7. SEPARATION OF SOLID - LIQUID MIXTURES

TEACHING TASK

JEE MAINS LEVEL QUESTIONS

1. The process of transfering clean liquid without disturbing sediments is called:
A) Sedimentation B) Decantation C) Filtration D) Evaporation

Answer:B

Solution:Decantation is the process of carefully pouring out the clear liquid without disturbing the settled sediment.

2. When a liquid change into gaseous state on gentle heating, such that liquid does not boil, the process is called:
A) Filteration B) Evaporation C) Distillation D) Both A and B

Answer:B

Solution:Evaporation occurs when a liquid turns into a gas (vapor) at temperatures below its boiling point.

3. In Gulf countries, the drinking water is obtained by:
A) Filtration B) Evaporation C) Centrifugation D) Distillation

Answer:D

Solution: In Gulf countries, seawater is desalinated (removing salt) through distillation (or reverse osmosis) to obtain drinking water.

4. Barium sulphate and water can be separated by filtration. Which of the following is left as a residue from the above mixture
A) Water
B) Barium sulphate
C) Both water and barium sulphate
D) Neither water nor barium sulphate

Answer:B

Solution:Since barium sulphate is insoluble in water, it remains as a residue on the filter paper during filtration.

5. The process of evaporation is suitable for the separation of
A) (i) $\rightarrow$Volatile soluble (ii) $\rightarrow$Solute
B) (i) $\rightarrow$ Insoluble (ii) $\rightarrow$Solution
C) (i)$\rightarrow$Non-volatile (ii)$\rightarrow$Liquid solvent
D) (i) $\rightarrow$Sublimate (ii)$\rightarrow$Filtrate

Answer:C

Solution: Evaporation is used to separate a non-volatile solute (like salt) from a volatile liquid solvent (like water).

6. Iodine in chloroform can be separated by the method of:
A) Filtration B) EvaporationC) Distillation D) Sedimentation and Decantation

Answer:C

Solution: Iodine and chloroform can be separated by distillation because chloroform is volatile and evaporates first, leaving iodine behind.

7. Iodine and methyl alcohol seperated by distillation because
A) Methyl alcohol is non volatile in nature
B) Iodine is non-voltaile solid
C) Both methyl alcohol and iodine are volatile

D) Iodine acts as a solvent

Answer:B

Solution:Since iodine does not evaporate easily, distillation allows methyl alcohol (volatile) to vaporize, leaving iodine behind.

8. A mixture contains three components namely camphor, common salt and water . These can be seperated by

A)Filtration and Distillation.

B)Filtration, sedimentation and decantation

C)Sublimation and distillation .

D)Sublimation , sedimentation and decantation.

Answer:C

Solution:Sublimation separates camphor (sublimes upon heating).

Distillation separates water (evaporates) from salt (non-volatile residue).

9. Which of the following are separated by filtration?

A)Salt in water B)Sugar in water C)Corn flakes in milk D)Oil in water.

Answer:C

Solution: Filtration separates insoluble solids (corn flakes) from liquids (milk).

10. Which of the following mixtures can be separated by using a filter paper?

A) Vinegar B) Saltwater C) Sand and water D) Sugar water

Answer:C

Solution:Sand is an insoluble solid that can be separated from water using filter paper.

JEE ADVANCED LEVEL QUESTIONS

Multi correct answer type:

11. Centrifugation is useful for :

A) The separation of cream from the milk

B) Sugar crystals from cane juice

C) Honey from the bee's wax

D) Blood and other biological samples

Answer:A,C,D

Solution:A) The separation of cream from milk – Centrifugation separates cream (lighter fat) from milk (heavier liquid) based on density differences.

C) Honey from the bee's wax – Centrifugation helps separate honey (liquid) from wax (solid).

D) Blood and other biological samples – Centrifugation separates blood components (plasma, RBCs, WBCs) in labs.

B) Sugar crystals from cane juice – Sugar is obtained by evaporation/ crystallization, not centrifugation.

12. Which of the following are used for separation of solid liquid mixtures ?

A)sublimation B) evaporation C) distillation D) gravity

Answer:B,C,D

Solution:B) Evaporation – Removes liquid (e.g., water) leaving behind solid (e.g., salt).

