

THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

(LO 2037)

MARCH 2019

Sub. Code: 2037

B.PHARM. DEGREE EXAMINATION
PCI Regulation – SEMESTER III
PAPER IV – PHARMACEUTICAL ENGINEERING

Q.P. Code: 562037

Time: Three hours

Maximum: 75 Marks

I. Elaborate on: Answer any TWO questions. (2 x 10 = 20)

1. Describe the construction, working principle, efficiency, merits and demerits of Fractional distillation.
2. Discuss in detail Ball Mill.
3. Write about the principle, construction, working and application of Freeze dryer.

II. Write notes on: Answer any SEVEN questions. (7 x 5 = 35)

1. Describe various types of iron as material of construction.
2. Cyclone Separator.
3. Factors affecting size reduction.
4. Sigma blade Mixer.
5. Describe with a diagram 'Venturimeter'.
6. Forced circulation evaporator.
7. Different Sources of heat.
8. Bernoulli's Theorem.
9. Filter leaf.

III. Short answers on: Answer ALL questions. (10 x 2 = 20)

1. Convection.
2. Heat interchangers.
3. Applications of size separation.
4. Centrifugation.
5. What are the standard for sieves?
6. Advantages of plastics.
7. Filter aids.
8. Define Corrosion.
9. Calandria.
10. Double cone blender.

THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

(LP 2037)

SEPTEMBER 2019

Sub. Code: 2037

**B.PHARM. DEGREE EXAMINATION
PCI REGULATION – SEMESTER III
SECOND YEAR
PAPER IV – PHARMACEUTICAL ENGINEERING**

Q.P. Code: 562037

Time: Three hours

Maximum: 75 Marks

I. Elaborate on: Answer any TWO questions. (2 x 10 = 20)

1. Explain the principle, construction, working, uses, merits and demerits of Climbing film evaporator.
2. Discuss in detail Filter Press.
3. Explain the theory behind Corrosion. How will you prevent and control Corrosion?

II. Write notes on: Answer any SEVEN questions. (7 x 5 = 35)

1. Rota meter.
2. Concepts of Boundary layer.
3. Write briefly on mechanism of heat transfer.
4. Propellers.
5. Edge runner mill.
6. Stainless steel as the material of pharmaceutical plant construction.
7. Steam distillation.
8. Materials used for plant construction.
9. Super centrifuge.

III. Short answers on: Answer ALL questions. (10 x 2 = 20)

1. Turbulent Flow.
2. What are the grades of powder?
3. Write any two factors influencing Filtration.
4. Lyophilisation.
5. Homogenization.
6. Define Filter Aids.
7. Centrifugal effect.
8. What is latent heat?
9. Fourier's Law.
10. Volatility.

THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

[LR 0121]

JANUARY 2021

Sub. Code: 2037

(MARCH 2020 EXAM SESSION)

B. PHARMACY DEGREE EXAMINATION

PCI REGULATION – SEMESTER III

PAPER IV – PHARMACEUTICAL ENGINEERING

Q.P. Code: 562037

Time: Three hours

Maximum: 75 Marks

I. Elaborate on: Answer any TWO questions.

(2 x 10 = 20)

1. Describe the construction, working, advantages and disadvantages of Fluidized bed dryer.
2. Explain about details of Steam distillation.
3. Define Corrosion. Explain about type and theories of Corrosion.

II. Write notes on: Answer any SEVEN questions.

(7 x 5 = 35)

1. Orifice meter.
2. Hammer mill.
3. Mechanism of conduction.
4. Silversion emulsifier.
5. Filter leaf.
6. Factors in rate of Evaporation.
7. Any one size Separator.
8. Non Perforated basket centrifuge.
9. Factors affecting in materials for plant construction.

III. Short answers on: Answer ALL questions.

(10 x 2 = 20)

1. Types of Manometers.
2. Method of size reduction.
3. Define Distillation.
4. Equilibrium Moisture Content.
5. Propellers.
6. Heat exchangers.
7. Define Mixing.
8. Classify Filters.
9. Application of Centrifugation.
10. Classify Ferrous metals.

THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

[BPHARM 0921]

**SEPTEMBER 2021
(SEPTEMBER 2020 EXAM SESSION)**

Sub. Code: 2037

**B.PHARM. DEGREE EXAMINATION
PCI Regulation 2017 – SEMESTER III
PAPER IV - PHARMACEUTICAL ENGINEERING**

Q.P. Code: 562037

Time: Three hours

Maximum: 75 Marks

I. Elaborate on: Answer any TWO questions. (2 x 10 = 20)

1. Describe the mechanism and different modes of Stress applied in size reduction. Write the principle, construction and working of Fluid energy mill.
2. Explain the Reynolds experiment & Bernoulli's theorem of fluid flow.
3. Write about the principle, construction, working and application of FBD.

II. Write notes on: Answer any SEVEN questions. (7 x 5 = 35)

1. Cyclone Separator.
2. Mechanism of Filtration.
3. Factors affecting size reduction.
4. Planetary mixer.
5. Multiple effects of Evaporator.
6. Glass as the material of Pharmaceutical plant construction.
7. Different sources of Heat.
8. Explain Raoult's law of distillation.
9. Basic of Material handling systems.

III. Short answers on: Answer ALL questions. (10 x 2 = 20)

1. Lyophilization.
2. Critical moisture content.
3. Applications of Centrifugation.
4. Fourier's law.
5. What are the standards for Sieves?
6. Comminution.
7. Filter media.
8. Binary mixture.
9. Calandria.
10. Flash distillation.

THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

[BPHARM 0122]

**JANUARY 2022
(MARCH 2021 EXAM SESSION)**

Sub. Code: 2037

B.PHARMACY DEGREE COURSE (SEMESTER EXAMINATIONS)

PCI Regulation 2017 – SEMESTER III

PAPER IV - PHARMACEUTICAL ENGINEERING

Q.P. Code: 562037

Time: Three hours

Maximum: 75 Marks

I. Elaborate on: Answer any TWO questions. (2 x 10 = 20)

1. Define Filtration. Write in detail about Plate and Frame filter press.
2. Explain about separation of mixture of components by fractional distillation using boiling point composition diagrams.
3. Define Evaporation. Discuss about climbing film evaporator.

II. Write notes on: Answer any SEVEN questions. (7 x 5 = 35)

1. Operational details of Ball mill.
2. Rotary drum filter.
3. Spray dryer.
4. Silverson – Mixer emulsifier.
5. Stainless steel as material of plant construction.
6. Cyclone separator.
7. Orificemeter.
8. Factors influencing corrosion.
9. Rotameter.

III. Short answers on: Answer ALL questions. (10 x 2 = 20)

1. Define Elutriation.
2. Various grades of Powders.
3. Darcy's law.
4. Give suitable dryers for obtaining:
(i) Granular free flowing solids and (ii) Sticky pastes.
5. Factors affecting Evaporation.
6. Define Rectifying columns.
7. Mechanisms of Solid mixing.
8. Stefan-Boltzmann law.
9. Uses of Plastics.
10. Applications of Distillation.

THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

[BPHARM 0522]

**MAY 2022
(SEPTEMBER 2021 EXAM SESSION)**

Sub. Code: 2037

**B.PHARM. DEGREE EXAMINATION
PCI Regulation 2017 – SEMESTER III
PAPER IV - PHARMACEUTICAL ENGINEERING
Q.P. Code: 562037**

Time: Three hours

Maximum: 75 Marks

I. Elaborate on: Answer any TWO questions. (2 x 10 = 20)

1. Explain the principle, construction, working and applications of orifice meter.
2. Explain principle construction and working of Silverson Emulsifier with neat Diagram.
3. Explain in brief about types of corrosion and their prevention method.

