

**University of Mumbai**  
**Online Examination 2020**

Program: BE Chemical Engineering

Curriculum Scheme: Revised 2012

Examination: Third Year Semester V

Course Code: CHC502

Course Name: Mass Transfer Operation I

Time: 1 hour

Max. Marks: 50

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

Q1.	Solutes like water will diffuse through oxygenated polymers like cellulose acetate
Option A:	By forming hydrogen bonds with the polymer
Option B:	By dissolving in the polymer
Option C:	By plasticizing the polymer
Option D:	By reverse osmosis
Ans:	
Q2.	Following is one of the mechanism of diffusion through metal crystals
Option A:	Vacancy Mechanism
Option B:	Knudsen diffusion
Option C:	Hydrodynamic flow
Option D:	Dissolution mechanism
Ans:	
Q3.	Knudsen diffusion occurs through
Option A:	Polymers
Option B:	Crystalline solids
Option C:	Porous solids
Option D:	Liquids
Ans:	
Q4.	Hydrodynamic flow of gases through porous solids is due
Option A:	Gravity
Option B:	Concentration gradient
Option C:	Temperature gradient
Option D:	Pressure gradient
Ans:	
Q5.	Diffusion through solids occurs in operations
Option A:	Where there is contact of solid and liquid
Option B:	When there is contact between one liquid with another liquid.
Option C:	When there is contact between a gas and a liquid
Option D:	There are no operations in chemical engineering, which involves diffusion in solid phase.
Ans:	
Q6.	Spray tower is a _____ operation.
Option A:	stagewise contact
Option B:	continuous

Option C:	batch
Option D:	semi-batch
Ans:	
Q7.	Find the rate of non-diffusing solute, if the mole fraction of the gas phase is 0.5 and diffusing rate is 100 moles/hr.
Option A:	200 moles/hr
Option B:	100 moles/hr
Option C:	75 moles/hr
Option D:	50 moles/hr
Ans:	
Q8.	In a closed system the concentration of the two phases at the interphase _____
Option A:	changes continuously
Option B:	becomes zero
Option C:	never changes
Option D:	increases till the driving force becomes zero
Ans:	
Q9.	A binary mixture of oxygen and nitrogen with partial pressures in the ratio 0.21 and 0.79 is contained in a vessel at 300K. If the total pressure of the mixture is $1 \times 10^5 \text{ N/m}^2$ , find molar fraction of nitrogen.
Option A:	0.13
Option B:	0.21
Option C:	0.23
Option D:	0.79
Ans:	
Q10.	Following theory is applicable to interphase mass transfer
Option A:	Film theory
Option B:	Two-film theory
Option C:	Penetration theory
Option D:	Surface renewal theory
Ans:	
Q11.	In sparged vessels, the sparger can be simple open tube
Option A:	if the vessel diameter is less than 0.3 m
Option B:	if the vessel diameter is more than 0.3 m
Option C:	if the vessel diameter is more than 1 m
Option D:	if the vessel diameter is less than 1 m
Ans:	
Q12.	Dumping in tray towers occurs
Option A:	If the gas flow rates are very low
Option B:	If the gas flow rates are very high
Option C:	Dumping is not related to gas flow rate
Option D:	If the liquid is not able to drain down
Ans:	
Q13.	In packed columns

Option A:	The gas and liquid phases are contacted in a stagewise manner
Option B:	There is not a direct contact between gas and liquid phases
Option C:	The gas and liquid phases are contacted in a continuous manner manner
Option D:	Gas experiences negligible pressure drop
Ans:	
Q14.	In gas absorption, the stripping factor is defined as-
Option A:	Ratio of slope of the operating line to the slope of equilibrium curve
Option B:	Ratio of slope of the equilibrium curve to the slope of the operating line
Option C:	Product of the slope of the operating line and that of the equilibrium curve
Option D:	Ratio of the liquid flow rate to the gas flow rate.
Ans:	
Q15.	Gas absorption is used for
Option A:	Separating the components of a liquid solution
Option B:	Separating the components from a mixture of gases
Option C:	Separating components of a solid mixture.
Option D:	Purifying liquid solution
Ans:	
Q16.	The liquid used on gas absorption is called as
Option A:	Solvent
Option B:	Entrainer
Option C:	Solute
Option D:	Solution
Ans:	
Q17.	HETP stands for
Option A:	Height equilibrium with pressure.
Option B:	Heat equivalent to a theoretical plate.
Option C:	Height equivalent to a theoretical plate.
Option D:	Heat transfer by a plate
Ans:	
Q18.	When, $H_1$ = Total heat of air entering the coil (heating or cooling) $H_2$ = Total heat of air leaving the coil (heating or cooling) $H_3$ = Total heat of air at the end of the process (humidification or dehumidification) then, the sensible heat factor $(H_2 - H_1) / (H_3 - H_1)$ represents the process of
Option A:	cooling and humidification
Option B:	cooling and dehumidification
Option C:	<b>heating and humidification</b>
Option D:	heating and dehumidification
Ans:	
Q19.	When the rate of evaporation of water is zero, the relative humidity of the air is
Option A:	0%
Option B:	100%
Option C:	50%
Option D:	unpredictable
Ans:	

Q20.	What is the temperature at which the water vapour in the mixture of water vapour in air, starts condensing called?
Option A:	condensation temperature
Option B:	dew point temperature
Option C:	vaporization temperature
Option D:	saturation temperature
Ans:	
Q21.	The temperature of air recorded by thermometer when the bulb is covered by a cotton wick saturated by water is called as
Option A:	dry bulb temperature
Option B:	wet bulb temperature
Option C:	stream temperature
Option D:	psychrometric temperature
Ans:	
Q22.	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
Ans:	
Q23.	The substance moisture exerts equilibrium vapour pressure equals to vapour pressure of liquid is _____
Option A:	Bound moisture
Option B:	Unbound moisture
Option C:	Equilibrium moisture
Option D:	Critical
Ans:	
Q24.	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
Ans:	
Q25.	The substance like food stuff, pharma products are dried by _____ drying.
Option A:	Direct
Option B:	Indirect
Option C:	Freeze
Option D:	Spray drying
Ans:	

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