

National Testing Agency

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MASS TRANSFER I

Group Number :	1
Group Id :	603489130
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Break time :	0
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Is this Group for Examiner? :	No

MASS TRANSFER I -1

Section Id :	603489188
Section Number :	1
Section type :	Online
Mandatory or Optional :	Mandatory

Number of Questions :	50
Number of Questions to be attempted :	50
Section Marks :	100
Enable Mark as Answered Mark for Review and Clear Response :	Yes
Sub-Section Number :	1
Sub-Section Id :	603489348
Question Shuffling Allowed :	Yes

Question Number : 1 Question Id : 6034899794 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 2 Wrong Marks : 0

Mass transfer necessarily involves:

1. Physical changes of composition
2. Chemical changes of composition
3. Either physical or chemical changes of composition or both
4. None of the above

Options :

60348937115. 1

60348937116. 2

60348937117. 3

60348937118. 4

Question Number : 2 Question Id : 6034899795 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 2 Wrong Marks : 0

There are major ways of classification of mass transfer operations.

1. 6
2. 4
3. 2
4. 3

Options :

- 60348937119. 1
- 60348937120. 2
- 60348937121. 3
- 60348937122. 4

Question Number : 3 Question Id : 6034899796 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

In mass transfer operations, immiscible phases are

- 1. Never contacted directly
- 2. Always contacted directly
- 3. Rarely contacted directly
- 4. None of the above

Options :

- 60348937123. 1
- 60348937124. 2
- 60348937125. 3
- 60348937126. 4

Question Number : 4 Question Id : 6034899797 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Foam fractionation is

- 1. A mechanical operation
- 2. A mass transfer operation
- 3. Either a mechanical operation or a mass transfer operation, depending on the size scale of the substance being separated
- 4. None of the above

Options :

- 60348937127. 1
- 60348937128. 2

60348937129. 3

60348937130. 4

Question Number : 5 Question Id : 6034899798 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Adsorption is

1. A mass transfer operation
2. A mechanical operation
3. Neither a mass transfer operation nor a mechanical operation
4. None of the above

Options :

60348937131. 1

60348937132. 2

60348937133. 3

60348937134. 4

Question Number : 6 Question Id : 6034899799 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

In binary diffusion systems, the two component diffusivities D_{AB} and D_{BA} are related as

1. $D_{AB} > D_{BA}$
2. $D_{AB} < D_{BA}$
3. $D_{AB} = D_{BA}$
4. None of the above

Options :

60348937135. 1

60348937136. 2

60348937137. 3

60348937138. 4

Question Number : 7 Question Id : 6034899800 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

If solution density is constant, the equation of continuity reduces to

1. Divergence of velocity vector equal to zero
2. Divergence of density equal to zero
3. Substantial derivative of density equal to zero
4. None of the above

Options :

60348937139. 1

60348937140. 2

60348937141. 3

60348937142. 4

Question Number : 8 Question Id : 6034899801 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Fick's second law is

1. For a steady state situation
2. For an unsteady state situation
3. Either for a steady or an unsteady state situation
4. None of the above

Options :

60348937143. 1

60348937144. 2

60348937145. 3

60348937146. 4

Question Number : 9 Question Id : 6034899802 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

To make use of the master equation of diffusion for steady state binary system with species A diffusing through another species B which is stagnant, one needs and obtains a relationship between N_A and N_B from

1. Consideration of stoichiometry
2. Consideration of enthalpy
3. Consideration of stoichiometry or enthalpy
4. None of the above

Options :

60348937147. 1

60348937148. 2

60348937149. 3

60348937150. 4

Question Number : 10 Question Id : 6034899803 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

In surface-stretch theory of Lightfoot and co-workers, the mass-transfer resistance lies in

1. Core of a drop
2. Interface of the drop and surrounding liquid
3. Surface layer of varying thickness
4. None of the above.

Options :

60348937151. 1

60348937152. 2

60348937153. 3

60348937154. 4

Question Number : 11 Question Id : 6034899804 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Momentum boundary layer is

1. As thick as concentration boundary layer
2. Much thinner than concentration boundary layer
3. Either as thick or thinner than the concentration boundary layer
4. None of the above.

