



UNIVERSITY OF THE PUNJAB

Fourth Prof. A/2015

Examination: Doctor of Pharmacy (Pharm.D.)

Roll No.

Subject: Pharmaceutics-VI (Industrial Pharmacy)

PAPER: 3

TIME ALLOWED: 3 hrs.

MAX. MARKS: 100

NOTE: Attempt any FIVE questions. All Questions carry equal marks.

- Q.1. a)** What is filtration. Write down the types of filtration used in pharmaceutical industry. (10)
b) What are defects of tablets? (10)
- Q.2. a)** Define the milling and elaborate the types of milling? (8)
b) Write down a note on Hammer mill? (6)
c) What is Ball milling? (6)
- Q.3. a)** What are semisolid preparations and write note their packaging techniques? (10)
b) What are suspending agents? (5)
c) Write a short note on ophthalmic preparations? (5)
- Q.4. a)** What are emulsions and their types? (8)
b) Write down methods for preparations of emulsions? (6)
c) What are suspending agent and give few examples? (6)
- Q.5 a).** What are Excipients of tablets? (8)
b). Define mixing. (6)
c). which instruments are used for solid mixing? (6)
- Q.6. a)** What are different methods of tablet preparations, describe dry granulation method? (12)
b) Discuss spray drying and freeze drying. (8)
- Q.7. Write note on**
a) Rotary dryers (5)
b) Quality assurance (5)
c) Micro-Emulsions (5)
d) Compartment drying (5)

UNIVERSITY OF THE PUNJAB



Fourth Prof. A/2016

Examination: Doctor of Pharmacy (Pharm.D.)

Roll No.

Subject: Pharmaceutics-VI (Industrial Pharmacy)
PAPER: 3

TIME ALLOWED: 3 hrs.
MAX. MARKS: 100

NOTE: Attempt any FIVE questions. All Questions carry equal marks.

Question 1:

- (a) - Define Hazard, Safety and Risk. Discuss different detailed aspects of chemical hazards? (10)
- (b) - Write a detailed note on the Fire as an industrial hazard and explain the detection and prevention of fire in an industry. (10)

Question 2: Define Good Manufacturing Practices (GMP) and Current Good Manufacturing Practices (cGMP) and discuss the significance and different aspects of GMP for Finished pharmaceutical products (FPP). (20)

Question.3:

- (a) - Discuss in detail the principal and working of Ball mill and colloidal mill. (10)
- (b) - Briefly discuss spray drying technique and its application in detail? (10)

Question.4:

- (a) - Describe the aqueous solvent systems used for the parenteral preparations (12)
- (b) - Describe the method of production for a terminally sterilized formulation. (8)

Question: 5

- (a) - Discuss the methods used for ampules sealing? (6)
- (b) - What is clean-in-place concept? How equipment are cleaned for sterile manufacturing? (14)

Question: 6: write a short note on four (04) of the followings where each part contains equal (05) marks.

- 1- Filter press
- 2- Clarification
- 3- Mechanism of freeze drying
- 4- Mechanism of milling
- 5- Mass transfer

Question: 7:

- (a) - Discuss the problems associated with the manufacturing of tablets and suggest the solutions to overcome these problems (10)
- (b) - Define angle of Repose and write in detail the method of its measurement (10)



UNIVERSITY OF THE PUNJAB

Fourth Prof. 2nd A/2016

Examination: Doctor of Pharmacy (Pharm.D.)

Roll No.

Subject: Pharmaceutics-VI (Industrial Pharmacy)

TIME ALLOWED: 3 hrs.

PAPER: 3

MAX. MARKS: 100

NOTE: Attempt any FIVE questions. All Questions carry equal marks.

Question 1:

- (a)- What are different theories of drying? Write down the classification of dryers? (10)
- (b)- Discuss emulsions and their stability? Write down mechanical equipments used for emulsions preparation? (10)

Question 2:

Define quality assurance. Write detailed note on Good Manufacturing Practices and Current Good Manufacturing Practices used in pharmaceutical industry? (20)

Question 3:

- (a)- Discuss in detail the principal and working of cutter mill and fluid energy mill? (10)
- (b)- Define mixing. What are the reasons for size reduction and factors affecting size reduction? (10)

Question 4:

- (a)- Define sterile area. Write detailed note on Inprocess Quality Control of parenterals? (10)
- (b)- What is filter media? Discuss leaf filter and rotary filter in detail. (10)

Question 5:

- (a)- What is solid-air interface and angle of repose? (6)
- (b)- Discuss in detail the tablet coating, and problems involved in tableting? (12)

Question 6: Write a short note on 04 of the followings. All parts carry equal (05) marks. (20)

- 1- Heat transfer
- 2- Evaporation under reduced pressure
- 3- Granulation
- 4- Inflammable gases and dusts
- 5- Size analysis and sieving.

Question 7:

- (a)- Define packaging. Discuss packaging area and influence of packaging materials on pharmaceuticals' products? (10)
- (b)- How suspensions are formulated? And which type of equipments are employed for their preparation? (10)



UNIVERSITY OF THE PUNJAB

Fourth Prof: A/2017

Examination: Doctor of Pharmacy (Pharm.D.)

