University of Mumbai
Online Examination 2020

Program: BE Chemical Engineering

Curriculum Scheme: Revised 2016

Examination: Third Year Semester: V

Course Code: CHC502

Course Name: Mass Transfer Operations I

Time: 1 hour   Max. Marks: 50

Note to the students:- All Questions are compulsory and carry equal marks .

Q1.	The ratio of mass concentration of species and the total mass density of the mixture is known as
Option A:	Mass density
Option B:	Concentration
Option C:	Mole fraction
Option D:	Mass fraction
Ans:	
Q2.	Which among the following is always true for mass transfer to occur?
Option A:	Difference in concentration
Option B:	Difference in Pressure
Option C:	Difference in temperature
Option D:	Difference in chemical potential
Ans:	
Q3.	For the calculation of Mass average velocity, which velocity of the molecule is

	used?
Option A:	Instantaneous Velocity
Option B:	Instantaneous Velocity as well as Mean Velocity
Option C:	Mean Velocity
Option D:	Bulk velocity of the mixture
Ans:	
Q4.	Which among the following is the statement of the 'Fick's Law'?
Option A:	The molar flux of species relative to an observer moving with the molar average velocity is proportional to the concentration gradient of the species.
Option B:	The mass flux of species relative to an observer moving with the molar average velocity is proportional to the concentration gradient of the species
Option C:	The molar flux of species relative to an observer moving with the mass average velocity is proportional to the concentration gradient of the species.
Option D:	The molar flux of species relative to a stationary observer is proportional to the concentration gradient of the species.
Ans:	
Q5.	For what kind of mixtures $D_{AB} = D_{BA}$ holds?
Option A:	Ideal
Option B:	Real
Option C:	For both real and ideal
Option D:	This relation is never true
Ans:	

Q6.	For steady state equi-molal diffusion in a stagnant film, mass transfer coefficient is the ratio of molecular diffusivity to the thickness of the _____ .
Option A:	turbulent flow layer
Option B:	convective flow layer
Option C:	eddy current layer
Option D:	stagnant layer
Ans:	
Q7.	A correlation for mass transfer at high Schmidt numbers (430 to 100,000) is
Option A:	$N_{Sh} = 0.0096 \, N_{Re}^{0.913} \, N_{Sc}^{0.346}$
Option B:	$N_{Sh} = 0.0096 \, N_{Nu}^{0.913} \, N_{Sc}^{0.346}$
Option C:	$N_{Sh} = 0.0096 \, N_{Pr}^{0.913} \, N_{Sc}^{0.346}$
Option D:	$N_{Sh} = 0.0096 \, N_{Gz}^{0.913} \, N_{Sc}^{0.346}$
Ans:	
Q8.	In principle, there is no need of mass-transfer coefficients for _____.
Option A:	turbulent flow
Option B:	convective flow
Option C:	transition flow
Option D:	laminar flow
Ans:	

Q9.	A stream of air at 100 kPa pressure and 300 K is flowing on the top surface of a thin flat sheet of solid naphthalene of length 0.2 m with a velocity of 20 m/sec. Mass diffusivity of naphthalene vapor in air = 6 x 10^{-6} m^2/sec, Kinematic viscosity of air = 1.5 x 10^{-5} m^2/s, Concentration of naphthalene at the air-solid naphthalene interface = 1 x 10^{-5} kmol/m^3.Calculate the overage mass transfer coefficient over the flat plate.
Option A:	0.014 m/sec
Option B:	0.015 m/sec
Option C:	0.016 m/sec
Option D:	0.013 m/sec
Ans:	
Q10.	The Concentration of the two phases in a closed system at the interphase is _____
Option A:	Changes continuously
Option B:	Never changes
Option C:	Becomes zero
Option D:	Increases till the driving force becomes zero
Ans:	
Q11.	In a concurrent process, the entering and leaving stream of the liquid phase concentrations in terms mole ratio is 0.25 and 0.45 also the entering and leaving stream concentration of the gas phase in terms mole ratio is 0.4 and 0.6. Find the slope of the operating line.
Option A:	1
Option B:	2
Option C:	3