Options :

60348937155. 1

60348937156. 2

60348937157. 3

60348937158. 4

Question Number : 12 Question Id : 6034899805 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

For flow past an infinitely long flat plate, the dimensionless velocity, concentration, and temperature profiles are identical if

1. $Sc=1$
2. $Pr=1$
3. $Sc=Pr=1$
4. None of the above.

Options :

60348937159. 1

60348937160. 2

60348937161. 3

60348937162. 4

Question Number : 13 Question Id : 6034899806 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

If $Sh/Re_x \Phi^{1/3} = f/2 = 0.332 Re_x^{-1/2}$, then Φ is

1. Sc
2. Pr
3. Either Sc or Pr
4. None of the above.

Options :

60348937163. 1

60348937164. 2

60348937165. 3

60348937166. 4

Question Number : 14 Question Id : 6034899807 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

In turbulent flow, the analogy between heat and mass transfer is not true, if

1. $Sc \ll 1$
2. $Sc \gg 1$
3. $Sc = 0$
4. None of the above.

Options :

60348937167. 1

60348937168. 2

60348937169. 3

60348937170. 4

Question Number : 15 Question Id : 6034899808 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

For flow through smooth pipes in the range $5000 < Re < 200,000$

1. $f = 0.046 Re^{-0.2}$
2. $f = 0.046 Re^{-1/2}$
3. $f = 0.046 Re^{-1/3}$
4. None of the above.

Options :

60348937171. 1

60348937172. 2

60348937173. 3

60348937174. 4

Question Number : 16 Question Id : 6034899809 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

$N_A M_A C_{pA}$ has the same units as

1. Momentum transfer coefficient
2. Heat transfer coefficient
3. Mass transfer coefficient
4. None of the above.

Options :

60348937175. 1

60348937176. 2

60348937177. 3

60348937178. 4

Question Number : 17 Question Id : 6034899810 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

For crystalline solids with lattices of cubic symmetry

1. Diffusion coefficient is anisotropic
2. Diffusion coefficient is isotropic
3. Diffusion coefficient varies in stepwise fashion
4. None of the above.

Options :

60348937179. 1

60348937180. 2

60348937181. 3

60348937182. 4

Question Number : 18 Question Id : 6034899811 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Diffusion coefficient in a multi-crystalline metal is

1. Equal to that in a single crystal of the same metal
2. Smaller than that in a single crystal of the same metal
3. Greater than that in a single crystal of the same metal
4. None of the above.

Options :

60348937183. 1

60348937184. 2

60348937185. 3

60348937186. 4

Question Number : 19 Question Id : 6034899812 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

For diffusion in porous solids, $D_{AB}/D_{AB,eff}$ is

1. Different for different solutes
2. Same for different solutes
3. A characteristic constant for each category of solutes and differing for different classes of compounds
4. None of the above

Options :

60348937187. 1

60348937188. 2

60348937189. 3

60348937190. 4

Question Number : 20 Question Id : 6034899813 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

For simple gases diffusing through a polymer, the diffusion coefficient is

1. Strongly dependent on concentration
2. Mildly dependent on concentration
3. Reasonably independent of concentration
4. None of the above

Options :

60348937191. 1

60348937192. 2

60348937193. 3

60348937194. 4

Question Number : 21 Question Id : 6034899814 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Unit of permeability, P, is

1. $\text{cm}^3(\text{STP})/\text{cm}^2.\text{s}(\text{cm Hg})$
2. $\text{cm}^3(\text{STP})/\text{cm}^2.\text{s}(\text{cm Hg}/\text{cm})$
3. $\text{cm}^3(\text{STP})/\text{cm}^2.\text{s}$
4. None of the above

Options :

60348937195. 1

60348937196. 2

60348937197. 3

60348937198. 4

Question Number : 22 Question Id : 6034899815 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Law of Knudsen Diffusion is consistent with

1. Graham's law
2. Fick's 1st law of diffusion
3. Fick's 2nd law of diffusion
4. None of the above

Options :

60348937199. 1

60348937200. 2

60348937201. 3

60348937202. 4

Question Number : 23 Question Id : 6034899816 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Knudsen diffusion mechanism prevails in diffusion through porous solids if

1. $d/\lambda < 0.2$
2. $d/\lambda > 20$
3. $0.2 < d/\lambda < 20$
4. None of the above