Roll No.

Subject: Pharmaceutics-VI (Industrial Pharmacy)

PAPER: 3

TIME ALLOWED: 3 hrs.

MAX. MARKS: 100

NOTE: Attempt any FIVE questions. All Questions carry equal marks.

Question 1:

- (a) - Briefly discuss the different types of hazards and their impact on the life of employees working in a Pharmaceutical manufacturing unit. (12)
- (b) - Write a detailed note on the fire hazards with reference to identification and prevention fire hazards in the pharmaceutical industry. (08)

Question 2:

Discuss in detail the aspects of Good Manufacturing Practices (GMP) and its applications for producing quality Finished pharmaceutical products (FPP) in an industry. (20)

Question 3:

(a)- Discuss the following four only (05 marks each)

- 1- Heat transfer
- 2- Mass transfer
- 3- Types of dryers
- 4- Pin Mill

Q.4: (a) Discuss the details of manual size reduction method and write the major differences between manual and mechanical size reduction (12).

(b) Define the different terms used to explain the filtration process (08).

Q. 5. (a) Discuss the principle, working and advantages of the colloid mill, Hand mill and fluid energy mill. (12)

(b). Discuss the different methods of size reduction and with the help of examples. (08).

Q. 6 (a) - Define compression and consolidation and describe phenomenon of Angle of Repose and Flow Rates. (10)

(b) - Give the classification of various industrial dryers and discuss the details of fluidized bed dryer. (10).

Q. 7. (a) - Discuss the equipment used in the preparation of semisolid dosage forms (10)

(b) - Discuss the formulation aspects of emulsions in a Pharmaceutical industry (10)



UNIVERSITY OF THE PUNJAB

Fourth Prof: 2nd Annual - 2017
Examination: Doctor of Pharmacy (Pharm.D.)

Roll No.

Subject: Pharmaceutics-VI (Industrial Pharmacy)
PAPER: 3

TIME ALLOWED: 3 hrs.
MAX. MARKS: 100

NOTE: Attempt any FIVE questions. All Questions carry equal marks.

Question 1:

- (a) - Define Hazard, Give the different classes of hazards and discuss in detail the different aspects of fire hazards? (10)
- (b)- Write a detailed note on the chemicals as an industrial hazard and explain the prevention of chemical hazards in industry. (10)

Question 2:

Define Good Manufacturing Practices (GMP) and Current Good Manufacturing Practices (cGMP) and discuss the significance and different aspects of GMP for Finished pharmaceutical products (FPP). (20)

Question.3:

- (a)- Discuss in detail the types of heat transfer mechanism and its applications (10)
- (b)- Briefly discuss the principles and mechanism of mass transfer and its applications in pharmaceutical industrial? (10)

Question.4:

- (a) - Describe the ideal characteristics of sterile products and explain the requirements for the preparation of parenteral preparations in pharmaceutical industry (12)
- (b) - Describe the method of production for sterilized products in pharmaceutical industry (8)

Q.5 (a) What is comminution ? Discuss the advantages, disadvantages and the factors affecting the particle size reduction (10)

(b) Define filtration, clarification, sedimentation and decantation and also discuss the mechanism of filtration with reference to Darcy's Law. (10)

Q.6 a) Define & discuss the properties of an ideal filter media and also discuss the different factors affecting the selection of filter media. (06)

b) Write a detail note on the different types of filter media used in an industry. (14)

Q.7. Write note on four of the following (5 marks each)

- a) - Compression and Compaction
- b) - Angle of Repose
- c) - Ball mill
- d) - Hussner's ratios
- e) - Problems of tablets manufacturing



UNIVERSITY OF THE PUNJAB

Fourth Prof: Annual – 2018

Examination: Doctor of Pharmacy (Pharm.D.)

Roll No.

Subject: Pharmaceutics-IV (Industrial Pharmacy) (New Course)
PAPER: 3 (Part – II)

TIME ALLOWED: 2 Hrs. & 30 min.
MAX. MARKS: 80

Attempt this Paper on Separate Answer Sheet provided.

Attempt any 4 questions. Each question carry equal marks.

- Q 2 a) Describe theory of heat transfer, what are the application of heat transfer in pharmaceutical industry? 10
b) Give classification of dryers used in pharma industry, discuss Fluidized bed dryer in detail. 10
- Q 3 a) Why powder volume is difficult to measure? What is the solution then? How the porosity affects the tablets properties? 10
b) Describe some approaches to avoid chemical hazards in pharmaceutical industry. 10
- Q 4 a) How sterility is maintained in the clean room of a pharmaceutical industry? 10
b) Why granulation is important? Name its various types and describe the steps in wet granulation process. 10
- Q 5 Give brief answers of following. 5 Marks each
i. Preparation of water for injection (Flow diagram)
ii. Capping and lamination in tablet manufacturing with reasons and remedy to avoid.
iii. Importance of HVAC system in pharmaceutical industry.
iv. Different tablet coating techniques
- Q 6 a) What are the different mechanism for mechanical size reduction? Discuss in construction and operation of Planetary Ball mill. 10
b) List down different characteristics of a packaging materials and describe the reasons why glass is preferred over the plastics for the packaging of injectable. 10
- Q 7 a) Discuss the mechanism of liquids/liquids mixing and describe the construction and application of silver son homogenizer 10
b) Can we dry solution/suspension? How? Describe the principal of such methods 10



UNIVERSITY OF THE PUNJAB

Fourth Prof: Annual – 2018

Examination: Doctor of Pharmacy (Pharm.D.)