C) Distillation – Separates a volatile liquid from a non-volatile solid (e.g., saltwater $\rightarrow$ pure water + salt residue).

D) Gravity – Sedimentation (a gravity-based process) separates heavy solids from

liquids (e.g., mud settling in water).
A) Sublimation – Used for solids that directly turn into gas (e.g., camphor, iodine), not for typical solid-liquid mixtures.

Statement Type:

A) Both Statements are true, Statement II is the correct explanation of Statement I.
B) Both Statements are true, Statement II is not correct explanation of Statement I.
C) Statement I is true, Statement II is false.
D) Statement I is false, Statement II is true.
13. Statement-I : Sedimentation is used to separation of sulphur and iron.
Statement-II : The process of setting down of a heavier and insoluble components from a mixture called sedimentation.
Answer:D
Solution:Statement-I:
False $\rightarrow$ Sedimentation is used for insoluble solids in liquids (e.g., mud in water), not for solid-solid mixtures like sulphur and iron (which are separated using magnetic separation).
Statement-II:
True $\rightarrow$ This is the correct definition of sedimentation.
14. Statement-I : The process of distillation is useful in obtaining pure water from the water containing dissolved impurities.
Statement II : The pure liquid collected from its salt solution by the combined process of distillation and condensation is called distillate or distilled liquids.
Answer:A
Solution:Statement-I: True $\rightarrow$ Distillation removes dissolved salts/impurities by evaporating and condensing the water.
Statement-II: True $\rightarrow$ This correctly explains the product of distillation.
Does Statement II explain Statement I$\rightarrow$ Yes, because it describes how distillation works to produce pure water (distillate).

Comprehension Type:

Comprehension I:

The process of seperation of insoluble solid constituents of a mixture from its liquid constituents, by passing through some porous material is called filtration.
15. Which of the following separation techniques will you suggest to seperate silver chloride and water
A)sublimation B) evaporation C) distillation D) gravity
Answer:B
Solution:Silver chloride (AgCl) is insoluble in water.In a mixture of silver chloride and water, the water can be evaporated, leaving behind solid silver chloride as a residue.
16. The clear liquid obtained from a mixture of a solid and a liquid by the process of filltration is called_____ .
A) Filtrate B) Decantate C) Distillate D) Sediment
Answer:A

Solution:When a solid-liquid mixture is filtered:
The solid residue stays on the filter paper.
The clear liquid that passes through is called the filtrate.

Comprehension II:

The process of convertion of a liquid into gaseous state on boiling and then recondensing the gas so formed into liquid by condensation in another vessel is called distillation.

17. Which of the following component require in pure state in a solid liquid mixture?

A) Liquid component B) Solid component C) Non volatile solid D) All the above

Answer:A

Solution: Liquid component (since distillation focuses on purifying the liquid by vaporization and condensation).

18. Which one is non volatile solid in the mixture of iodine and chloroform

A) Choloroform B) Methyl alcohol C) Water D) Iodine

Answer:D

Solution:Chloroform (liquid) is volatile (evaporates easily).
Iodine (solid) is non-volatile (does not evaporate at normal distillation temperatures).
During distillation, chloroform vaporizes, leaving iodine behind.

Matrix Matching Type:

19. Column-I	Column-II
A) Filteration	1) Seawater
B) Distillation	2) Drinking water obtained from sea water
C) Evaporation	3) Cream from milk
D) Centrifugation	4) Ammonium chloride
	5) Chalk and water

Answer:A-5,B-2,C-1,D-3

Solution:

Column-I	Column-II
A) Filteration	5) Chalk and water (Insoluble solid separated from liquid)
B) Distillation	2) Drinking water obtained from seawater (Salt removal via evaporation & condensation)
C) Evaporation	1) Seawater $\rightarrow$ Salt (Water evaporates, leaving solid salt behind)
D) Centrifugation	3) Cream from milk (Denser liquid separates from lighter fat under high-speed spin)

20. Column-I	Column-II
a) Residue	1) The process of change in liquid into gaseous state
b) Filtrate	2) Sodium sulphate
c) Non-volatile solid	3) Common salt
d) Evaporation is	4) A clear liquid obtained by process of filtration
	5) The insoluble solid constituent left on the filter paper.

