Name: Enrolment No:											
							End Semester Examination, May 2024				
Program Name:		B.Tech Biotechnology		Semester : IV							
Course Name:		Unit Operations		Time	: 3 hi	s					
Course Code:		HSCC2023		Max. Marks : 100							
Nos. of page(s):		02									
S. No.		Section	A: 30 Marks		Marks	COs					
		(Attempt	all questions)			COS					
Q 1	Define s	phericity.			1.5 M	CO1					

Q 1	Define sphericity.	1.5 M	CO1
Q 2	List any two mechanical unit operations used for solid-fluid separation.	1.5 M	CO1
Q 3	Write the expression for determining the volume surface mean diameter of a particle.	1.5 M	CO1
Q 4	Write the expression for critical speed of a ball mill.	1.5 M	CO1
Q 5	What is cake filtration?	1.5 M	CO1
Q 6	What is the definition of screen effectiveness based on the over size.	1.5 M	CO1
Q 7	List out different modes of mass transfer.	1.5 M	CO3
Q 8	What is the driving force in mass transfer.	1.5 M	CO3
Q 9	What is the unit of molar flux?	1.5 M	CO3
Q 10	Define unbound moisture.	1.5 M	CO5
Q 11	Write the unit for rate of drying.		CO5
Q 12	What type of dryer is used for drying heat sensitive substances.	1.5 M	CO5
Q 13	Develop an expression to relate the moisture content on dry basis and wet basis.	1.5 M	CO5
Q 14	Define humidification.	1.5 M	CO4
Q 15	Define dry bulb temperature.		CO4
Q 16	Define relative humidity.		CO4
Q 17	Write the merits and demerits of forced draft cooling towers over induced draft cooling		CO4
0.10	towers.	1 5 3 6	004
Q 18	List out various applications of air-water contacting.	1.5 M	CO4
Q 19	What is crystallization?	1.5 M	CO2
Q 20	Mention any two applications of crystallization.	1.5 M	CO2
	Section B: 20 Marks		
	(Attempt all questions)		
Q 21	Explain the working of belt conveyor with neat diagram.	5 M	CO2
Q 22	Discuss classification of mass transfer operation in detail.	5 M	CO3
Q 23	List out various types of industrial dryers. Explain any one in detail.	5 M	CO5
Q 24	Find the sphericity of a cylinder of 2 mm diameter and 5 mm length.	5 M	CO1

		Sect (Atte	ion C: 30 Marks mpt all questions)		
Q 25	The screen analysis s	hown in the table b	below applies to a	sample of crushed quartz.	The	
	density of the particle	For				
	the material between	ıare				
	millimetres per gram					
	<u>Table:</u>					
	Mesh	Screen opening, D _{pi} , mm	Mass fraction retained, x _i	Cumulative fraction smaller than D _{pi}		
	4	4.699	0.00	1.0		
	6	3.327	0.0251	0.9749		
	8	2.362	0.1250	0.8499		
	10	1.651	0.3207	0.5292	15 M	
	14	1.168	0.2570	0.2722	13 141	C01
	20	0.833	0.1590	0.2232		
	28	0.589	0.0538	0.0594		
	35	0.417	0.0210	0.0384		
	48	0.295	0.0102	0.0282		
	65	0.208	0.0077	0.0205		
	100	0.147	0.0058	0.0147		
	150	0.104	0.0041	0.0106		
	200	0.074	0.0031	0.0075		
	Pan	-	0.0075	0.00		
Q 26	With the help of a typ	pical drying curve,	explain the follow	ving:		
	i) Constant and falling rate periods iv) Free moisture content.					
	ii) Equilibrium moi	15 M	CO5			
	iii) Bound moisture					
		Sect	ion D: 20 Marks			
Q 27	(Attempt all questions) Explain the crushing laws. Define work index.					CO1
Q 28	With a neat schematic explain the working of natural draft cooling towers.					CO4
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