g. What is corrosion? Write in detail about the theory of corrosion.

**B. PHARM**  
**(SEM-III) THEORY EXAMINATION 2019-20**  
**PHARMACEUTICAL ENGINEERING**

Time: 3 Hours

Total Marks: 75

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

**SECTION A**

1. Attempt all questions in brief.

10 x 2 = 20

|    |                                                                                               |
|----|-----------------------------------------------------------------------------------------------|
| a. | Differentiate between Fluid Statics & Fluid Dynamics.                                         |
| b. | Define Attrition & Impact?                                                                    |
| c. | What is the difference between Sedimentation & Elutriation?                                   |
| d. | State and express Fourier's Law of heat transmission with equation.                           |
| e. | How evaporation differs from drying and distillation?                                         |
| f. | Write the principle of Steam Distillation.                                                    |
| g. | What do you mean by Sublimation?                                                              |
| h. | Differentiate between Mixing & Blending. What do you understand by dead spot in solid mixing? |
| i. | Express the mechanisms of Impingement & Entanglement.                                         |
| j. | What is meant by under-driven and over-driven assembly? Give examples also.                   |

**SECTION B**

2. Attempt any two parts of the following:

2 x 10 = 20

|    |                                                                                                                                                                          |
|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| a. | State and derive Bernoulli's equation.                                                                                                                                   |
| b. | What do you understand by Multiple Effect Evaporator? Describe construction & working of triple effect evaporator? Add a note on economy of multiple effect evaporators. |
| c. | Explain with the help of diagram the principle, working and applications of Flash Distillation.                                                                          |

**SECTION C**

3. Attempt any five parts of the following:

5 x 7 = 35

|    |                                                                                                            |
|----|------------------------------------------------------------------------------------------------------------|
| a. | Describe Reynolds's experiment elucidating different types of flow patterns.                               |
| b. | Draw a neat and labeled diagram of a Shell & Tube Heat Exchanger and explain its construction and working. |
| c. | Describe the principle, construction, working and uses of Fluidized Bed Dryer.                             |
| d. | Describe the principle, construction working and uses of Twin Shell Blender.                               |
| e. | Explain theories of filtration. Add a note on objectives of filtration.                                    |
| f. | Describe the principle, construction working and uses of Perforated Basket Centrifuge.                     |
| g. | Write a note on different types of Stainless Steel, its composition and its uses.                          |



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**B. PHARM.**  
**(SEM: III) THEORY EXAMINATION 2020-21**  
**PHARMACEUTICAL ENGINEERING**

**Time: 3 Hours****Total Marks: 75****Note: 1.** Attempt all Sections. If require any missing data; then choose suitably.**SECTION A****1. Attempt all questions in brief.****10 x 2 = 20**

|    |                                                                                |
|----|--------------------------------------------------------------------------------|
| a. | What is the significance of Reynold's Number?                                  |
| b. | Define the terms Attrition & Impact?                                           |
| c. | Name any 2 mechanisms of Size Separation.                                      |
| d. | State and express Fourier's Law of heat transmission with equation.            |
| e. | How evaporation differs from drying and distillation?                          |
| f. | What do you understand by Molecular Distillation?                              |
| g. | What do you mean by Eutectic Point?                                            |
| h. | Differentiate between Mixing & Blending with examples.                         |
| i. | How will you write Poiseuille's and Darcy's equation for theory of filtration? |
| j. | What are Ferrous and Non-ferrous metals? Give 2 examples each.                 |

**SECTION B****2. Attempt any two parts of the following:****2 x 10 = 20**

|    |                                                                                                                                              |
|----|----------------------------------------------------------------------------------------------------------------------------------------------|
| a. | Give a neat sketch of two fluid manometers. Explain the construction and working principle of Simple Manometer,                              |
| b. | Describe principle, construction & working of Triple Effect Evaporator? What do you mean by economy of multiple effect evaporators? Explain. |
| c. | Discuss in details about the principle, construction, working and uses of Freeze Dryer.                                                      |

**SECTION C****3. Attempt any five parts of the following:****7 x 5 = 35**

|    |                                                                                                                                  |
|----|----------------------------------------------------------------------------------------------------------------------------------|
| a. | What do you understand by Size Reduction? Describe the principle, construction, working and uses of Ball Mill.                   |
| b. | Define the term Distillation. Discuss about the principle, construction, working and uses of Steam Distillation.                 |
| c. | Distinguish between Solid Mixing & Liquid Mixing. Add a note on the mechanisms of solid mixing and liquid mixing.                |
| d. | What are the factors influencing filtration? Explain the principle and working of Drum Filter with the help of suitable diagram. |
| e. | Classify Evaporators. What are the factors influencing evaporation? Discuss.                                                     |
| f. | Describe the principle, construction working and uses of Non-Perforated Basket Centrifuge                                        |
| g. | What is Corrosion? Name the various types of corrosion. How can corrosion be prevented?                                          |