II. Write notes on: Answer any SEVEN questions. (7 x 5 = 35)

1. Reynolds number
2. Explain in brief about ball mill with diagram.
3. Air separator
4. Explain the principle and working of a heat interchanger with a labeled diagram
5. Explain in brief about multiple effect evaporators and its economy.
6. Differentiate simple distillation with fractional distillation
7. Brief note on drying rate curve with explanation of each phase
8. Briefly explain in detail about drum filter.
9. Factors influencing selection of materials for plant construction

III. Short answers on: Answer ALL questions. (10 x 2 = 20)

1. Applications of size reduction
2. Labeled diagram of cyclone separator
3. Merits and demerits of Radiation method
4. Differentiate between evaporation and distillation
5. Types of fractionating columns
6. Types of dryers
7. Objectives of mixing
8. Factors influencing filtration
9. Applications of centrifugation
10. Advantages of Non-metals in pharmaceutical plant construction

THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

[BPHARM 1022]

**OCTOBER 2022
(MARCH 2022 EXAM SESSION)**

Sub. Code: 2037

B.PHARMACY DEGREE COURSE (SEMESTER EXAMINATIONS)

PCI Regulation 2017 – SEMESTER III

PAPER IV - PHARMACEUTICAL ENGINEERING

Q.P. Code: 562037

Time: Three hours

Maximum: 75 Marks

I. Elaborate on: Answer any TWO questions.

(2 x 10 = 20)

1. Explain in detail the methods of heat transfer and its applications.
2. Draw the diagram, principle, working and its applications of steam distillation.
3. Define Evaporation and Factors affecting evaporation.

II. Write notes on: Answer any SEVEN questions.

(7 x 5 = 35)

1. Discuss the theories of drying.
2. Bernoulli's Theorem.
3. Forced circulation evaporator.
4. Discuss the theories involved in the fluid flow.
5. Fluidized bed drier.
6. Discuss the theories involved in the corrosion.
7. Write in detail the double cone blender.
8. Principle involved in the Centrifugation.
9. Factors affecting size reduction.

III. Short answers on: Answer ALL questions.

(10 x 2 = 20)

1. Manometer.
2. Reynolds number.
3. Stefan-Boltzmann law.
4. Equilibrium Moisture Content.
5. Lyophilization.
6. Galvanic cell.
7. Super Centrifuge.
8. Filter Aids
9. Types of corrosion.
10. Types of mixtures.

THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

[B.PHARM 0323]

**MARCH 2023
(SEPTEMBER 2022 EXAM SESSION)**

Sub. Code: 2037

**B.PHARMACY DEGREE COURSE (SEMESTER EXAMINATIONS)
PCI Regulation 2017 – SEMESTER III
PAPER IV - PHARMACEUTICAL ENGINEERING**

Q.P. Code: 562037

Time: Three hours

Maximum: 75 Marks

I. Elaborate on: Answer any TWO questions. (2 x 10 = 20)

1. Discuss in detail Filter Press.
2. Write about the principle, construction, working and application of Fluidized bed dryer.
3. Explain the laws governing size reduction and Discuss in detail Ball Mill.

II. Write notes on: Answer any SEVEN questions. (7 x 5 = 35)

1. Mechanism of heat transfer.
2. Horizontal tube evaporator.
3. Steam distillation.
4. Factors affecting size reduction.
5. Double cone blender.
6. Bernoulli's Theorem.
7. Rotometer.
8. Rate of drying curve.
9. Principles of centrifugation.

III. Short answers on: Answer ALL questions. (10 x 2 = 20)

1. Venturimeter.
2. Heat interchanger.
3. Filter aids.
4. Types of corrosion.
5. Reynolds number.
6. Super centrifuge.
7. Calandria.
8. Stephen Boltzmann constant.
9. Global humidity Index.
10. Types of propellers.

THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

[B.PHARM 0823]

**AUGUST 2023
(MARCH 2023 EXAM SESSION)**

Sub. Code: 2037

**B.PHARMACY DEGREE COURSE (SEMESTER EXAMINATIONS)
PCI Regulation 2017 – SEMESTER III
PAPER IV - PHARMACEUTICAL ENGINEERING**

Q.P. Code: 562037

Time: Three hours

Maximum: 75 Marks

I. Elaborate on: Answer any TWO questions. (2 x 10 = 20)

1. Write the principle, construction, working and application of Ball mill.
2. Define corrosion. Give the example of corrosion formation and add a note on importance of Corrosion in pharmaceutical industry.
3. Describe Fourier's law and explain in detail mechanism of heat transfer.