Subject: Pharmaceutics-IV (Industrial Pharmacy) (New Course)

TIME ALLOWED: 30 min.

PAPER: 3 Part – I (Compulsory)

MAX. MARKS: 20

Roll No.

Attempt this Paper on this Question Sheet only.

Please encircle the correct statement. Each MCQ carries 1 Mark. This Paper will be collected back after expiry of time limit mentioned above.

Q.1 MCQ's (Select the most appropriate option)

1. Slicing and cutting principles are used for the size reduction of -----
type of drugs
 - A) Animal origin
 - B) Mineral origin
 - C) Vegetable origin
 - D) Synthetic drugs
2. The porcelain mortar and pestle, used for the small scale bruising process, is not suitable for the-----
 - A) Tannins
 - B) Acidic drug
 - C) Basic drugs
 - D) None of the above
3. ----- is a process in which coarse emulsion is converted into a colloidal state of uniform composition by reducing particle size.
 - A) Homogenization
 - B) Sedimentation
 - C) Grinding
 - D) Both A and B are correct options
4. Rate of filtration is ----- to the viscosity of liquid to be filtered.
 - A) Inversely proportional
 - B) Directly proportional
 - C) None of them
 - D) Equal to
5. Which is one of the most common granulating agent?
 - A) Acacia
 - B) Gelatin
 - C) Tragacanth
 - D) Starch

61

6. Which tablets are designed to produce solution rapidly?
 - A) Implantation tablets
 - B) Effervescent tablets
 - C) Dispensing tablets
 - D) Hypodermic tablets
7. Randomization of dissimilar particles within a system is called -----
 - A) Milling
 - B) Correlation
 - C) Mixing
 - D) Drying
8. The method most widely used for measuring particle size distribution in pharmaceutical industry is?
 - A) Sieving
 - B) Microscopy
 - C) Sedimentation
 - D) Laser diffraction
9. Tablet coating adds an approximate increase in weight of
 - A) 3-5 %
 - B) 1-2%
 - C) 2-5%
 - D) 10-20%
10. In coating of tablets pan speeds for non-aqueous film coating is
 - A) 10-15 rmp
 - B) 3-10 rmp
 - C) 40 rmp
 - D) 100 rmp
11. During coating when atomization is very fine it may lead to effect called
 - A) Orange peel
 - B) Bridging
 - C) Spray drying
 - D) Capping
12. If average weight of one tablet is 250 mg what would be the weight of API batch for 1 lac tablets
 - A) 2500 kg
 - B) 25 kg
 - C) 250 kg
 - D) 250000 kg
13. Spray dried lactose is prone to ----- in presence of excess moisture.
 - A) Darkening
 - B) Oxidation
 - C) Hydration
 - D) Hydro-oxidation

14. Percentage of binders used in tablet formulation
- A) 5 - 10 %
 - B) 10 - 20%
 - C) 20 - 30%
 - D) 0.01 - 1%
15. In sugar coating, ----- material is used for polishing
- A) Carnauba wax
 - B) Cocoa powder
 - C) Oleic acid
 - D) Gelatin
16. Glass apparatus used in the production of sterile products can be sterilized by
- A) Dry heat 140 degrees for 30 minutes
 - B) Dry heat 120 degrees for 1 hour
 - C) Saturated steam 121 degrees for 15 minutes
 - D) Using Suitable Disinfectant
17. ----- is used as biological indicator in radiation sterilization.
- A) Bacillus subtilis
 - B) Clostridium sporogenes
 - C) Bacillus pumilis
 - D) Bacillus stereo-thermophilous
18. Mesh size is the number of opening per-----
- A) Inch
 - B) Square inch
 - C) Linear inch
 - D) Centimeter
19. Empty capsule has moisture content in the range of
- A) 5%-10%
 - B) 12%-15 %
 - C) 30%-45%
 - D) 50%- 70%
20. If average weight of one tablet is 250 mg what would be the weight of API batch for 1 lac tablets
- A) 2500 kg
 - B) 25 kg
 - C) 250 kg
 - D) 250000 kg



UNIVERSITY OF THE PUNJAB

Fourth Prof: 2nd Annual – 2018

Examination: Doctor of Pharmacy (Pharm.D.)

Roll No.

Subject: Pharmaceutics-IV (Industrial Pharmacy) (New Course)

PAPER: 3 Part – II

MAX. TIME: 2 Hrs. 30 Min.

