

THE KAVERY ENGINEERING COLLEGE*(An Autonomous Institution)***B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, NOV/DEC 2025***Third Semester**Agricultural Engineering***UAITL24301 – Unit Operations in Agricultural Processing***Regulations - 2024**Duration : 3 Hrs**Maximum : 100 Marks***PART – A (ANSWER ALL QUESTIONS) (Marks 10*2=20)**

<i>Q.No</i>	<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
1.	In a single effect evaporator, 1000 kg of water is evaporated per hour. Steam consumption is 980 kg/hr. Find the economy of operation.	L3	1	2
2.	Define boiling point elevation.	L1	1	2
3.	What is differential setting?	L1	2	2
4.	Distinguish between Filtrate and Residue.	L2	2	2
5.	Recall Kick's law.	L1	3	2
6.	Calculate the operating speed of rotation in rpm of a ball mill of 4000 mm diameter charged with 200 mm balls. The ball mill is used for solid material grinding.	L3	3	2
7.	Compare Gas Absorption and Gas Desorption.	L2	4	2
8.	Define Leaching.	L1	4	2
9.	Tell the effect of temperature on solubility.	L1	5	2
10.	Compare steam and vacuum distillation.	L2	5	2

PART – B (ANSWER ALL QUESTIONS) (Marks 5*16 = 80)

<i>Q.No</i>	<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
11.	a i Outline the factors responsible for enhancing the rate of evaporation.	L3	1	6
	ii A triple effect evaporator uses steam in the first effect at 108°C, the boiling point of liquid in the last of liquid in the last effect is 52°C. The overall coefficients are 2500 kcal/h.m ² . °C in the first effect, 2000 kcal/h.m ² °C, and 1000 kcal/h.m ² . °C in the third effect. Estimate the boiling temperature of the liquid in the first and second effects.	L3	1	10
	Or			
	b Outline the points to be considered while designing an evaporator for food processing operations.	L3	1	16
12.	a i Explain the role of sedimentation and centrifugation in food industry.	L2	2	6
	ii Illustrate the working principle of rotary vacuum filter with neat diagram.	L2	2	10
	Or			
	b i Compare centrifugation and filtration.	L2	2	6
	ii Explain the operation of Gas-solid cyclone separator with neat diagram.	L2	2	10

13.	a i	If 3.75 KW/h energy is required to reduce a material from 6.4 mm to 1.6 mm, then calculate the energy requirement to reduce the size from 6.4 mm to 0.8 mm using Kick's law.	L3	3	8
	ii	Illustrate working principle of hammer mill with neat diagram.	L3	3	8
		Or			
	b	Explain in detail about the working principle of ball mill with neat diagram.	L3	3	16
14.	a	Identify the types of equipment used for the leaching and explain the working principle of Dorr agitator.	L3	4	16
		Or			
	b	Identify the types of packed tower gas absorption equipment and describe the working principles of packed tower system.	L3	4	16
15.	a	Indicate the process of batch distillation and their advantages and limitations with neat diagram.	L3	5	16
		Or			
	b i	Describe the process of steam distillation with a neat sketch.	L3	5	8
	ii	If sodium chloride solution has a concentration of 50% at a temperature of 40°C and the solubility of sodium chloride at this temperature is 36.6 g/100 g water, then calculate the quantity of sodium chloride crystals that will form once crystallization has been started.	L3	5	8