

QP 1**Rajiv Gandhi University of Health Sciences****Subject: Pharmaceutical Engineering****III B. Pharm (RS4 Syllabus)****Long Essay:****2X 10 = 20**

1	Explain construction and working of meta filter and super centrifuge.
2	Explain different mechanisms of liquid mixing. Give the characteristics of mixing impellers.

Short Essays:**5x 6 = 30**

3	Explain the concept of solid transport by fluidisation.
4	Write the construction and working of centrifugal pump.
5	Explain the theory of drying giving more emphasis on rate of drying.
6	Explain, with relevant example, the separation of an azeotropic mixture.
7	Explain the working of a heat exchanger with a labelled diagram.
8	Briefly explain Mier's supersaturation theory giving conditions and limitations.

Short Answers:**2X10 = 20**

9	Describe the principle of stoichiometry with a suitable example.
10	Give the applications of protective linings and coatings with respect to corrosion control.
11	Explain the methods of regeneration of resins of a demineralising bed.
12	Explain the usefulness of humidity chart.
13	What is calandria? Write its importance.
14	Enumerate mechanisms of size reduction giving one example of a mill for each.
15	Define moderately fine powder as per IP.
16	How is it possible to prevent heat generation during milling using colloid mill?
17	Define evaporation in terms of capacity and economy as applied to evaporation practice.
18	Write the importance of plastic as packaging material.

QP 2**Rajiv Gandhi University of Health Sciences****Subject: Pharmaceutical Engineering****III B. Pharm (RS4 Syllabus)****Long Essay:****2X 10 = 20**

1	Explain the theories of filtration. Write the principle and working of filter leaf.
2	Explain the construction and working of pneumatic conveyors and peristaltic pumps.

Short Essays:**5x 6 = 30**

3	Differentiate homogenisation and mixing. Explain the working of colloid mill.
4	Explain the principle involved in the working of V-cone blender with its applications.
5	Explain the theory of crystallization.
6	What are azeotropic mixtures? Explain azeotropic distillation.
7	Explain the theory of drying.
8	Explain principle and construction of a noisy mill that works on the principles of impact and attrition.

Short Answers:**2X10 = 20**

9	Define 'overall heat transfer coefficient' and 'individual film coefficient'
10	Write Stefan Boltzman equation. Explain the terms.
11	Write the importance of forced circulation in forced circulation evaporator.
12	How is multiple effect evaporator advantageous over single effect evaporator?
13	Define sieve number. What is its relation with aperture size.
14	Define humid volume and humidity.
15	Enlist the measures to check the problems of corrosion.
16	Describe the steps involved in the process of ion-exchange.
17	Define dimensional formula with example.
18	Explain Rayleigh's equation.

QP 3**Rajiv Gandhi University of Health Sciences****Subject: Pharmaceutical Engineering****III B. Pharm (RS4 Syllabus)****Long Essay:****2X 10 = 20**

1	a) Explain Mier's super saturation theory of crystallization. b) Explain vortex formation? Give the reasons and preventive methods for the same.
2	a) Explain in detail the construction and working of belt conveyor. b) Explain transportation of fluids using centrifugal pump.

Short Essays:**5x 6 = 30**

3	Write the theory of solid-solid mixing.
4	Explain the factors affecting size reduction.
5	Explain principle, construction, and working of fluidised bed dryer.
6	Write the principle and working of drum filter.
7	Explain the construction and working of climbing film evaporator.
8	Derive an equation for heat transfer by conduction through a metal wall.

Short Answers:**2X10 = 20**

9	What is meant by dimensionless equation? Give an example.
10	Differentiate ideal and actual screens.
11	Define humidity and humid heat.
12	Write advantage and disadvantages of plastic as a construction material.
13	Differentiate counter ions and co-ions.
14	Classify fractionating columns with examples.
15	In what way the factors influence centrifugal effect?
16	Write the differences between extractive distillation and azeotropic distillation.
17	Justify the selection of filtration equipment for the slurry containing 25% solids.
18	Write the principle of steam distillation.

QP 4**Rajiv Gandhi University of Health Sciences****Subject: Pharmaceutical Engineering****III B. Pharm (RS4 Syllabus)****Long Essay:****2X 10 = 20**

1	Explain the theories of filtration. Differentiate surface filtration and depth filtration.
2	Write the theory of solid-solid mixing. Explain the principle, construction, and working of planetary mixer.