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Subject Code: BP304T

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**BPHARM**  
**(SEM III) THEORY EXAMINATION 2021-22**  
**PHARMACEUTICAL ENGINEERING**

**Time: 3 Hours****Total Marks: 75****Note: 1. Attempt all Sections. If require any missing data; then choose suitably.****SECTION A****1. Attempt all questions in brief.****10 x 2 = 20**

|    |                                                                |
|----|----------------------------------------------------------------|
| a. | Give the difference between evaporation and drying.            |
| b. | Define filtration.                                             |
| c. | Draw the labelled diagram of non perforated basket centrifuge. |
| d. | Write Reynold's equation.                                      |
| e. | Define size reduction.                                         |
| f. | Write the statement of Raoult's law.                           |
| g. | List the types of corrosion.                                   |
| h. | Distinguish the solid and liquid mixing.                       |
| i. | Define centrifugation.                                         |
| j. | Discuss the advantages of double cone blender.                 |

**SECTION B****2. Attempt any two parts of the following:****2 x 10 = 20**

|    |                                                                                                              |
|----|--------------------------------------------------------------------------------------------------------------|
| a. | Explain the principles, construction, working, uses, merits and demerits of ball mill with suitable diagram. |
| b. | Summarize the factors affecting selection of material for pharmaceutical plant construction.                 |
| c. | Explain the theory and applications of centrifugation.                                                       |

**SECTION C****3. Attempt any five parts of the following:****7 x 5 = 35**

|    |                                                                                                                    |
|----|--------------------------------------------------------------------------------------------------------------------|
| a. | Discuss Fourier's law of heat transfer and its applications.                                                       |
| b. | Show the basic principle and applications of steam distillation with a neat sketch.                                |
| c. | Describe the applications and mechanisms of size reduction.                                                        |
| d. | Outline the principle, construction, working, uses, merits and demerits of planetary mixer using suitable diagram. |
| e. | Discuss the factors influencing filtration.                                                                        |
| f. | Describe the principle and working of filter cake with a clear and labelled diagram.                               |
| g. | Describe the different phases of drying using rate of drying curve.                                                |

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**B. PHARM.**  
**(SEM III) THEORY EXAMINATION 2022-23**  
**PHARMACEUTICAL ENGINEERING**

**Time: 3 Hours****Total Marks: 75****Note:** Attempt all Sections. If require any missing data; then choose suitably.

**SECTION A**

**1. Attempt all questions in brief. 2 x 10 = 20**

- a. Describe Attrition & Impact.
- b. Name any two mechanisms of Size Separation.
- c. Define the term Entrainment. How it is prevented?
- d. Compare Heat-interchanger and Heat-exchanger.
- e. Differentiate between Bound Moisture & Unbound Moisture.
- f. What is Convective and Diffusive Mixing?
- g. Discuss Impingement & Entanglement.
- h. What are Filter Aids? Discuss in brief.
- i. Define Corrosion. Explain the effect of pH on corrosion.
- j. Name the materials comes under Inorganic and organic non-metals.

**SECTION B**

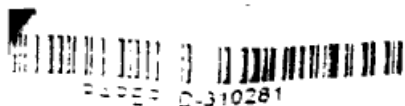
**2. Attempt any two parts of the following: 10 x 2 = 20**

- a. Draw a neat sketch of Fluid Energy Mill. Describe principle, construction, working and applications of Hammer Mill.
- b. Explain principle, construction, and operational details of Freeze Drying. Summarize its pharmaceutical applications also.
- c. Categorize the types of Filters. Describe principle, construction and working of Plate & Frame Filter Press.

**SECTION C**

**3. Attempt any five parts of the following: 7 x 5 = 35**

- a. Derive an equation to determine velocity of fluid at orifice by using Orifice meter.
- b. Classify Evaporators. Describe construction and working of Horizontal Tube Evaporator.
- c. Distinguish between Mixing and Blending. Describe construction, working and uses of Silverson Emulsifier.
- d. Compare and contrast Poiseuille's & Darcy's theory of filtration, Express Kozeny-Carman equation also.
- e. Define Centrifugation. Explain theory of centrifugation with respect to centrifugal effect.
- f. Discuss about the principle, construction, working and uses of Fractional Distillation.
- g. Write a descriptive note on types of Stainless Steel, composition, and its uses.