Options :

60348937203. 1

60348937204. 2

60348937205. 3

60348937206. 4

Question Number : 24 Question Id : 6034899817 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Under most general conditions, porous solids can show

1. Ordinary molecular diffusion
2. Knudsen diffusion
3. A combination of hydrodynamic flow, ordinary molecular diffusion, and Knudsen diffusion
4. None of the above

Options :

60348937207. 1

60348937208. 2

60348937209. 3

60348937210. 4

Question Number : 25 Question Id : 6034899818 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Cost of separation/purification depends on the ratio of

1. Final to initial concentration of separated product
2. Initial to final concentration of separated product
3. Final to initial concentration of impurities
4. None of the above

Options :

60348937211. 1

60348937212. 2

60348937213. 3

60348937214. 4

Question Number : 26 Question Id : 6034899819 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Sweep diffusion involves

1. 1 component
2. 2 components
3. 3 or more components
4. 3 or more components of which at least one is a condensable vapour

Options :

60348937215. 1

60348937216. 2

60348937217. 3

60348937218. 4

Question Number : 27 Question Id : 6034899820 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Foam fractionation is a surface-phenomena based on separation of

1. Solid particles
2. Molecules
3. Solid particles or molecules
4. None of the above

Options :

60348937219. 1

60348937220. 2

60348937221. 3

60348937222. 4

Question Number : 28 Question Id : 6034899821 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Indirect mass-transfer operations involve

1. Use of a foreign substance
2. Use of heat
3. Either a foreign substance or heat
4. None of the above

Options :

60348937223. 1

60348937224. 2

60348937225. 3

60348937226. 4

Question Number : 29 Question Id : 6034899822 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Batch mass-transfer operations are

1. Always unsteady-state operations
2. Always steady-state operations
3. Either unsteady or steady-state operations
4. None of the above

Options :

60348937227. 1

60348937228. 2

60348937229. 3

60348937230. 4

Question Number : 30 Question Id : 6034899823 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Persistence of a flow-regime within an apparatus may be one of the requirements for maintaining

1. A steady state
2. An unsteady state
3. Either a steady or an unsteady state
4. None of the above

Options :

60348937231. 1

60348937232. 2

60348937233. 3

60348937234. 4

Question Number : 31 Question Id : 6034899824 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

"Equilibrium, Ideal, or Theoretical stage" means

1. A stage from which the phases leaving are in equilibrium
2. A stage from which the phases leaving are still able to effect separation
3. A stage not desired in practice
4. None of the above

Options :

60348937235. 1

60348937236. 2

60348937237. 3

60348937238. 4

Question Number : 32 Question Id : 6034899825 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

The rate of mass-transfer from one phase to another depends on

1. Mass transfer coefficient only
2. Mass transfer coefficient and area of surface/interface and difference in concentration
3. Mass transfer coefficient and difference in concentration
4. Mass transfer coefficient and area of surface/interface and difference in concentration/chemical potential difference

Options :

60348937239. 1

60348937240. 2

60348937241. 3

60348937242. 4

Question Number : 33 Question Id : 6034899826 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

The maximum ratio of mass transfer coefficients of two components in gas/vapour phase (or in water-like liquid phase) is at most

1. 100:1 or 1000:1
2. 10:1 or 100:1
3. 3:1 or 4:1
4. None of the above

Options :

60348937243. 1

60348937244. 2

60348937245. 3

60348937246. 4

Question Number : 34 Question Id : 6034899827 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Mass transfer coefficients are important because they determine the

1. Cost of equipment used for separation
2. Size of equipment used for separation
3. Time of phase contact required for separation
4. All of the above

Options :

60348937247. 1

60348937248. 2

60348937249. 3

60348937250. 4

Question Number : 35 Question Id : 6034899828 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Diffusion rate in a gas phase

1. Increases upon increasing the pressure
2. Increases upon decreasing the pressure
3. Is independent of pressure
4. None of the above

Options :

60348937251. 1

60348937252. 2

60348937253. 3

60348937254. 4

Question Number : 36 Question Id : 6034899829 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Mass transfer operations are characterized by

1. Transfer of matter at bulk scale
2. Transfer of one substance through another at molecular scale
3. Either (1) or (2)
4. None of the above