Option D:	4
Ans:	
Q12.	Flooding in a vapor-liquid contacting equipment occurs in a tray, when the pressure drop through a tray is _____ the liquid head available in the downcomer.
Option A:	less than
Option B:	more than
Option C:	same as
Option D:	very much less
Ans:	
Q13.	During gas dispersion, if a chemical reaction between gas and liquid phase is needed, then the preferred equipment is
Option A:	Agitated vessel
Option B:	Sparged vessel
Option C:	Tray tower
Option D:	Wetted wall column
Ans:	
Q14.	In a packed bed absorption column, the channeling will be noted by the
Option A:	increase in flow rate
Option B:	sharp drop in pressure drop.
Option C:	sharp rise in pressure drop.
Option D:	No change in Pressure drop.
Ans:	

Q15.	Find the absorption tower height if Number of gas phase transfer units is 4.09 and height of the gas phase transfer unit is 1.5 meters.
Option A:	2.72 meters
Option B:	0.36 meters
Option C:	6.135 meters
Option D:	0. 50 meters
Ans:	
Q16.	The reciprocal of stripping factor is termed as
Option A:	Selectivity Index
Option B:	Relative Volatility
Option C:	Absorption Factor
Option D:	Marphree Efficiency
Ans:	
Q17.	With increase in the liquid flow rate at a fixed gas velocity in a randomly packed counter current gas-liquid absorption column, the gas pressure drop
Option A:	Decreases
Option B:	Remains unchanged
Option C:	Increases
Option D:	Decreases exponentially
Ans:	
Q18.	The height equivalent to a theoretical plate (HETP) changes with flow rates?
Option A:	because flow rates affect the absorption rates

Option B:	because flow rates does not affect the absorption rates
Option C:	because flow rates are in cross-current manner
Option D:	because flow rates are in co-current manner
Ans:	
Q19.	If the equilibrium vapour pressure is lower than pure liquid pressure then the moisture content is _____
Option A:	Bound moisture
Option B:	Unbound moisture
Option C:	Equilibrium moisture
Option D:	Critical moisture
Ans:	
Q20.	Convert 5 kg of moisture /kg of dry solid to wet basis
Option A:	3/6
Option B:	4/6
Option C:	5/6
Option D:	1
Ans:	
Q21.	The method of drying by conduction through materials are done by _____
Option A:	Direct driers
Option B:	Indirect driers
Option C:	Tray driers
Option D:	Rotary driers
Ans:	

Q22.	When dry bulb temperature (DBT) and wet bulb temperature (WBT) are measured, greater the difference between DBT and WBT,
Option A:	greater the amount of water vapour held in the mixture
Option B:	smaller the amount of water vapour held in the mixture
Option C:	same the amount of water vapour held in the mixture
Option D:	no amount of water vapour held in the mixture
Ans:	
Q23.	The temperature at which the air cannot hold all the water vapour mixed in it and some vapour starts condensing is called as
Option A:	humidification temperature
Option B:	dehumidification temperature
Option C:	dew point temperature
Option D:	saturation temperature
Ans:	
Q24.	When the dew point temperature is equal to the air temperature then the relative humidity is
Option A:	0%
Option B:	50%
Option C:	60%
Option D:	100%
Ans:	D

Q25.	On psychrometric chart, wet bulb temperature lines are
Option A:	horizontal with uniformly spaced
Option B:	horizontal with non-uniformly spaced
Option C:	inclined with uniformly spaced
Option D:	inclined with non-uniformly spaced
Ans:	

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Question	Correct Option (Enter either 'A' or 'B' or 'C' or 'D'
Q1.	D
Q2.	D
Q3.	C
Q4	A
Q5	A
Q6	D
Q7	A
Q8.	D
Q9.	A
Q10.	B
Q11.	A
Q12.	B
Q13.	A
Q14.	B
Q15.	C
Q16.	C
Q17.	C
Q18.	A
Q19.	A
Q20.	C
Q21.	B
Q22.	B
Q23.	C
Q24.	D
Q25.	C