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Subject Code: BP3041

BPHARM  
(SEM III) THEORY EXAMINATION 2023-24  
PHARMACEUTICAL ENGINEERING

TIME: 3 HRS

M.MARKS: 75

**Note:** Attempt all Sections.

**SECTION A**

**1. Attempt all questions in brief.**

**10 x 2 = 20**

- a. Draw a labeled diagram of fluid energy mill.
- b. Ball mill is not useful for size reduction of fibrous material. Explain
- c. Define distillation.
- d. Explain Fourier's law for conduction of heat.
- e. Suggest suitable equipments for solid-solid mixing.
- f. What is free moisture content.
- g. Write use of super centrifuge.
- h. What are filter aids?
- i. What is corrosion?
- j. Classify materials used for the construction of the plant.

**SECTION B**

**2. Attempt any two parts of the following:**

**2 x 10 = 20**

- a. Describe the principle, construction, working, uses and merits of the ball mill with a well labeled diagram.
- b. Explain the basic principle and methodology of flash distillation.
- c. Describe various types of corrosion and suggest the methods to prevent the same in the pharmaceutical industry.

**SECTION C**

**3. Attempt any seven parts of the following:**

**7 x 5 = 35**

- a. Describe the construction, working, uses and merits of cyclone separator. -
- b. Explain the working of any one heat interchanger with a labeled diagram. -
- c. How do you classify dryers? Explain the principle of drum dryer. -
- d. Write a note on perforated basket centrifuge.
- e. Write a note on the utility of glass and stainless steel in pharmaceutical industry. -
- f. Give a neat sketch of venturi meter and explain its principle and working. -
- g. Discuss factors influencing evaporation.
- h. Draw the neat sketch of the ribbon blender and give its principle, working and application.
- i. Describe the construction, working, uses, merits and demerits of the filter leaf with a well labeled diagram.



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Printed Page: 1 of 1  
Subject Code: BP304T

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**BPHARM**  
**(SEM III) THEORY EXAMINATION 2023-24**  
**PHARMACEUTICAL ENGINEERING**

**TIME: 3HRS****M.MARKS: 75****Note:** 1. Attempt all Sections. If require any missing data; then choose suitably.**SECTION A****1. Attempt all questions in brief.****10 x 2 = 20**

|    |                                                                |
|----|----------------------------------------------------------------|
| a. | What is Darcy's law?                                           |
| b. | Write the applications of centrifugation                       |
| c. | What is critical moisture content?                             |
| d. | Differentiate between drying and evaporation                   |
| e. | Define bound moisture content and equilibrium moisture content |
| f. | Define molecular distillation                                  |
| g. | Mention the significance of Raoult's law                       |
| h. | Explain the principle of operation of venturimeter             |
| i. | Mention the different mechanisms of filtration                 |
| j. | What is work index?                                            |

**SECTION B****2. Attempt any two parts of the following:****2 x 10 = 20**

|    |                                                                                                                                                                             |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| a. | Explain with the help of a diagram the principle, construction, working, advantages, disadvantages, and applications of a ball mill. What is critical speed of a ball mill? |
| b. | With the help of a neat diagram, discuss the concept of film and overall heat transfer in forced convection.                                                                |
| c. | Classify dryers. Write a detailed note on rate of drying curve emphasizing constant rate and falling rate periods.                                                          |

**SECTION C****3. Attempt any five parts of the following:****7 x 5 = 35**

|    |                                                                                                 |
|----|-------------------------------------------------------------------------------------------------|
| a. | Narrate the design, working and application of cyclone separator.                               |
| b. | Explain the working of 2-4 shell and tube heat exchanger with a labelled diagram.               |
| c. | Suggest the various factors affecting rate of evaporation.                                      |
| d. | Discuss the principle, construction, working, uses, merits and demerits of fluidized bed dryer. |
| e. | Enlist the various factors affecting material selection for pharmaceutical plant construction   |
| f. | Elaborate the the principle, construction, working, merits and demerits of rotary drum dryer.   |
| g. | Mention the various types of corrosion and ways to avoid them                                   |



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Subject Code: BP304T

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**BPHARM**  
**(SEM III) THEORY EXAMINATION 2024-25**  
**PHARMACEUTICAL ENGINEERING**

**TIME: 3 HRS****M.MARKS: 75**

**Note:** 1. Attempt all Sections. If require any missing data; then choose suitably.  
 2. Any special paper specific instruction.