Answer:A-5,B-4,C-2,3,D-1

Solution:

Column-I	Column-II

a) Residue 5) The insoluble solid constituent left on the filter paper.
b) Filtrate 4) A clear liquid obtained by process of filtration
c) Non-volatile solid 3) Common salt,2) Sodium sulphate
d) Evaporation is 1) The process of change in liquid into gaseous state

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LEARNING TASK

CONCEPTUAL UNDERSTANDING QUESTIONS (CUQ's)

1. The process of settling down of a heavier and insoluble components from a mixture is called:
A) Evaporation B) Distillation C) Sedimentation D) Decantation
Answer:C
Solution:Sedimentation is the process where heavier, insoluble particles settle down in a mixture.
2. Name the process to make large amounts of common salt from sea water by the process of:
A) Sedimentation B) Decantation C) Filtration D) Evaporation
Answer:D
Solution:Common salt is obtained from seawater by evaporating the water, leaving behind salt crystals.
3. Tea leaves from tea is separated by
A) sedimentation B) decantation C) evaporation D) filtration
Answer:D
Solution:Tea leaves are separated from tea by filtration (using a strainer or filter).
4. Distilled water is obtained from sea water by the process of
A) filtration B) distillation C) centrifugation D) evaporation
Answer:B
Solution:Distilled water is obtained by boiling seawater, collecting the vapor (pure water), and condensing it back into liquid.
5. Blood samples can be separted by
A)Centrifugation B) distillation C)Evaporation D) filtration
Answer:A
Solution:Blood components (plasma, RBCs, WBCs) are separated by spinning at high speed in a centrifuge.
6. The process of separating clear liquid without disturbing sediment is called
A)sedimentation B)decantation C)filtration D)evaporation
Answer:B
Solution:Decantation involves carefully pouring out the clear liquid without disturbing the settled sediment.
7. The insoluble solid left on filter paper is called
A)residue B)sediment C)filtrate D)supernatant liquid
Answer:A
Solution:The insoluble solid left on the filter paper after filtration is called the residue.
8. The process of seperating fine particles from liquid by whirling at a high speed is called
A)Sedimentation B)Filtration C)Centrifugation D)Decantation.

Answer:C

Solution:Centrifugation uses high-speed spinning to separate fine particles from a liquid.

9. The machine used for centrifugation process is

A) filter paper B) residue C) Sieve D) centrifuge

Answer:D

Solution:The machine used for centrifugation is called a centrifuge.

10. separation of salt from salt solution done by the process of

A) boiling B) evaporation C) filtration D) decantation

Answer:B

Solution:Salt is separated from a salt solution by evaporating the water, leaving behind dry salt.

JEE MAINS LEVEL QUESTIONS

1. _____ is the process of seperating very fine undissolved solid particles present in a liquid quickly, completely and effectively

A) Sedimentation B) Decantation C) Filtration D) Evaporation

Answer:C

Solution:Filtration is the most effective method for separating very fine undissolved solid particles from a liquid quickly and completely.

2. Which method of separation would you suggest to separate sand and water ?

A) Distillation B) Sublimation C) Filtration D) Crystallisation

Answer:C

Solution:Sand and water can be easily separated by filtration since sand is insoluble in water.

3. The insoluble solid constituent particles left out on the filtering material called?

A) Residue B) Filtrate C) Filterine D)Precipitate

Answer:A

Solution:The insoluble solid particles left on the filter paper after filtration are called the residue.

4. The process of separation of insoluble solid constituent of a mixture from its liquid constituent by passing it through some porous material is called ____.

A) Evaporation B) Crystallization C) Filtration D) Decantation

Answer:C

Solution:Filtration involves passing a mixture through a porous material to separate insoluble solids from liquids.

5. Choose the incorrect statement :

A) Sulphur is non volatile solid. B)Sodium sulphate is a non-volatile solid.

C)Carbondisulphide is volatile. D)Commonsalt is a volatile solid

Answer:D

Solution:This is incorrect because common salt (sodium chloride) is a non-volatile solid.

6. The best method for separation of solid-liquid mixture is:

A)Sedimentation B) Decantation

C)Filtration D)Distillation.

Answer:C

Solution:Filtration is the best method for separating solid-liquid mixtures when the solid is insoluble in the liquid.