MAX. MARKS: 80

ATTEMPT THIS (SUBJECTIVE) ON THE SEPARATE ANSWER SHEET PROVIDED

Note: Attempt any four questions, all questions carry equal marks.

- Q 2 a) Describe theory of mass transfer, what are the application of mass transfer in pharmaceutical industry? 10
- b) Discuss principle, operation and application of Tray dryer in detail. 10
- Q 3 a) Define compression, consolidation and compaction, discuss their mechanisms in detail. 10
- b) Name the methods of tablet manufacturing, make flow chart to describe these, how the choice is made between these methods? 10
- Q 4 a) How you will differentiate the sterile area of a pharmaceutical industry into different classes? What type of operation are carried out in each area? 10
- b) Milling of APIs affect their flow, mixing and compressional properties, discuss this argument with reasons. 10
- Q 5 Give brief answers of following terms. 5 Marks each
- Steps in the manufacturing of hard gel capsules
 - Sugar coating of tablets
 - Picking and mottling with reasons and remedy to avoid.
 - Bulk and terminal sterilization of injectables
- Q 6 a) Discuss the principle, working and applications of colloid mill and fluid energy mill. 5+5
- b) Discuss different types of material used to prepare the containers for pharmaceutical packaging. 10
- Q 7 a) Describe different mechanism of milling with suitable examples, which type of milling instrument is suitable for the size reduction of waxy materials 10
- b) Write a note on different types of impeller Mixers used for liquid mixing? 10



UNIVERSITY OF THE PUNJAB

Fourth Prof: 2nd Annual – 2018

Examination: Doctor of Pharmacy (Pharm.D.)

Roll No. in Fig.

Roll No. in Words.

Subject: Pharmaceutics-IV (Industrial Pharmacy)

MAX. TIME: 30 Min.

PAPER: 3 Part – I (Compulsory) (New Course)

MAX. MARKS: 20

Signature of Supdt.:

Attempt this Paper on this Question Sheet only.

Please encircle the correct option. Division of marks is given in front of each question.

This Paper will be collected back after expiry of time limit mentioned above.

Q.1. Encircle the right answer cutting and overwriting is not allowed. (1x20=20)

1. Mechanical process of size reduction of solid substances is called as
 - A) Levigation
 - B) Pulverization
 - C) Milling
 - D) Trituration
2. The ball mill consists of a horizontally rotating hollow vessel of cylindrical shape with-----
 - A) The length equal to its diameter
 - B) The length slightly greater than its diameter
 - C) The length slightly shorter than its diameter
 - D) The diameter is much shorter
3. The size reduction process a pin mill follows the mechanism of
 - A) Cutting
 - B) Compression
 - C) Grinding
 - D) Impact and attrition
4. Solid collected on filter medium is the desired product then the process is known as
 - A) Cake filtration
 - B) Sedimentation
 - C) Filter aids
 - D) Filter press
5. The solids retained on a filter during filtration process is known as-----
 - A) Filtrate
 - B) Mixture
 - C) Residue
 - D) Filter Aid
6. Clarification is applied when the solids do not exceed-----percent.
 - A) 2.0%
 - B) 1.0%
 - C) 3.0%
 - D) 10%

7. Which test is useful for testing membrane efficiency?
- A) Diffusion testing
 - B) Forward Flow test
 - C) Bubble point test
 - D) Integrity Testing
8. Mesh screen of basket rack assembly of disintegration apparatus is-----.
- A) 15 mesh screen
 - B) 10 mesh screen
 - C) 20 mesh screen
 - D) 25 mesh screen
9. Capping of tablets during manufacturing occurs due to-----
- A) Air entrapment
 - B) Plastic deformation
 - C) Improper adjustment of sweep-off blades
 - D) All of these options are correct
10. Durability of a tablet to combined effects of shock & abrasion is evaluated by using -----
- A) Hardness tester
 - B) Disintegration test apparatus
 - C) Friabilator
 - D) Screw gauge
11. Which of the following is not added in lozenges?
- A) Binder
 - B) Disintegrant
 - C) Sweetener
 - D) All
12. Sub coating is given to the tablets during sugar coating
- A) To increase the bulkiness
 - B) To avoid deterioration due to microbial attack
 - C) To prevent the solubility in acidic medium
 - D) To avoid stickiness
13. The integrity of HEPA filters can be checked by----- test.
- A) TOT aerosol challenge
 - B) DOP aerosol challenge
 - C) Killer-Killani
 - D) Fehling's
14. All of the following are filter-aids except -----
- A) Diatomite
 - B) Carbon
 - C) Cellulose
 - D) Polyvinyl chloride

15. The non-aqueous vehicle used in injections is-----

- A) Alcohol
- B) Glycerol
- C) Alcoholic sodium stearate
- D) Vegetable oils

16. For granules high angle of repose indicates -----

- A) High porosity
- B) High bulk density
- C) Smooth surface
- D) Rough surface

17. superdisintegrant are essential component of

- A) Buccal Tablets
- B) Gastroretentive drug delivery system
- C) Lozenges
- D) Fast dissolving tablets

