

Exam Date &amp; Time: 02-May-2022 (10:00 AM - 01:00 PM)



# MANIPAL ACADEMY OF HIGHER EDUCATION

## Pharmaceutical Engineering [PCE-BP304T - S2]

Marks: 75

Duration: 180 mins.

### I Multiple Choice Questions (MCQs)

Answer all the questions.

Section Duration: 30 mins

- 1) Which mill is preferred for wet grinding? (1)
- |                |                |                |                 |
|----------------|----------------|----------------|-----------------|
| 1) Hammer mill | 2) Roller mill | 3) Cutter mill | 4) Colloid mill |
|----------------|----------------|----------------|-----------------|
- 2) Which one of the following forces greatly enhance the separation? (1)
- |                       |                    |                         |                        |
|-----------------------|--------------------|-------------------------|------------------------|
| 1) Centrifugal forces | 2) Brownian forces | 3) Gravitational forces | 4) Vander Waals forces |
|-----------------------|--------------------|-------------------------|------------------------|
- 3) Reynolds number is indicative of one of the following? (1)
- |                      |                    |                 |                          |
|----------------------|--------------------|-----------------|--------------------------|
| 1) Frictional factor | 2) Fluid flow type | 3) Pumping rate | 4) Roughness of the pipe |
|----------------------|--------------------|-----------------|--------------------------|
- 4) Heat exchanges are NOT used in one of the following unit operations (1)
- |                    |           |                |                    |
|--------------------|-----------|----------------|--------------------|
| 1) Crystallization | 2) Drying | 3) Evaporation | 4) Size separation |
|--------------------|-----------|----------------|--------------------|
- 5) Hammer mill works on which principle? (1)
- |              |           |            |             |
|--------------|-----------|------------|-------------|
| 1) Attrition | 2) Impact | 3) Cutting | 4) Crushing |
|--------------|-----------|------------|-------------|
- 6) Which property of mercury is responsible for its use in manometers? (1)
- |                         |                         |                         |                        |
|-------------------------|-------------------------|-------------------------|------------------------|
| 1) High surface tension | 2) High vapour pressure | 3) Low specific gravity | 4) Low vapour pressure |
|-------------------------|-------------------------|-------------------------|------------------------|
- 7) ..... experiments is used for the study of flow of fluids? (1)
- |                |                  |             |           |
|----------------|------------------|-------------|-----------|
| 1) Bernoulli's | 2) Orifice meter | 3) Reynolds | 4) Stokes |
|----------------|------------------|-------------|-----------|
- 8) According to Fourier's law, conduction of heat through a metal wall is: (1)
- |   |                                       |                                      |   |
|---|---------------------------------------|--------------------------------------|---|
| 1) Inversely proportional to temperature difference | 2) Proportional to area of metal wall | 3) Proportional to thickness of wall | 4) Proportional to weight of metal wall |
|---|---------------------------------------|--------------------------------------|---|
- 9) Which of the following evaporator is also known as rinsing film evaporator (1)
- |                               |                          |                             |                                  |
|-------------------------------|--------------------------|-----------------------------|----------------------------------|
| 1) Horizontal tube evaporator | 2) Steam jacketed kettle | 3) Climbing film evaporator | 4) Forced circulation evaporator |
|-------------------------------|--------------------------|-----------------------------|----------------------------------|
- 10) Heat transfer from a metal wall does NOT involve one of the following mechanism. (1)
- |  |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|
|  |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|

1) | Conduction | 2) | Convection | 3) | Emission | 4) | Radiation |

11) Which of the following evaporator is used in pharmaceutical, pulp and paper industry? (1)

1) Horizontal tube evaporator	2) Steam jacketed kettle	3) Climbing film evaporator	4) Forced circulation evaporator
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12) Which equation is useful in the analysis of simple distillation? (1)

1) Rayleigh Equation	2) Haigen Poiseuille's equation	3) Bernoulli's equation	4) Mier's theory
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13) The enzyme, vitamins, glycoside and alkaloids are extracted by (1)

1) Steam distillation	2) Distillation under reduced pressure	3) Flash distillation	4) Vacuum distillation
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14) Once a material attains EMC, the rate of drying becomes (1)

1) Constant	2) High	3) Zero	4) Low
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15) Which of the following dryer is suitable when recovery of solvent is essential? (1)

1) Freeze dryer	2) Vacuum dryer	3) Tray dryer	4) Tunnel dryer
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16) \_\_\_\_\_ is NOT a mechanism for liquid mixing. (1)

1) Molecular diffusion	2) Turbulent mixing	3) Laminar mixing	4) Micromixing
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17) \_\_\_\_\_ is used for the mixing of cohesive solids (1)

1) Sigma blender	2) Cube blender	3) Twin shell blender	4) Double cone blender
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18) Which of the following is used for the separation of immiscible liquids in an emulsion? (1)

1) Semi continuous centrifuge	2) Supercentrifuge	3) Perforated basket centrifuge	4) Non-perforated basket centrifuge
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19) \_\_\_\_\_ has the lowest thermal expansion (1)

1) Lead	2) Iron	3) Invar	4) Tungsten
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20) The type of corrosion seen around high speed impellers (1)

1) Crevice corrosion	2) Cavitation corrosion	3) Fatigue corrosion	4) Fretting corrosion
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### II Long Answers

Answer all the questions.

- Define Heat exchanger and heat interchangers. Explain the working of any one of heat exchanger with a labelled diagram (10)
- Explain principle, construction, working and uses of a plate and filter press. Mention its merits and demerits. (10)

### III Short Answers

**Answer all the questions.**

- 1) Explain various Energy losses w.r.t flow of fluids through pipes (5)
- 2) Explain the working of ball mill (5)
- 3) Explain the principle, construction and working of a sigma blade mixer. (5)
- 4) Describe the working of a fluidized bed dryer. Mention its advantages and disadvantages. (5)
- 5) Explain the principle, construction and working of a supercentrifuge. (5)
- 6) Define biological corrosion. Explain any TWO methods to prevent corrosion. (5)
- 7) Write a note on different types of glass used in pharmaceutical packaging. (5)

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