

PHB Education

**Government Exam and D. Pharm Exit Exam Preparation
Questions Bank**

Subject: *Pharmaceutics*
Chapter 4 : *Size reduction*

Section 1: Introduction and Objectives of Size Reduction

1. The term **size reduction** is also known as —

- A) Pulverization
- B) Comminution
- C) Diminution
- D) All of the above

Answer: D) All of the above

2. The main objective of size reduction is —

- A) To increase surface area
- B) To decrease solubility
- C) To improve flavor
- D) To increase density

Answer: A) To increase surface area

3. Size reduction helps to improve —

- A) Drug absorption
- B) Drug color
- C) Drug stability only
- D) Odor of drug

Answer: A) Drug absorption

4. The process of size reduction helps in —

- A) Uniform mixing
- B) Faster dissolution
- C) Improved bioavailability
- D) All of the above

Answer: D) All of the above

5. **Size reduction** is a process that involves —

- A) Cutting only
- B) Breaking large particles into smaller ones
- C) Increasing surface area by melting
- D) Mixing fine particles

Answer: B) Breaking large particles into smaller ones

6. The efficiency of size reduction depends on —

- A) Hardness of the material
- B) Type of equipment
- C) Moisture content
- D) All of the above

Answer: D) All of the above

7. The operation of reducing solid materials into smaller particles is called —

- A) Mixing
- B) Size reduction
- C) Extraction
- D) Filtration

Answer: B) Size reduction

8. The process of **size reduction** increases —

- A) Particle number
- B) Surface area
- C) Rate of reaction
- D) All of the above

Answer: D) All of the above

9. One major application of size reduction in pharmacy is —

- A) Tablet granulation
- B) Capsule formulation
- C) Powder blending
- D) All of the above

Answer: D) All of the above

10. The **size reduction** operation improves —

- A) Dissolution rate
- B) Suspension stability
- C) Drug uniformity
- D) All of the above

Answer: D) All of the above

Section 2: Factors Affecting Size Reduction

11. The **hardness** of a substance can be measured by —

- A) Moh's scale
- B) Richter scale

C) pH scale

D) None

Answer: A) Moh's scale

12. Soft materials are best reduced by —

A) Cutting

B) Impact

C) Attrition

D) Compression

Answer: A) Cutting

13. Hard and brittle substances are best reduced by —

A) Cutting

B) Impact

C) Attrition

D) Shearing

Answer: B) Impact

14. Fibrous materials are best reduced by —

A) Cutting

B) Crushing

C) Compression

D) Impact

Answer: A) Cutting

15. The moisture content of the material affects —

A) Size reduction efficiency

B) Color of product

C) Density of material

D) None of the above

Answer: A) Size reduction efficiency

16. Sticky materials are best handled by —

A) Wet grinding

B) Dry grinding

C) High-speed impact

D) Cryogenic milling

Answer: A) Wet grinding

17. Elastic materials are ground by —

A) Impact

B) Freezing before grinding

C) Compression

D) None of the above

Answer: B) Freezing before grinding

18. Temperature during grinding affects —

A) Drug stability

B) Particle shape

C) Moisture content

D) All of the above

Answer: D) All of the above

19. The friability of material refers to —

A) Ability to break easily

B) Ability to resist grinding

C) Ability to absorb water

D) Ability to dissolve quickly

Answer: A) Ability to break easily

20. Abrasiveness of a drug affects —

A) Efficiency of grinder

B) Wear and tear of machine

C) Product quality

D) All of the above

Answer: D) All of the above

Section 3: Mechanisms of Size Reduction

21. Impact involves —

A) Striking the material

B) Compressing between surfaces

C) Shearing

D) Cutting

Answer: A) Striking the material

22. Attrition involves —

A) Scraping or rubbing action

B) Compression

C) Impact

D) Cutting

Answer: A) Scraping or rubbing action

23. Compression mechanism is used in —

- A) Roller mills
- B) Ball mills
- C) Hammer mills
- D) Cutter mills

Answer: A) Roller mills

24. Cutting mechanism is used in —

- A) Cutter mills
- B) Hammer mills
- C) Ball mills
- D) Fluid energy mills

Answer: A) Cutter mills

25. Combined mechanisms (impact + attrition) are used in —

- A) Ball mill
- B) Hammer mill
- C) Both A and B
- D) None

Answer: C) Both A and B

26. Crushing involves —

- A) Pressure
- B) Impact
- C) Friction
- D) Cutting

Answer: A) Pressure

27. Tearing is most suitable for —

- A) Hard materials
- B) Fibrous materials
- C) Sticky materials
- D) Soft powders