18. Glass apparatus used in the production of sterile products can be sterilized by

- A) Dry heat 140 degrees for 30 minutes
- B) Dry heat 120 degrees for 1 hour
- C) Saturated steam 121 degrees for 15 minutes
- D) Using Suitable Disinfectant

19. Which statement is NOT correct?

- A) Buccal route avoids first pass metabolism
- B) Parenteral route avoids first pass metabolism
- C) Sublingual route avoids first pass metabolism
- D) Oral route avoids first pass metabolism

20. In pan coating technique , the core material is-----

- A) Solid
- B) Liquid
- C) Gas
- D) Both A and B are correct



UNIVERSITY OF THE PUNJAB

Fourth Prof: 2nd Annual – 2018

Examination: Doctor of Pharmacy (Pharm.D.)

Roll No.

Subject: Pharmaceutics-VI (Industrial Pharmacy) (Old Course)
PAPER: 3

MAX. TIME: 3 Hrs.

MAX. MARKS: 100

NOTE: Attempt any FIVE questions. All questions carry equal marks.

- Q1 a) Describe theory of mass transfer, what are the application of mass transfer in pharmaceutical industry? 10
b) Discuss principle, operation and application of fluid bed dryer in detail. 10
- Q2 a) What is the difference b/w manual and mechanical size reduction? Write a detail note on manually used method. 10
b) What is unit pack? Discuss the blister packaging and material used to prepare it. 10
- Q3 a) Define compression, consolidation and compaction, discuss their mechanisms in detail. 10
b) Name the methods of tablet manufacturing, make flow chart to describe these, how the choice is made between these methods? 10
- Q4 a) How you will differentiate the sterile area of a pharmaceutical industry into different classes? What type of operation are carried out in each area? 10
b) Milling of APIs affect their flow, mixing and compressional properties, discuss this argument with reasons. 10
- Q5 Give brief answers of following terms. 5 Marks each
i. Steps in the manufacturing of hard gel capsules
ii. Sugar coating of tablets
iii. Picking and mottling with reasons and remedy to avoid.
iv. Bulk and terminal sterilization of injectables
- Q6 a) Discuss the principle, working and applications of colloid mill and fluid energy mill. 5+5
b) Discuss different types of material used to prepare the containers for pharmaceutical packaging. 10
- Q7 a) How batch mixing of liquids is different from continuous mixing, describe Silverson mixer in detail
b) Describe some approaches to avoid mechanical hazards in pharmaceutical industry? 10

UNIVERSITY OF THE PUNJAB

Doctor of Pharmacy (Pharm.D.) Fourth Prof: Annual-2019

Subject: Pharmaceutics-IV (Industrial Pharmacy) (New Course)

Paper: 3 Part – I (Compulsory)

Time: 30 Min. Marks: 20

Roll No. in Fig.

Roll No. in Words.

Signature of Supdt.:

ATTEMPT THIS PAPER ON THIS QUESTION SHEET ONLY.

Division of marks is given in front of each question.

This Paper will be collected back after expiry of time limit mentioned above.

Q.1. Encircle the correct option.

(20x1=20)

- i. Mechanical process of size reduction of solid substances is called as:
a) Levigation b) Pulverization
c) Milling d) Trituration
- ii. Most commonly used disintegrant in tablet dosage form is:
a) Calcium phosphate b) Lactose
c) Mannitol d) Starch
- iii. The size reduction process in a pin mill follows the mechanism of
a) Cutting b) Impact
c) Grinding d) Impact and attrition
- iv. Solid collected on filter medium is the desired product then the process is known as:
a) Cake b) Sedimentation
c) Filter aids d) Filter press
- v. Which is one of the most common granulating agent?
a) Acacia b) Gelatin
c) Tragacanth d) Starch
- vi. Which tablets are designed to produce solution rapidly?
a) Implantation tablets b) Effervescent tablets
c) Dispensing tablets d) Hypodermic tablets
- vii. Randomization of dissimilar particles within a system is called:
a) Milling b) Correlation
c) Mixing d) Binding
- viii. The method most widely used for measuring particle size distribution in pharmaceutical industry is?
a) Sieving b) Microscopy
c) Sedimentation d) Laser diffraction
- ix. Which term is used for separation of a tablet into two or more distinct layers?
a) Capping b) Lamination
c) Picking d) Sticking
- x. Picking is the problem when material is attached to
a) Hopper b) Punches
c) Dyes d) Sweep of blades
- xi. During coating when atomization is very fine it may lead to effect called
a) Orange peel b) Bridging
c) Spray drying d) Capping

P.T.O.

