

Time: 3 Hrs

## Question No, 1. Multiple choice questions

1×20=20 Marks

1. Which of the following is not a type of energy loss?
  - A. Friction losses
  - B. Resistance losses
  - C. Enlargement losses
  - D. Losses in fittings
2. Rittinger's Law states that energy required for size reduction is proportional to:
  - A. Volume of particles
  - B. Weight of particles
  - C. Square root of size reduction ratio
  - D. Increase in surface area
3. What type of evaporator is used to concentrate insulin, liver extract and vitamin?
  - A. Falling film evaporator
  - B. Climbing film evaporator
  - C. Evaporating pan
  - D. Horizontal tube evaporator
4. Equation for rate of heat transfer by conduction is \_\_\_\_\_.
  - A.  $\text{Rate} = q = \epsilon b A T^4$
  - B.  $\text{Rate} = E1/\alpha1 = E2/\alpha2$
  - C.  $\text{Rate} = hc A(t1 - t2)$
  - D.  $\text{Rate} = \text{Driving force}/\text{Resistance}$
5. Which of the following is a type of packed fractionation column.
  - A. Rings
  - B. Sieve plate
  - C. Bubble plate
  - D. Two valve plate
6. Silveson emulsifier works on the principle of:
  - A. Centrifugal separation
  - B. Diffusion
  - C. High shear mixing
  - D. Sedimentation
7. Solid mixing differs from liquid mixing mainly because:
  - A. Liquids mix by molecular diffusion, solids by bulk movement
  - B. Liquids require mechanical agitation, solids do not
  - C. Solids always dissolve in liquids
  - D. Solids mix faster than liquids
8. In a Venturimeter, the pressure difference is measured between:
  - A. Throat and outlet
  - B. Any two points in pipe
  - C. Inlet and throat
  - D. Inlet and outlet
9. Elutriation tanks separate particles based on:
  - A. Magnetic properties
  - B. Difference in settling velocity
  - C. Centrifugal force
  - D. Adsorption capacity
10. What is the primary objective of size separation in pharmaceutical engineering?
  - A. To improve drug stability
  - B. To increase solubility of drugs
  - C. To reduce particle size
  - D. To classify particles based on size
11. Rotary drum filter operates on the principle of:
  - A. Centrifugal separation
  - B. Continuous vacuum filtration
  - C. Gravity sedimentation
  - D. Diffusion
12. In evaporators Calandria consists of number of
  - A. Baffles
  - B. Outlets
  - C. Tubular surfaces
  - D. Jackets
13. What is the full form of HETP?
  - A. Height equivalent to theoretical plane
  - B. Height equivalent to terminal plane
  - C. Height equivalent to theoretical plan
  - D. Height equivalent to theoretical plate

14. Select a dryer to dry product such as single dose and multi dose vials in final container \_\_\_\_\_
- A. Freeze dryer  
B. Fluidized bed dryer  
C. Drum dryer  
D. Tray dryer
15. Super centrifuges are particularly useful for:
- A. Separation of coarse suspensions  
B. Continuous solid discharge  
C. Drying powders  
D. Separation of fine emulsions and biological fluids
16. Twin shell blender is also known as:
- A. Ribbon blender  
B. Planetary mixer  
C. Sigma mixer  
D. V-blender
17. Which theory explains corrosion as formation of anodic and cathodic areas on metal surface?
- A. Electrochemical theory  
B. Dry theory  
C. Oxidation theory  
D. Adsorption theory
18. After the unsaturated drying is completed, \_\_\_\_\_ water starts to evaporate.
- A. Unbound  
B. Equilibrium  
C. Bound  
D. Free moisture
19. Emissivity value for black body is \_\_\_\_\_
- A. Equal to 1  
B. Less than 1  
C. More than 1  
D. Equal to zero
20. Which factor is most critical in semisolid mixing?
- A. Temperature only  
B. Particle size  
C. Shear force applied  
D. Particle shape

**Question No. 2: Answer any TWO of the following**

**10×2= 20Marks**

- A. Explain the properties and applications of ferrous metals used in pharmaceutical plant construction.
- B. Discuss the principle, construction and working of spray dryer
- C. Explain Rittinger's Law, Kick's Law, and Bond's Law of size reduction with suitable examples

**Question No. 3: Answer any SEVEN of the following**

**5×7= 35Marks**

- A. Describe Reynolds classical experiment elucidating different types of flow patterns.
- B. Differentiate between boiling and evaporation
- C. Describe the principle, construction and working of concentric tube heat exchanger
- D. With the help of neat, labelled diagram explain the principle, construction and working of simple distillation
- E. What is mixing? Discuss the Twin Shell Blender.
- F. Explain principle construction, working and uses of V cone blender
- G. What are filter aids? Explain their role, types, and applications in improving filtration efficiency.
- H. Describe principle, construction, working and uses of super centrifuge.
- I. What are the properties of glass? Discuss its applications as a material of construction

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