Answer: B) Fibrous materials

28. Shearing is a mechanism where —

- A) Material is cut by blades
- B) Material is pressed
- C) Material is rubbed
- D) Material is heated

Answer: A) Material is cut by blades

29. **Roller mills** work mainly on —

- A) Compression
- B) Impact
- C) Cutting
- D) Attrition

Answer: A) Compression

30. **Ball mills** use —

- A) Impact and attrition
- B) Cutting and compression
- C) Tearing and shearing
- D) Crushing only

Answer: A) Impact and attrition

Section 4: Methods of Size Reduction

31. Size reduction methods are classified as —

- A) Cutting, Crushing, Grinding
- B) Dry and Wet
- C) Manual and Mechanical
- D) All of the above

Answer: D) All of the above

32. **Grinding** refers to —

- A) Fine size reduction
- B) Coarse reduction
- C) Drying
- D) Sieving

Answer: A) Fine size reduction

33. **Crushing** is suitable for —

- A) Coarse size reduction
- B) Very fine powders
- C) Liquid materials
- D) Volatile substances

Answer: A) Coarse size reduction

34. **Wet grinding** is preferred for —

- A) Heat-sensitive drugs
- B) Sticky materials

C) Gummy materials

D) All of the above

Answer: D) All of the above

35. Dry grinding is suitable for —

A) Crystalline materials

B) Heat-labile drugs

C) Wet materials

D) Sticky substances

Answer: A) Crystalline materials

36. Cryogenic grinding uses —

A) Liquid nitrogen

B) Steam

C) Air cooling

D) Ice

Answer: A) Liquid nitrogen

37. Micronization refers to —

A) Reduction to micron size

B) Powder mixing

C) Tablet coating

D) Powder drying

Answer: A) Reduction to micron size

38. The fluid energy mill is based on —

A) Air impact

B) Cutting

C) Compression

D) Crushing

Answer: A) Air impact

39. The colloid mill is used for —

A) Size reduction of suspensions and emulsions

B) Dry powders

C) Gases

D) None

Answer: A) Size reduction of suspensions and emulsions

40. Edge runner mill works on —

A) Compression and attrition

B) Impact

C) Cutting

D) Shearing

Answer: A) Compression and attrition

Section 5: Hammer Mill

41. **Hammer mill** works on which principle?

A) Impact

B) Cutting

C) Compression

D) Shearing

Answer: A) Impact

42. The **hammers** in a hammer mill are attached to —

A) Rotor

B) Shaft

C) Frame

D) Blades

Answer: A) Rotor

43. The **speed of rotation** in a hammer mill is about —

A) 1000–2000 rpm

B) 2000–4000 rpm

C) 5000–10000 rpm

D) 100–500 rpm

Answer: B) 2000–4000 rpm

44. The **screen** in a hammer mill controls —

A) Product size

B) Airflow

C) Temperature

D) Weight

Answer: A) Product size

45. **Feed size** for hammer mill should be —

A) Large blocks

B) Moderate

C) Very fine

D) Wet slurry

Answer: B) Moderate

46. The **fineness** of product depends on —

- A) Screen size
- B) Hammer speed
- C) Feed rate
- D) All of the above

Answer: D) All of the above

47. **Pharmaceutical uses** of hammer mill include —

- A) Grinding herbs
- B) Granulation
- C) Powder preparation
- D) All of the above

Answer: D) All of the above

48. **Advantages** of hammer mill include —

- A) High capacity
- B) Easy cleaning
- C) Continuous operation
- D) All of the above

Answer: D) All of the above

49. **Disadvantages** of hammer mill include —

- A) Noisy operation
- B) Heat generation
- C) Wear of screens
- D) All of the above

Answer: D) All of the above

50. **Hammer mill is not suitable** for —

- A) Sticky materials
- B) Hard materials
- C) Crystalline drugs
- D) Dry powders