- xii. If average weight of one tablet is 250 mg what would be the weight of API batch for 1 lac tablets:
- | | |
|------------|--------------|
| a) 2500 kg | b) 25 kg |
| c) 250 kg | d) 250000 kg |
- xiii. The efficiency of HEPA filter in removing the solid particles is:
- | | |
|-----------|-----------|
| a) 99.0% | b) 99.70% |
| c) 99.99% | d) 99.97% |
- xiv. Percentage of binders used in tablet formulation
- | | |
|-------------|--------------|
| a) 5 - 10 % | b) 10 - 20% |
| c) 20 - 30% | d) 0.01 - 1% |
- xv. In sugar coating, ----- material is used for polishing
- | | |
|-----------------|-----------------|
| a) Carnauba wax | b) Cocoa powder |
| c) Oleic acid | d) Gelatin |
- xvi. For granules high angle of repose indicates -----
- | | |
|-------------------|----------------------|
| a) High porosity | b) High bulk density |
| c) Smooth surface | d) Rough surface |
- xvii. The non-aqueous vehicle used in injections is
- | | |
|------------------------------|-------------------|
| a) Alcohol | c) Glycerol |
| c) Alcoholic sodium stearate | d) Vegetable oils |
- xviii. Glass apparatus used in the production of sterile products can be sterilized by
- | |
|---|
| a) Dry heat 140 degrees for 30 minutes |
| b) Dry heat 120 degrees for 1 hour |
| c) Saturated steam 121 degrees for 15 minutes |
| d) Using Suitable Disinfectant |
- xix. Which statement is NOT correct?
- | |
|--|
| a) Buccal route avoids first pass metabolism |
| b) Parenteral route avoids first pass metabolism |
| c) Sublingual route avoids first pass metabolism |
| d) Oral route avoids first pass metabolism |
- xx. During sugar coating, following coating prevent the moisture penetration
- | | |
|------------------|-----------------|
| a) Sub-coating | b) Seal-coating |
| c) Syrup coating | d) Polishing |



UNIVERSITY OF THE PUNJAB

Doctor of Pharmacy (Pharm.D.) Fourth Prof: Annual-2019

Roll No.

Subject: Pharmaceutics-IV (Industrial Pharmacy) (New Course)
Paper: 3 Part – II

Time: 2 Hrs. 30 Min. Marks: 80

ATTEMPT THIS (SUBJECTIVE) ON THE SEPARATE ANSWER SHEET PROVIDED

Note: Attempt any *FOUR* questions. Each question carries equal marks.

- Q 2 a) What are different mechanisms of heat transfer, Describe the factors affecting the drying process. 10
- b) Discuss principle, operation and application of fluid bed dryer in detail. 10
- Q 3 a) How solid state properties affect the Tablet manufacturing process? How these are settled then? 10
- b) Name different components of tablet formulation, describe different stages of granulation process. 10
- Q 4 a) Describe the classification of clean room of a pharmaceutical industry. How laminar air flow helps in maintaining the sterility of clean room? 10
- b) What are the components of sterile products? How sterilization of such products is achieved? 10
- Q 5 Give brief answers of following. 5 Marks each
- Filter Aid
 - Steps in manufacturing of Hard gelatin capsule
 - Sticking and Picking with reasons and remedy.
 - Sugar coating of tablets
- Q 6 a) Milling of APIs affect their flow, mixing and compressional properties, discuss this argument with reasons. 10
- b) Compare glass as pharmaceutical packaging material, list down the advantages and disadvantages of this material. 10
- Q 7 a) Describe various instruments used in the manufacturing of Emulsions? Discuss any two of them 10
- b) Define Hazard, enlist its types and discuss chemical hazards and its management in detail. 10



Doctor of Pharmacy (Pharm.D.) Fourth Prof: Annual-2019

Subject: Pharmaceutics-VI (Industrial Pharmacy) (Old Course)

Paper: 3 Part – I (Compulsory)

Time: 30 Min. Marks: 20

Roll No. in Fig.

Roll No. in Words.

Signature of Supdt.:

ATTEMPT THIS PAPER ON THIS QUESTION SHEET ONLY.

Division of marks is given in front of each question.

This Paper will be collected back after expiry of time limit mentioned above.

Q.1. Encircle the correct option.

(20x1=20)

- i. Following additive is leached from plastic container into the product during storage:
a) Antioxidants b) Stabilizer
c) Colorants d) Diluents
- ii. The mixing mechanism analogous to bulk transport is referred to as:
a) Convective mixing b) Shear mixing
c) Diffusive mixing d) Turbulent mixing
- iii. If average weight of one tablet is 250 mg what would be the weight of API batch for 1 lac tablets
a) 2500 kg b) 25 kg
c) 250 kg d) 250000 kg
- iv. Low melting point substances causes _____ problem in tablet:
a) Picking b) Lamination
c) Sticking d) Mottling
- v. The reduction of bulk volume of the material as a result of displacement of the gaseous phase is called:
a) Compaction b) Compression
c) Slugging d) D. Consolidation
- vi. Clarification is applied when the solids do not exceed _____ percent.
a) 2.0% b) 1.0%
c) 3.0% d) 10%
- vii. Which test is used for testing membrane efficiency?
a) Diffusion testing b) Forward Flow test
c) Bubble point test d) Integrity Testing
- viii. Warehouse is the area of industry where _____.
a) Raw Material are stored
b) Production is carried out
c) Maintenance work is carried out
d) Raw material and finished goods are stored
- ix. Capping of tablets during manufacturing occurs due to _____.
a) Air entrapment
b) Plastic deformation
c) Improper adjustment of sweep-off blades
d) All of these options are correct
- x. Air locks made in different parts of pharma industry help in _____.
a) Filtration of air b) Preventing cross contamination
c) Maintaining sterility of area d) Helps in ventilation

P.T.O.

