23FPB315N

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BVoc DEGREE EXAMINATION DECEMBER 2025
(Third Semester)

Branch – **FOOD PROCESSING TECHNOLOGY**

UNIT OPERATIONS IN FOOD PROCESSING

Time: Three Hours Maximum: 75 Marks

SECTION-A (10 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** marks (10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	Which mechanism of heat transfer occurs mainly in solids by molecular vibration? a) Convection b) Conduction c) Radiation d) Evaporation	K1	1
	2	Which type of heat exchanger has both fluids flowing in the same direction? a) Counter flow b) Cross flow c) Parallel flow d) Reverse flow	K2	1
2	3	Which of the following evaporators is most suitable for concentrating highly viscous and heat-sensitive liquids? (a) Long tube vertical evaporator (b) Circulation evaporator (c) Agitated film evaporator (d) Single effect evaporator	K1	2
	4	Which principle is the primary reason for the enhanced steam economy in a multiple-effect evaporator system? (a) Increasing the heat transfer area (b) Using high-pressure steam in each effect (c) Reusing the latent heat of vapor from one effect to heat the next (d) Increasing the feed temperature	K2	2
3	5	Which property of a fluid represents its resistance to shear or angular deformation? (a) Density (b) Specific Gravity (c) Viscosity (d) Pressure	K1	3
	6	Which law forms the basis for the working of hydraulic systems like lifts and brakes? (a) Newton's Law of Viscosity (b) Pascal's Law (c) Bernoulli's Principle (d) Archimedes' Principle	K2	3
4	7	Which distillation method is ideal for purifying organic compounds that are sensitive to high temperatures? (a) Differential distillation (b) Flash distillation (c) Vacuum distillation (d) Fractional distillation	K1	4
	8	Which piece of equipment is specifically designed for the leaching or solid-liquid extraction of materials like oilseeds? (a) Liquid mixer (b) Steam distillation unit (c) Basket extractor (d) Agitated vessel	K2	4
5	9	Which piece of equipment provides continuous filtration and is widely used for dewatering large volumes of slurry? (a) Plate and frame filter press (b) Leaf filter (c) Rotary vacuum filter (d) Bag filter	K1	5
	10	Which law governs the terminal velocity of a small spherical particle settling under gravity in a viscous fluid? (a) Darcy's Law (b) Stoke's Law (c) Pascal's Law (d) Newton's Law of Viscosity	K2	5

Cont...

SECTION - B (35 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks (5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	Explain conduction, convection, and radiation as mechanisms of heat transfer with practical examples.	K2	1
		(OR)		
	11.b.	Summarize the working of parallel flow, counter flow, and cross flow heat exchangers with diagrams.		
2	12.a.	Express the working principle of a multiple-effect evaporator system with a neat sketch of a forward-feed arrangement and sketch its advantages and disadvantages compared to a single-effect evaporator.	K3	2
		(OR)		
	12.b.	Examine the differences between a rising film evaporator and a falling film evaporator. Illustrate their construction, mechanism of liquid flow, and specific applications expressing which one is preferred over the other.		
3	13.a.	Sketch the properties is of fluid.	K3	3
		(OR)		
	13.b.	Classify the following types of fluid flow, providing a clear definition and at least one example for each: • Steady and Unsteady flow • Uniform and Non-uniform flow • Laminar and Turbulent flow		
4	14.a.	Explain the key objectives of mixing solids, pastes, and liquids in chemical processing. Point out the working principle of a mixer specifically designed for high-viscosity masses, supported by a neat sketch.	K4	4
		(OR)		
	14.b.	Examine the operational process of a Basket Extractor with a simple diagram, highlighting how it achieves the separation.		
5	15.a.	Illustrate about the two primary modes of filtration: constant rate filtration and constant pressure filtration. Use graphical plots to show the variation of pressure and filtrate volume over time for each mode.	K4	5
		(OR)		
	15.b.	Figure out the key requirements that an ideal filter medium should possess. Classify four different types of filter media used in industrial applications, giving an example for each.		

SECTION -C (30 Marks)

Answer **ANY THREE** questions

ALL questions carry **EQUAL** Marks (3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Explain the main components and working principles of vapour compression refrigeration systems.	K4	1
2	17	Point out the working principles, advantages, and limitations of short tube vertical evaporators and long tube vertical evaporators.	K4	2
3	18	Examine the modes of fluid flow measurement.	K4	3
4	19	Outline significance of mixing in industrial processes? Classify various mixing equipment's used for Low-viscosity liquids and High-viscosity pastes and solids. Provide examples and sketches for each category.	K4	4
5	20	Analyze the concept of filter cake resistance and filter medium resistance in the theory of filtration. Illustrate about rotary vacuum filter.	K4	5

Z-Z-Z END