Short Essays:**5x 6 = 30**

3	Describe the construction and working of a screw conveyor.
4	Describe the construction and working of cycloidal blower.
5	Compare and contrast heat transmission following counter current and parallel current feed techniques with relevant equations.
6	State and explain the laws governing size reduction.
7	Describe the drying rate curve for a nonporous granular solid.
8	Write the theory of crystallization.

Short Answers:**2X10 = 20**

9	Describe 'unit operation' and 'unit process'. Give examples for each.
10	What are the different modes of feed in multiple effect evaporator?
11	Define Raoult's law. What is its significance?
12	Define mean free path. Write its importance in molecular distillation.
13	Define fine powder as per IP.
14	Mention the humidity conditions maintained in different areas of pharma industry.
15	Write a note on the utility of stainless steel in pharmaceutical industry.
16	Why are two dissimilar metals should not be allowed to come in contact with each other during construction of equipment?
17	Suggest the method of controlling gastric acidity using ion exchange resin.
18	What are the criteria in selecting the metals for the construction of steam jacketed kettle?

QP 5**Rajiv Gandhi University of Health Sciences****Subject: Pharmaceutical Engineering****III B. Pharm (RS4 Syllabus)****Long Essay:****2X 10 = 20**

1	Classify impellers. Explain vortex formation and how can it be prevented?
2	Explain principle, construction, working, merits, and demerits of filter press.

Short Essays:**5x 6 = 30**

3	Write the construction and working of liquid-liquid interchanger.
4	Explain the principle and construction of an evaporator suitable for viscous liquids.
5	Explain the principle of steam distillation. Write its applications.
6	Define comminution. Explain the laws governing energy and power requirements of a mill.
7	Write the construction and working of pneumatic conveyor.
8	Define caking. How does caking of crystals take place? How can it be prevented?

Short Answers:**2X10 = 20**

9	Write a note on vulcanization.
10	What is pitting corrosion?
11	Mention suitable dryer to obtain a) granular free flowing solids b) spherical particles
12	Give examples for unit operation and unit process.
13	Write the applications of ion exchange resins.
14	Differentiate ideal screen and actual screen.
15	Write the applications of centrifugal pump.
16	Name different types of solid transportation systems.
17	Define humidity and humid heat.
18	Justify the use of atomizer in spray dryers.

QP 6**Rajiv Gandhi University of Health Sciences****Subject: Pharmaceutical Engineering****III B. Pharm (RS4 Syllabus)****Long Essay:****2X 10 = 20**

1	Write the theory of mixing. What is mixing index? Explain with a neat, labelled diagram the construction and working of an equipment used in the production of ointments and pastes.
2	Explain the material handling systems used for the transportation of solids. Explain the working and applications of screw conveyor.

Short Essays:**5x 6 = 30**

3	Describe Fourier's law of conduction through a metal wall and derive an equation for the same.
4	Write the construction and working of falling film evaporator.
5	Explain fractional distillation with example.
6	Explain the construction and working of a fluidised bed dryer.
7	Explain the factors affecting size reduction.
8	Explain the principle and working of Swenson Walker crystallizer with a neat, labelled diagram.

Short Answers:**2X10 = 20**

9	What is dimensionless equation? Give an example.
10	Enlist the disadvantages of sieve analysis.
11	Enlist the ideal properties of filter aids.
12	What is meant by back washing? How is it achieved in filtration?
13	What is galvanic corrosion?
14	Write the mathematical equation to express the factors influencing centrifugal effect.
15	Write the applications of sintered glass filter.
16	Differentiate wet bulb temperature and dew point temperature.
17	Write the usefulness of rubber in pharmaceutical industry.
18	Differentiate cationic and anionic ion exchangers.

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QP 7**Rajiv Gandhi University of Health Sciences****Subject: Pharmaceutical Engineering****III B. Pharm (RS4 Syllabus)****Long Essay:****2X 10 = 20**

1	Explain the theory of liquid-liquid mixing. Write the principle and working of Silverson emulsifier.
2	Explain the theory of centrifugation. Describe construction and working of the basket centrifuge.

Short Essays:**5x 6 = 30**

3	Derive an equation for heat transmission through metal wall.
4	Explain the theory of evaporation. Mention the factors affecting rate of evaporation.
5	Write the construction and working of a dryer based on sublimation.
6	Write the working of a ball mill explaining the importance of rpm.
7	Write the construction and working of a suitable crystallizer to obtain large crystals.
8	Explain the construction and working of cycloidal blower.