- xi. Which of the following excipient is not added in lozenges?
a) Binder
b) Disintegrant
c) Sweetener
d) Diluent
- xii. During sugar coating of tablets, the Sub coating is applied in order to
a) To increase the bulkiness
b) To avoid deterioration due to microbial attack
c) To prevent the solubility in acidic medium
d) To avoid moisture penetration
- xiii. Sodium starch glycolate is classed under
a) Glidant
b) Super disintegrants
c) Lubricants
d) Diluents
- xiv. Most commonly used diluent in tablet dosage form is:
a) Tricalcium phosphate
b) Mannitol
c) Starch
d) Lactose
- xv. The non-aqueous vehicle used in injections is _____.
a) Alcohol
b) Glycerol
c) Alcoholic sodium stearate
d) Vegetable oils
- xvi. Glass apparatus used in the production of sterile products can be sterilized by:
a) Dry heat 140°C for 30 minutes
b) Dry heat 120°C for 1 hour
c) Saturated steam 121°C for 15 minutes
d) Using Suitable Disinfectant
- xvii. _____ is the area where materials are stored until tested for quality.
A) Clean area
b) Compounding section
c) Dispensing area
d) Quarantine area
- xviii. Mesh size is the number of opening per _____.
a) Inch
b) Square inch
c) Linear inch
d) Centimeter
- xix. Hard gelatin capsule shells have moisture content in the range of:
a. 5%-10%
b) 12%-15 %
c) 30%-45%
d) 50%-70%
- xx. The particle size directly affects the _____ property of tablets.
a) Weight
b) Weight variation
c) Disintegration time
d) Dissolution rate



UNIVERSITY OF THE PUNJAB

Doctor of Pharmacy (Pharm.D.) Fourth Prof: Annual-2019

Roll No.

Subject: Pharmaceutics-VI (Industrial Pharmacy) (Old Course)
Paper: 3 Part - II

Time: 2 Hrs. 30 Min. Marks: 80

ATTEMPT THIS (SUBJECTIVE) ON THE SEPARATE ANSWER SHEET PROVIDED

Note: Attempt any *FOUR* questions. Each question carries equal marks.

- Q 2 a) Describe theory of mass transfer, what are the application of mass transfer in pharmaceutical industry? 10
- b) How we can dry temperature sensitive products? Give a detailed account of dryer used for such operation. 10
- Q 3 a) What the relation between density and porosity of powders? how these properties affect the tableting process. 10
- b) Name the methods of tablet manufacturing, make flow chart to describe tablet manufacturing by wet granulation method? 10
- Q 4 a) How sterility is maintained in the clean room of a pharmaceutical industry? What is the role of Laminar flow hood in this process? 10
- b) Define sterilization? Describe different methods used for the terminal sterilization of pharmaceutical formulation 10
- Q 5 Give brief answers of following terms. 5 Marks each
- i. Bubble point test of filter integrity
 - ii. Film coating of tablets
 - iii. Capping and lamination with reasons and remedy.
 - iv. Parts of single punch tablet machine
- Q 6 a) Discuss the mechanism of size reduction during milling process. Discuss the principle, working and applications of ball mill. 5+5
- b) Briefly describe different packaging materials used in pharmaceuticals, what are different factors that affect the selection of packaging material? 10
- Q 7 a) How batch mixing of liquids is different from continuous mixing, describe the operation of Silverson homogenizer
- b) Write a detailed note on Fire and Explosion Hazards focusing on its sources, causes, types of fire, detection and prevention 10



UNIVERSITY OF THE PUNJAB

Doctor of Pharmacy (Pharm.D.) Fourth Prof: Annual-2021

Subject: Pharmaceutics-IV (Industrial Pharmacy) (New Course)

Paper: 3

Part - I (Compulsory)

Time: 30 Min. Marks: 20

Roll No. in Fig.

Roll No. in Words.

Signature of Supdt.:

ATTEMPT THIS PAPER ON THIS QUESTION SHEET ONLY.

Division of marks is given in front of each question.

This Paper will be collected back after expiry of time limit mentioned above.

Q.1. Encircle the correct option.

