BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION SP2023)

CLASS: IMSc **SEMESTER : VI**
BRANCH: FOOD TECHNOLOGY **SESSION : SP2023**

SUBJECT: FT309 MASS TRANSFER IN FOOD PROCESSING

TIME: 02 Hours **FULL MARKS: 25**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 5 marks and total 25 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates**

Q1	From the first principle derive on equation to determine the molar flux. Apply this equation to determine molar flux for steady diffusion A through non diffusing B.	[5]	CO-1	L2
Q2	Methane diffuses at steady state through a tube containing helium. At point 1, the partial pressure of methane is P_{A1} = 55 kPa and at point 2, 0.03 m apart P_{A2} = 15 kPa. The total pressure is 101.32 kPa and the temperature is 298 K. At this pressure and temperature, the value of diffusivity is 6.75×10^{-5} m^2/sec. Calculate the flux of CH_4 at steady state for equimolal counter-diffusion.	[5]	CO-1	L2
Q3	A sphere of naphthalene having a radius of 2.0 mm is suspended in a large volume of still air at 318K and $1.01325X10^5$ Pa (1 atm). The surface temperature of the naphthalene can be assumed to be at 318K and its vapor pressure at 318K is 0.555 mm of Hg. The D_{AB} of naphthalene in air at 318K is $6.92X10^{-6}$ m^2/s. Calculate the rate of evaporation of naphthalene from the surface.	[5]	CO-1	L2
Q4	Discuss application of azeotropic and extractive distillation. Give Flow sheet to explain the processes.	[5]	CO-2	L1
Q5	Soyabean seed are extracted with hexane in batch Extracter. The flaked seed contain 18.6% oil, 69.0% solid and 12.4 % moisture. At the end of the process, cake of milk is separated from the hexane oil mixture. The cake analysis yield 0.8% oil, 87.7% solid and 11% moisture. Find the % recovery of oil. All % are by wt only.	[5]	CO-3	L2

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