**SECTION A****1. Attempt *all* questions in brief.****10 x 2 = 20**

|    |                                                                         |
|----|-------------------------------------------------------------------------|
| a. | What is critical speed of a ball mill.                                  |
| b. | Define Reynold number.                                                  |
| c. | What is convection?                                                     |
| d. | State Bernoulli's theorem                                               |
| e. | How does tray dryer works in a pharma industry?                         |
| f. | Justify with examples the differences between solid and liquid mixing . |
| g. | What is filter aid and filter media?                                    |
| h. | What is grey body and black body?                                       |
| i. | What is the difference between Sedimentation & Elutriation?             |
| j. | What is galvanic corrosion?                                             |

**SECTION B****2. Attempt any *two* parts of the following;****2 x 10 = 20**

|    |                                                                                                                                                       |
|----|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| a. | Suggest the factors affecting size reduction. Explain with a diagram the working principles, applications and process of size reduction of ball mill. |
| b. | Narrate the various types of corrosion. Suggest some measures to control such corrosion                                                               |
| c. | Draw and explain drying rate curve. Write a short note on fluidized bed dryer                                                                         |

**SECTION C****3. Attempt any *five* parts of the following;****7 x 5 = 35**

|    |                                                                                                                                                                        |
|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| a. | What is filter aid? Explain the various factors influencing filtration.                                                                                                |
| b. | Discuss the working uses, merits and demerits of Perforated basket centrifuge, Non-perforated basket centrifuge                                                        |
| c. | What are the various processes of heat transfer ? Explain the various types of shell and tube heat exchangers with the help of diagrams.                               |
| d. | Explain the principles, construction and uses of twin shell blender.                                                                                                   |
| e. | What is filter aid? Explain the various factors influencing filtration.                                                                                                |
| f. | Explain steam and molecular distillation alongwith its pharmaceutical applications                                                                                     |
| g. | Write short notes on:<br><div style="display: flex; justify-content: space-around; margin-top: 10px;"> <span>i. Sieve shaker</span> <span>ii. Pitot tube</span> </div> |



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Subject Code:BP304T

Roll No:

**BPHARM**  
**(SEM. III) THEORY EXAMINATION 2025-26**  
**PHARMACEUTICAL ENGINEERING**

**TIME: 3 HRS****M.MARKS: 75**

**Note:** Attempt all Sections. In case of any missing data; choose suitably.

**SECTION A**

**1. Attempt all questions in brief.****10 x 02 = 20**

|    |                                                               |
|----|---------------------------------------------------------------|
| a. | Define Reynolds number and its significance.                  |
| b. | State any two differences between laminar and turbulent flow. |
| c. | What is Venturi meter used for?                               |
| d. | Define fluid energy mill.                                     |
| e. | What is sieve analysis?                                       |
| f. | State Fourier's law of heat conduction.                       |
| g. | What is flash distillation?                                   |
| h. | Define equilibrium moisture content.                          |
| i. | What is filter aid? Give one example.                         |
| j. | Define super centrifuge.                                      |

**SECTION B**

**2. Attempt any two of the following:****02 x 10 = 20**

|    |                                                                                                        |
|----|--------------------------------------------------------------------------------------------------------|
| a. | Explain the principle, construction and working of Venturi meter. Add its pharmaceutical applications. |
| b. | Describe size separation techniques. Explain cyclone separator with neat labelled diagram.             |
| c. | Explain evaporation process. Discuss working, merits and demerits of climbing film evaporator.         |

**SECTION C**

**3. Attempt any five of the following:****05 x 07 = 35**

|    |                                                                                                 |
|----|-------------------------------------------------------------------------------------------------|
| a. | Explain Bernoulli's theorem and discuss its pharmaceutical applications.                        |
| b. | Discuss mechanism of size reduction. Explain fluid energy mill with advantages and limitations. |
| c. | Write a note on heat transfer by radiation and convection with suitable examples.               |
| d. | Explain rate of drying curve and its significance in pharmaceutical drying.                     |
| e. | Describe construction, working and applications of spray dryer.                                 |
| f. | Explain filtration theories and factors affecting filtration rate.                              |
| g. | Discuss corrosion in pharmaceutical plants. Explain any two methods of prevention.              |