Answer: A) Sticky materials

Section 6: Ball Mill

51. **Ball mill** works on the principle of —

- A) Impact and Attrition
- B) Cutting and Shearing

C) Compression only

D) Impact only

Answer: A) Impact and Attrition

52. In a ball mill, size reduction occurs due to —

A) Impact of falling balls

B) Friction between balls and wall

C) Both A and B

D) Compression

Answer: C) Both A and B

53. The **rotating cylinder** of a ball mill is partially filled with —

A) Balls

B) Stones

C) Granules

D) Rods

Answer: A) Balls

54. The **balls** in a ball mill are made of —

A) Steel

B) Porcelain

C) Flint pebbles

D) All of the above

Answer: D) All of the above

55. The **speed of rotation** of a ball mill is known as —

A) Critical speed

B) Optimum speed

C) Peripheral speed

D) Rotary speed

Answer: A) Critical speed

56. If the speed of rotation is too high, the balls —

A) Stick to the wall

B) Fall freely

C) Remain stationary

D) Exit the mill

Answer: A) Stick to the wall

57. **Optimum speed** of a ball mill is usually —

A) 50–60% of critical speed

B) 80–90% of critical speed

C) 100% of critical speed

D) 20–30% of critical speed

Answer: A) 50–60% of critical speed

58. Cascading action in a ball mill occurs when —

A) Balls fall from top of the shell

B) Balls roll over each other

C) Balls stick to wall

D) Balls remain stationary

Answer: A) Balls fall from top of the shell

59. Cataracting motion occurs at —

A) High speed

B) Low speed

C) Optimum speed

D) No rotation

Answer: A) High speed

60. The **feed size** in a ball mill is usually —

A) < 10 mm

B) 10–20 mm

C) 20–50 mm

D) < 1 mm

Answer: A) < 10 mm

Section 7: Types of Ball Mills

61. Planetary ball mill works by —

A) Rotating both jar and disc

B) Rotating one shaft only

C) Using air jets

D) Using vibration only

Answer: A) Rotating both jar and disc

62. Vibratory ball mill achieves size reduction by —

A) Rapid vibration of the container

B) Rotating drum

C) Using air flow

D) Using hammer action

Answer: A) Rapid vibration of the container

63. **Attritor mill** is also known as —

- A) Stirred ball mill
- B) Pebble mill
- C) Planetary mill
- D) Fluid energy mill

Answer: A) Stirred ball mill

64. The **working speed** of an attritor mill is —

- A) Higher than conventional ball mill
- B) Lower than ball mill
- C) Equal to ball mill
- D) Not related

Answer: A) Higher than conventional ball mill

65. **Continuous ball mills** are used for —

- A) Large-scale production
- B) Laboratory studies
- C) Intermittent processes
- D) None

Answer: A) Large-scale production

66. **Batch ball mills** are used for —

- A) Small quantities
- B) Continuous operation
- C) Drying
- D) Sieving

Answer: A) Small quantities

67. **Planetary ball mills** are mainly used for —

- A) Research and fine grinding
- B) Bulk production
- C) Granulation
- D) Mixing liquids

Answer: A) Research and fine grinding

68. **Vibratory ball mill** is ideal for —

- A) Very fine powders
- B) Coarse powders
- C) Sticky materials
- D) Liquids

Answer: A) Very fine powders

69. **Ball mill efficiency** depends on —

- A) Speed of rotation
- B) Size of balls
- C) Feed rate
- D) All of the above

Answer: D) All of the above

70. **Disadvantage** of ball mill is —

- A) Time-consuming
- B) Noisy operation
- C) Wear and tear of balls
- D) All of the above

Answer: D) All of the above

Section 8: Other Mills and Equipment

71. **Roller mill** works on —

- A) Compression
- B) Impact
- C) Shearing
- D) Attrition

Answer: A) Compression

72. The **edge runner mill** is used for —

- A) Crushing and grinding sticky materials
- B) Mixing powders
- C) Drying
- D) Sifting

