



KERALA AGRICULTURAL UNIVERSITY
B.Tech. (Food Engineering) 2019 Admission
Re-Examination – August 2022

Fden.2207

Unit Operations in Food Engineering (2+1)

Marks: 50
Time: 2 hours

- I Fill in the blanks (10x1=10)**
1. Material balance and energy balance are based on law of conservation of ----- and -----.
 2. The economy of the triple effect evaporator is ----- than single effect evaporator.
 3. Addition of small crystals intentionally in crystallization process is known as -----.
 4. ----- equipment is used to reduce the size of fat globules in milk.
 5. Metering section in extruder is otherwise known as -----.
- State True or False**
6. The pore size of ultra filtration membrane ranges from 0.001 to 0.02 μm .
 7. Propeller-type impellers are used largely for high-viscosity fluids.
 8. The operating speed of ball mill is always greater than critical speed of ball mill.
 9. In cyclone separator gravitational and centrifugal forces are used for separation.
 10. Mixing index increases with time.
- II Write short notes on ANY FIVE of the following (5x2=10)**
1. Explain the term 'unit operations' with an example.
 2. Define steam economy of an evaporator.
 3. Calculate the settling velocity of dust particles of 60 μm and 10 μm diameter in air at 21°C and 100kPa pressure. Assume that the particles are spherical and of density 1280 kgm^{-3} and that the viscosity of air = $1.8 \times 10^{-5} \text{ Nsm}^{-2}$ and density of air = 1.2 kgm^{-3} .
 4. Explain fractional distillation.
 5. Define homogeneous nucleation.
 6. Enumerate the types of membranes used in membrane separation.
 7. Extrusion systems
- III Answer ANY FIVE of the following (5x4=20)**
1. Explain with neat sketch working of a long and short tube evaporator.
 2. Explain working of plate and frame filter press with suitable diagram.
 3. Explain the principle of cyclone separator.
 4. What are the factors affecting rate of crystal growth?
 5. Write the applications of irradiation in food industry.
 6. Write short notes on different solid liquid extraction methods.
 7. Discuss working of steam distillation unit.
- IV Write an essay on ANY ONE of the following (1x10=10)**
1. Explain in detail about various size reduction equipments used for solids and liquids.
 2. Write an essay on contact equilibrium separation processes.