(20x1=20)

1. Subcoating is given to the tablets:
(A) To avoid deterioration due to microbial attack
(B) To avoid stickiness
(C) To prevent the solubility of in acidic media
(D) To increase the bulk
2. Sigma blade mixers are commonly used in:
(A) Dry granulation
(B) Powder mixing
(C) Wet granulation
(D) Crude fibre mixing
3. Poorly manufactured tablets may have small pinholes on the surface. This phenomenon is known as:
(A) Leaching
(B) Picking
(C) Mottling
(D) Chipping
4. Which of the following industrial dryer is used to dry tablet granules?
(A) Drum dryer
(B) Fluidized bed dryer
(C) Spray dryer
(D) Freeze dryer
5. One of the following is used as a pH dependent controlled release excipient:
(A) Carnauba wax
(B) Hydroxy propyl methyl cellulose phthalate
(C) Methyl cellulose
(D) Glyceryl monostearate
6. In the preparation of multilayer tablets one of the substances listed is used for hydrophilic matrix coating:
(A) CMC
(B) Shellac
(C) Stearyl alcohol
(D) Beeswax
7. Durability of a tablet to combined effects of shock and abrasion is evaluated by using:
(A) Hardness tester
(B) Disintegration apparatus
(C) Friabilator
(D) Screw Gauge
8. For good flow properties, angle of repose should be:
(A) 10 - 20
(B) 20
(C) 20 - 30
(D) 30-40
9. Which of the following polymer used to prepare mucoadhesive tablets:
(A) Starch
(B) Gelatin
(C) Sodium alginate
(D) Tragacanth
10. Identify superdisintegrant:
(A) Starch
(B) Sodium starch glycolate
(C) Sodium alginate
(D) HPMC

11. Glass is used as one of the major packing materials in pharmaceutical industry, its internal structure is based on the network of
- A. Silicon atoms
 - B. Polymer
 - C. Silicon and oxygen atoms
 - D. Diluents
12. Air locks installed in different parts of pharma industry help in _____
- A. Filtration of air
 - B. Preventing cross contamination
 - C. Maintaining sterility of area
 - D. Helps in ventilation
13. Drug dissolution might be faster from a tablet prepared by?
- A. direct compression
 - B. dry granulation
 - C. wet granulation
 - D. both dry and wet granulation
14. Methyl cellulose is used as?
- A. wet binder
 - B. dry binder
 - C. filler
 - D. Diluent
15. Which type of mixtures are used for batch mixing of solids?
- A. planetary mixers
 - B. zig-zag mixers
 - C. sigma blade mixers
 - D. turbines
16. Swirl is a problem with such arrangement of impellers?
- A. side-entering
 - B. off-centre
 - C. inclined entering
 - D. declined entering
17. Charring of cellulose materials/sugars can occur with which of the following methods of sterilization?
- A. Dry heat sterilization
 - B. Moist heat sterilization
 - C. Filtration
 - D. Radiation
18. Air locks installed in different parts of pharma industry help in _____
- A. Filtration of air
 - B. Preventing cross contamination
 - C. Maintaining sterility of area
 - D. Helps in ventilation
19. Milling is a rigorous mechanical process that leaves many unpleasant effects on the product, however one the following effect can be used as an opportunity for useful actions
- A. Agglomerations of particles
 - B. Charge development of particle surfaces
 - C. Amorphization
 - D. Chemical instability
20. Glass apparatus used in the production of sterile products can be sterilized by
- A. Dry heat 140 °C for 30 minutes
 - B. Dry heat 120 °C for 1 hour
 - C. Saturated steam 121 °C for 15 minutes
 - D. Using Suitable Disinfectant



UNIVERSITY OF THE PUNJAB

Doctor of Pharmacy (Pharm.D.) Fourth Prof: Annual-2021

Roll No.

Subject: Pharmaceutics-IV (Industrial Pharmacy) (New Course)

Paper: 3

Part – II

Time: 2 Hrs. 30 Min. Marks: 80

ATTEMPT THIS (SUBJECTIVE) ON THE SEPARATE ANSWER SHEET PROVIDED

Note: Attempt any *FOUR* questions. Each question carries equal marks.

Q.2. Write note on the following

(4 × 5 = 20)

- Mass volume relationship
- Porosity, voids and Bulk Volume
- Heckle plot
- Compressibility

Q.3. A) Define Compaction and discuss the different stages involved in powder compression. (10)

B) Define Consolidation and discuss the concept of cold welding and asperitic melting. (10)

Q.4. Define Physics of tablet and discuss the seven different events occur during compression. (20)

Q.5. Draw the diagram and discuss the advantages and disadvantages of (20)

- Rotary filter
- Meta filter

Q.6. A) Different mechanisms of milling, describe construction and working of ball mill. (10)

B) Briefly describe the followings: (5 × 2 = 10)

- Composition sterile products.
- Indicators used for dry heat sterilization.
- Specification of class A Clean room.
- Importance of leakage tests of injectables
- Advantages of using rubber as packing material

Q.7. A) What are sterile products? Classify them. Describe the "environment control" in respect of production of such products. (10)

B) Briefly describe the followings: (5 × 2 = 10)

- Effect of moisture on milling process
- Materials used in pharmaceutical packaging
- Leaching and sorption in respect of plastic containers
- Applications of size reduction in pharmacy
- Disadvantages of milling