Answer: A) Crushing and grinding sticky materials

73. The **end runner mill** works on —

- A) Compression and attrition
- B) Cutting
- C) Impact
- D) Shearing

Answer: A) Compression and attrition

74. **Fluid energy mill** works on —

- A) Impact and attrition using air jets
- B) Compression

C) Cutting

D) Shearing

Answer: A) Impact and attrition using air jets

75. The **air jet mill** is used for —

A) Micronization

B) Drying

C) Mixing

D) Coating

Answer: A) Micronization

76. **Colloid mill** works on —

A) Shear forces

B) Impact

C) Compression

D) None

Answer: A) Shear forces

77. The **roller compactor** is mainly used for —

A) Dry granulation

B) Mixing

C) Drying

D) Wet milling

Answer: A) Dry granulation

78. **Cutter mill** works by —

A) Cutting and shearing

B) Impact

C) Compression

D) Attrition

Answer: A) Cutting and shearing

79. **Vibration mills** achieve size reduction through —

A) High-frequency vibration

B) Compression

C) Air jet

D) Cutting

Answer: A) High-frequency vibration

80. **Micronizer** is a type of —

A) Fluid energy mill

B) Hammer mill

C) Cutter mill

D) Roller mill

Answer: A) Fluid energy mill

Section 9: Applications and Advantages

81. Size reduction increases —

- A) Surface area
- B) Dissolution rate
- C) Uniformity
- D) All of the above

Answer: D) All of the above

82. Fine powders are useful in —

- A) Tablet and capsule formulation
- B) Suspension preparation
- C) Inhalation dosage forms
- D) All of the above

Answer: D) All of the above

83. **Particle size** affects —

- A) Dissolution rate
- B) Bioavailability
- C) Flow properties
- D) All of the above

Answer: D) All of the above

84. **Size reduction** improves —

- A) Mixing efficiency
- B) Reaction rate
- C) Extraction efficiency
- D) All of the above

Answer: D) All of the above

85. **Over-grinding** may cause —

- A) Heat generation
- B) Degradation of drug
- C) Agglomeration
- D) All of the above

Answer: D) All of the above

86. **Moisture content** should be —

- A) Minimal
- B) High
- C) Moderate
- D) Maximum

Answer: A) Minimal

87. In **wet grinding**, a liquid medium is used to —

- A) Reduce heat
- B) Avoid dust formation
- C) Prevent sticking
- D) All of the above

Answer: D) All of the above

88. **Dry grinding** is preferred when —

- A) Water-sensitive drugs are used
- B) Sticky materials are used
- C) Gummy materials are used
- D) All of the above

Answer: A) Water-sensitive drugs are used

89. **Size reduction before extraction** increases —

- A) Surface contact with solvent
- B) Solubility
- C) Extraction yield
- D) All of the above

Answer: D) All of the above

90. **Micronization** is useful for —

- A) Increasing bioavailability
- B) Making fine suspensions
- C) Inhalation drugs
- D) All of the above

Answer: D) All of the above

Section 10: General and Conceptual MCQs

91. The energy required for size reduction depends on —

- A) Hardness
- B) Toughness

- C) Feed size
- D) All of the above

Answer: D) All of the above

92. Energy laws in size reduction include —

- A) Kick's Law
- B) Rittinger's Law
- C) Bond's Law
- D) All of the above

Answer: D) All of the above

93. Kick's Law is applicable for —

- A) Coarse size reduction
- B) Fine grinding
- C) Micronization
- D) Ultrafine powders

Answer: A) Coarse size reduction

94. Rittinger's Law applies to —

- A) Fine grinding
- B) Coarse crushing
- C) Mixing
- D) Drying

Answer: A) Fine grinding

95. Bond's Law gives a relation between —

- A) Energy and particle size
- B) Temperature and time
- C) Pressure and surface area
- D) None

Answer: A) Energy and particle size

96. Size reduction improves —

- A) Dissolution rate of poorly soluble drugs
- B) Drug color
- C) Drug odor
- D) None

Answer: A) Dissolution rate of poorly soluble drugs

97. Edge runner mill and **end runner mill** differ mainly in —

- A) Type of motion
- B) Principle
- C) Material of construction

D) Speed

Answer: A) Type of motion

98. Fluid energy mill can reduce size to —

A) $<10\ \mu\text{m}$

B) $100\ \mu\text{m}$

C) $500\ \mu\text{m}$

D) $1000\ \mu\text{m}$

Answer: A) $<10\ \mu\text{m}$

99. Hammer mill can reduce particle size up to —

A) $100\ \mu\text{m}$

B) $10\ \mu\text{m}$

C) $200\ \mu\text{m}$

D) $1\ \text{mm}$

Answer: A) $100\ \mu\text{m}$

100. The **overall aim** of size reduction in pharmacy is —

A) To obtain desired particle size for formulation

B) To improve taste

C) To increase color uniformity

D) To make tablets shiny

Answer: A) To obtain desired particle size for formulation