Short Answers:**2X10 = 20**

9	Give an example for dimensional formula and dimensionless equation.
10	Name the conveyor suitable for transporting solids a) to a long distance b) to elevate large quantity of materials in a closed condition
11	Explain Rayleigh's equation.
12	Write the principle involved in flash distillation.
13	Briefly explain sedimentation tank.
14	Why is humidity control important in pharmaceutical industries?
15	Differentiate fixed and moving bed ion exchange methods.
16	Explain biological corrosion.
17	Differentiate centrifugal pump and peristaltic pump.
18	Enlist the applications of molecular distillation.

QP 8**Rajiv Gandhi University of Health Sciences****Subject: Pharmaceutical Engineering****III B. Pharm (RS4 Syllabus)****Long Essay:****2X 10 = 20**

1	List the equipments used for solid-solid mixing. Describe the construction, working and applications of V- cone blender and planetary mixer.
2	Discuss the importance of conveyors in pharmaceutical industry. Write the working principles and advantages of basket conveyors and pneumatic conveyors.

Short Essays:**5x 6 = 30**

3	Explain the different modes of heat flow.
4	Write the principle and constructions of falling film evaporator.
5	What are azeotropic mixtures? How are they separated?
6	With a neat labelled diagram, explain the functioning of freeze dryer with its applications.
7	Explain the principle and working of hammer mill.
8	Describe the construction, working and application of vacuum filter.

Short Answers:**2X10 = 20**

9	Define steady state and unsteady state with example.
10	Define centrifugation. List out the equipments used for centrifugation.
11	Suggest the method to measure the relative humidity of the area?
12	What are the reasons for caking of crystals?
13	Applications of stainless steel as a construction material.
14	How ion exchange resins are useful in water purification?
15	Name a suitable crystallizer to get a) large sized crystals b) large quantity of crystals
16	Write Kozeny-Carman's equation. Explain the terms.
17	What are filter aids? Give examples.
18	Differentiate ideal and actual screens.

QP 9**Rajiv Gandhi University of Health Sciences****Subject: Pharmaceutical Engineering****III B. Pharm (RS4 Syllabus)****Long Essay:****2X 10 = 20**

1	Explain the factors affecting rate of filtration? Describe the construction, working, and applications of filter press.
2	Describe, with neat diagram, construction, working, and application of a Silversen emulsifier.

Short Essays:**5x 6 = 30**

3	Describe the construction and applications of peristaltic pump?
4	What are the advantages and disadvantages of pneumatic and bucket conveyors?
5	Derive Fourier's law for the conduction of heat through an uniform metal wall. Mention its applications.
6	Explain the concept of multiple effect evaporation.
7	Describe the principle and applications of steam distillation.
8	Describe the drying rate curve. Explain its importance.

Short Answers:**2X10 = 20**

9	What are the advantages and disadvantages of ball mill?
10	What are the differences between edge runner mill and end runner mill?
11	How is caking prevented?
12	Enumerate types of crystal forms.
13	List out the factors affecting size reduction.
14	What is unit process? Explain with an example.
15	Give applications of sedimentation tanks.
16	Describe the importance of humidity in pharmaceutical industry.
17	List out the methods to prevent corrosion.
18	Describe the methods for regeneration of ion exchange resins.

QP 10**Rajiv Gandhi University of Health Sciences****Subject: Pharmaceutical Engineering****III B. Pharm (RS4 Syllabus)****Long Essay:****2X 10 = 20**

1	Describe the theory of solid- solid mixing. Write the principle, construction, working, and applications of colloid mill.
2	Describe the theory of centrifugation. Write construction and working of conical disk centrifuge.

Short Essays:**5x 6 = 30**

3	Explain the construction and working of screw conveyor. Give its applications.
4	Describe the transportation of fluids by using positive displacement pumps.
5	Explain the mechanism of crystallization.
6	Explain the principle, construction, and working of fluid energy mill.
7	Explain construction and utility of bubble cap column.
8	Classify dryers. With a neat labelled diagram, explain the principle involved in vacuum dryer.

Short Answers:**2X10 = 20**

9	What is surface coefficient? Write its importance.
10	What are 'overall heat transfer coefficient' and 'individual heat transfer coefficient'?
11	Explain the term 'evaporator capacity'
12	Write applications of forced circulation evaporator.
13	List the factors affecting size reduction.
14	Give one example for material balance equation.
15	Give applications of bag filter in pharma industry
16	How is the wet bulb temperature determined?
17	What is dezincification?
18	How is hardness of water removed by ion exchange resins?