Options :

60348937255. 1

60348937256. 2

60348937257. 3

60348937258. 4

Question Number : 37 Question Id : 6034899830 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Fractional sublimation is an example of

1. Chemical reaction
2. Mechanical operation
3. Mass transfer operation
4. None of the above

Options :

60348937259. 1

60348937260. 2

60348937261. 3

60348937262. 4

Question Number : 38 Question Id : 6034899831 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Zone refining is an example of

1. Fractional extraction
2. Fractional crystallization
3. Fractional distillation
4. None of the above

Options :

60348937263. 1

60348937264. 2

60348937265. 3

60348937266. 4

Question Number : 39 Question Id : 6034899832 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Large-scale separation of isotopes of uranium, from a gas-phase mixture of uranium hexafluoride, is carried out by

1. Permeation
2. Using a microporous membrane
3. Using a combination of nonporous and porous membranes
4. None of the above

Options :

60348937267. 1

60348937268. 2

60348937269. 3

60348937270. 4

Question Number : 40 Question Id : 6034899833 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Dialysis makes use of a membrane permeable only to

1. Dissolved crystalline substance
2. Solvent
3. Solvent and dissolved crystalline substance
4. Solvent and the colloid

Options :

60348937271. 1

60348937272. 2

60348937273. 3

60348937274. 4

Question Number : 41 Question Id : 6034899834 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

The common feature between dialysis and osmosis is

1. Permeability to a colloid
2. Permeability to dissolved crystalline substance
3. Permeability to the solvent
4. None of the above

Options :

60348937275. 1

60348937276. 2

60348937277. 3

60348937278. 4

Question Number : 42 Question Id : 6034899835 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Centrifugation is

1. Pressure diffusion
2. Knudsen diffusion
3. Thermal diffusion
4. Brownian diffusion

Options :

60348937279. 1

60348937280. 2

60348937281. 3

60348937282. 4

Question Number : 43 Question Id : 6034899836 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

The characteristic of mechanical operations is that

1. The substance removed is in a mixture with other substances
2. The substance removed is chemically altered
3. The substance removed is pure
4. None of the above

Options :

60348937283. 1

60348937284. 2

60348937285. 3

60348937286. 4

Question Number : 44 Question Id : 6034899837 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

The overall size of a gas-absorption operation is determined by

1. Differential mole balance
2. Overall mole balance
3. Combination of differential and overall mole balances
4. None of the above

Options :

60348937287. 1

60348937288. 2

60348937289. 3

60348937290. 4

Question Number : 45 Question Id : 6034899838 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

The three problems related to flow through a packed bed are

1. Channeling, loading, and flooding
2. Pumping, blowing, and compression
3. Laminar flow, transition-regime flow, and turbulent flow
4. None of the above

Options :

60348937291. 1

60348937292. 2

60348937293. 3

60348937294. 4

Question Number : 46 Question Id : 6034899839 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Equation of continuity has the number of partial derivatives of velocity components equal to

1. 3
2. 1
3. 2
4. None of the above

Options :

60348937295. 1

60348937296. 2

60348937297. 3

60348937298. 4

Question Number : 47 Question Id : 6034899840 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Divergence of the velocity vector for a solution of constant density is equal to

1. 1
2. 0
3. ∞
4. None of the above

Options :

60348937299. 1

60348937300. 2

60348937301. 3

60348937302. 4

Question Number : 48 Question Id : 6034899841 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Convection is

1. Much slower than diffusion
2. Comparable to diffusion
3. Much faster than diffusion
4. None of the above

Options :

60348937303. 1

60348937304. 2

60348937305. 3

60348937306. 4

Question Number : 49 Question Id : 6034899842 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

True driving force for diffusion is

1. Concentration difference
2. Chemical potential difference
3. Pressure difference
4. None of the above

Options :

60348937307. 1

60348937308. 2

60348937309. 3

60348937310. 4

Question Number : 50 Question Id : 6034899843 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

The three properties/factors which are important and desirable in selection of packings are

1. Light weight, interlocking structure, fine size
2. Low cost, high mechanical strength, and chemical inertness
3. Machinability, hardness, toughness
4. None of the above

Options :

60348937311. 1

60348937312. 2

60348937313. 3

60348937314. 4