II. Write notes on: Answer any SEVEN questions. (7 x 5 = 35)

1. Theories of size reduction.
2. Cyclone separator.
3. Bernoulli's Theorem.
4. Orifice meter.
5. Steam distillation.
6. Applications of centrifugation.
7. Theories of filtration.
8. Forced circulation evaporator.
9. Filter press.

III. Short answers on: Answer ALL questions. (10 x 2 = 20)

1. Raoult's Law.
2. Stainless steel.
3. Types of flow.
4. Psychrometer.
5. Equilibrium Moisture Content.
6. Filter aids.
7. Double cone blender.
8. Standards of sieves.
9. Heat exchanger.
10. Freeze dryer.

THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

[B.PHARM 1223]

**DECEMBER 2023
(SEPTEMBER 2023 EXAM SESSION)**

Sub. Code: 2037

**B.PHARMACY DEGREE COURSE (SEMESTER EXAMINATIONS)
PCI Regulation 2017 – SEMESTER III
PAPER IV - PHARMACEUTICAL ENGINEERING**

Q.P. Code: 562037

Time: Three hours

Maximum: 75 Marks

I. Elaborate on: Answer any TWO questions.

(2 x 10 = 20)

1. Classify evaporators. Describe construction and working of a film evaporator.
2. Explain in brief about mechanism of solid and liquid mixing.
3. Brief account on perforated basket centrifuge.

II. Write notes on: Answer any SEVEN questions.

(7 x 5 = 35)

1. Orifice meter.
2. Hammer mill.
3. Mechanism of size separation.
4. Fourier's law.
5. Enumerate the merits and demerits of steam jacketed kettle.
6. Write the principle, construction and working of flash distillation.
7. Double cone blender.
8. Cartridge Filter.
9. Explain the theories of corrosion.

III. Short answers on: Answer ALL questions.

(10 x 2 = 20)

1. Pilot tube.
2. Principles of size reduction.
3. Elutriation tank.
4. Heat exchangers.
5. Merits and demerits of horizontal tube evaporator.
6. Write the limitations of distillation under pressure.
7. Moisture content.
8. Trituration.
9. Seidtz Filter.
10. Reynolds Number.

THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

[B.PHARM 0524]

MAY 2024

Sub. Code: 2037

B.PHARMACY DEGREE COURSE (SEMESTER EXAMINATIONS)

PCI Regulation 2017 – SEMESTER III

PAPER IV - PHARMACEUTICAL ENGINEERING

Q.P. Code: 562037

Time: Three hours

Maximum: 75 Marks

I. Elaborate on: Answer any TWO questions.

(2 x 10 = 20)

1. Explain the principle, construction, working and applications of orifice meter.
2. Describe the construction, working principle, efficiency, merits and demerits of Fractional Distillation.
3. Explain in detail the methods of heat transfer and its applications.

II. Write notes on: Answer any SEVEN questions.

(7 x 5 = 35)

1. Cyclone Separator.
2. Factors affecting size reduction.
3. Write a note on Critical moisture content.
4. Describe with a diagram 'Reynolds experiment'.
5. Forced circulation evaporator.
6. Describe various types of iron as material of construction.
7. Filter leaf.
8. Compare the operations of spray dryer and tray dryer.
9. Sigma Blade Mixer.

III. Short answers on: Answer ALL questions.

(10 x 2 = 20)

1. Applications of size separation.
2. Centrifugation.
3. Standards of sieves.
4. Types of dryers.
5. Ideal Solution.
6. Rota meter.
7. Homogenization.
8. Define Filter Aids.
9. Centrifugal effect.
10. What is latent heat?

THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

[B.PHARM 1024]

**OCTOBER 2024
(SEPTEMBER 2024 EXAM SESSION)**

Sub. Code: 2037

B. PHARMACY DEGREE COURSE (SEMESTER EXAMINATIONS)

PCI Regulation 2017 – SEMESTER III

PAPER IV - PHARMACEUTICAL ENGINEERING

Q.P. Code: 562037

Time: Three hours

Maximum: 75 Marks

I. Elaborate on: Answer any TWO questions.

(2 x 10 = 20)

1. Discuss the principle, construction, working, merits and demerits of Distillation under reduced pressure.
2. Describe fluid statics. Explain Simple Mercury Manometer.
3. Describe the principle, construction, working and applications of Silverson emulsifier.

II. Write notes on: Answer any SEVEN questions.

(7 x 5 = 35)

1. Energy losses during flow of fluids.
2. Fluid energy mill.
3. Official standards of powders.
4. Heat transfer by convection.
5. Economy of Multiple effect evaporator.
6. Principles of centrifugation.
7. Factors influencing filtration.
8. Tray dryer.
9. Preventive methods of corrosion.

III. Short answers on: Answer ALL questions.

(10 x 2 = 20)

1. Applications of Bernoulli's theorem.
2. Raoult's law.
3. Mechanism of size reduction.
4. Twin shell blender.
5. Azeotropes.
6. Demerits of perforated Centrifuge.
7. Lyophilisation.
8. Propellers.
9. Applications of filtration.
10. Glass.

THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

[B.PHARM 0325]

MARCH 2025

Sub. Code: 2037

B. PHARMACY DEGREE COURSE (SEMESTER EXAMINATIONS)

PCI Regulation 2017 – SEMESTER III

PAPER IV - PHARMACEUTICAL ENGINEERING

Q.P. Code: 562037

Time: Three hours

Maximum: 75 Marks

I. Elaborate on: Answer any TWO questions.

(2 x 10 = 20)

1. Describe the construction, working, advantages and disadvantages of Fluidized bed dryer.
2. Discuss in detail Filter Press.
3. Explain the principle and procedure of Molecular Distillation. What are its applications?

II. Write notes on: Answer any SEVEN questions.

(7 x 5 = 35)

1. Economy of Multiple Effect Evaporator.
2. Fluid energy mill.
3. Air Separator.
4. Mechanisms of Heat Flow.
5. Planetary Mixer.
6. Fourier's law.
7. Bernoulli's Theorem.
8. Super centrifuge.
9. Classify Ferrous metals.

III. Short answers on: Answer ALL questions.

(10 x 2 = 20)

1. Advantages of plastics.
2. Filter aids.
3. Define Corrosion.
4. Convection.
5. Turbulent Flow.
6. Define Mixing.
7. Real Solution.
8. Poiseuille's Equation.
9. Centrifugation.
10. What is a pressure head?

THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

[B.PHARM 0925]

SEPTEMBER 2025

Sub. Code: 2037

B. PHARMACY DEGREE COURSE (SEMESTER EXAMINATIONS)

PCI Regulation 2017 – SEMESTER III

PAPER IV - PHARMACEUTICAL ENGINEERING

Q.P. Code: 562037

Time: Three hours

Maximum: 75 Marks

I. Elaborate on: Answer any TWO questions.

(2 x 10 = 20)

1. Discuss the principle, construction, working, efficiency, merits and demerits of Fractional distillation.
2. Write about the principle, construction, working and applications of Vacuum dryer.
3. Explain the factors influencing materials selection for pharmaceutical plant construction.

II. Write notes on: Answer any SEVEN questions.

(7 x 5 = 35)

1. Rotameter.
2. End runner mill.
3. Differentiate: Evaporation and Drying.
4. Heat interchanger.
5. Multiple effect evaporator.
6. Official standards of powder.
7. Sigma blade mixer.
8. Filter leaf.
9. Super centrifuge.

III. Short answers on: Answer ALL questions.

(10 x 2 = 20)

1. Kick's law.
2. Significances of Reynold's number.
3. Sieve number.
4. Kirchoff's law for radiation.
5. Calandria.
6. Centrifugation.
7. Desorption.
8. Passivation.
9. Applications of filtration.
10. Plastics.
