



KERALA AGRICULTURAL UNIVERSITY
B.Tech.(Food Technology) 2022 Admission
V Semester Final Examination – January 2025

Pafe.3127

Food Process Equipment Design (2+1)

Marks: 50
Time: 2 hours

I Fill in the blanks

(10x1=10)

1. Designs adhere to standards like ASME Boiler andCode (BPVC)
2. Ductility of a material is measured by
3. NTU stand for
4. Full form of GMP is
5. andare essential in mixing, blending, and separating components in a variety of industrial processes.

State True or False

6. Conveyor screws with pitch equal to screw diameter are considered standard.
7. The rotational speed of ball mills are kept at 35%-50% of critical speed.
8. Plate heat exchangers are not ideal for applications requiring high heat transfer rates with relatively lower flow rates.
9. Centrifuges are widely used in chemical processing, food industries, and wastewater treatment.
10. The design of fermenters must ensure efficient mixing, aeration, and temperature control to maintain optimal conditions for microbial growth.

II Write short notes on ANY FIVE of the following

(5x2=10)

1. What is the significance of Plate Heat Exchanger?
2. What factors must be considered when designing a sterilizer or retort for food or pharmaceutical applications?
3. How does a tunnel dryer differ from a tray dryer in its design and operation?
4. What are the common design methods for speed reduction systems?
5. How do you calculate the torque calculation for Screw conveyers?
6. How do you calculate the thickness of a pressure vessel wall?
7. Why is it necessary to incorporate a factor of safety when designing equipment like pressure vessels?

III Answer ANY FIVE of the following

(5x4=20)

1. Discuss the significance of ductility and hardness in material selection for fabrication.
2. A twin-screw extruder operates at 100 RPM and processes 60 kg/h of material. The effective density of the material is 900 kg/m³, and the volumetric efficiency is 85%. Calculate the screw channel cross-sectional area.
3. What is corrosion, and how can it be prevented through protective coatings and linings?
4. Comparison of Bucket Elevators and Pneumatic Conveyors
5. Comparison of Chain and Screw Conveyors.
6. Explain the design principles of heat exchangers.
7. Elaborate on the design considerations for evaporators.

IV Write an essay on ANY ONE of the following

(1x10=10)

1. Write a detail note on optimization of design with reference to process efficiency, energy and cost.
2. Explain various types of dryers with example.