7. The non-volatile solid in common salt and water is:

A)Common salt B)Water C)Both A&B D)None

Answer:A

Solution:In a mixture of common salt and water, common salt is the non-volatile solid, while water is the volatile liquid.

8. The clear liquid above the sediment when a suspension is allowed to stand undisturbed is called :

A) Residue B)Supernatant liquid C) Filtrate D)Sediment

Answer:C

Solution:The clear liquid above the sediment in a suspension is called the supernatant liquid.

9. What is the process by which a gas changes into a liquid?

A) Decantation B) Sublimation C) Condensation D) Sedimentation

Answer:C

Solution:The process by which a gas changes into a liquid is called condensation.

10. What kind of mixtures are alloys?

A) Solid-Gas B) Liquid-Liquid C) Gas-Gas D) Solid-Solid

Answer:D

Solution:Alloys are homogeneous mixtures of two or more metals, making them solid-solid mixtures.

JEE ADVANCED LEVEL QUESTIONS

Multi correct answer type:

11. Why the separation of components of a mixture is essential?

A) To remove unwanted components B) To remove harmful components

C) To obtain pure and useful components. D) None of the above

Answer:A,B,C

Solution:Separation is done to:

Eliminate unwanted or harmful substances (e.g., stones from rice, impurities from drinking water).

Extract the useful or pure substances (e.g., sugar from sugarcane, salt from seawater).

12. Which of the following mixture is separated by Distillation.

A) Salt and water B) Iodine and Methyl Alcohol

C) Iodine and Chloroform D) Chalk and water

Answer:A,B,C

Solution: A) Salt and water

Distillation evaporates water (volatile) and leaves salt (non-volatile) behind.

B) Iodine and Methyl Alcohol

Methyl alcohol (volatile liquid) boils off, leaving iodine (non-volatile solid).

C) Iodine and Chloroform

Chloroform (volatile liquid) evaporates, leaving iodine behind.

D) Chalk and water

Chalk is insoluble in water; filtration (not distillation) is used.

Statement Type:

A) Both Statements are true, Statement II is the correct explanation of Statement I.
B) Both Statements are true, Statement II is not correct explanation of Statement I.
C) Statement I is true, Statement II is false.
D) Statement I is false, Statement II is true.

13. Statement-I : The clear liquid over the sediment is supernatent liquid.
Statement-II : Decantation is the best method than sedimentation in the seperation of mixtures comparetively.

Answer:C

Solution:Statement I: Correct.
This is the standard definition of supernatant.
Statement II: Incorrect or misleading.
Sedimentation is the initial step where heavier particles settle down.
Decantation comes after sedimentation, where the clear liquid is poured off.““So, decantation and sedimentation work together, not in competition. One is not better than the other; they are sequential steps.

14. Statement I : In the filtration process the insoluble solid is completely removed, which is not possible in decantation.
Statement II : Common salt and water is separated by evaporation.

Answer:B

Solution:
Statement I: True.
Filtration (using filter paper) removes all insoluble solids, while decantation may leave some fine particles in the liquid.
Statement II:True, but irrelevant.
This describes a different separation method and doesn't explain why filtration is more complete than decantation.

Comprehension Type:

Comprehension I:

The process of seperation of insoluble solid constituents of a mixture from its liquid constituents, by passing through some porous material is called filtration.

15. A mixture of Chalk and water can be separated through the method of:
A) Separation by evaporation. B) Separation by crystallisation.
C) Separation by filtration. D) Separation by distillation.

Answer:C

Solution:Filtration is the perfect method as:
The porous filter paper will retain chalk particles (residue)
Water will pass through as filtrate

Comprehension II:

The process of convertion of a liquid into gaseous state on boiling and then recondensing the gas so formed into liquid by condensation in another vessel is called distillation.

16. Which of the following component require in pure state in a solid liquid mixture?

A) Liquid component B) Solid component C) Non volatile solid D) All the above

Answer:A

Solution:In solid-liquid mixtures, we typically use separation methods to obtain either:

The pure liquid component (via methods like distillation or evaporation)

The pure solid component (via filtration or crystallization)

17. Which one is non volatile solid in the mixture of iodine and chloroform

A) Choloroform B) Methyl alcohol C) Water D) Iodine

Answer:D

Solution:Chloroform is volatile (evaporates easily at room temperature)

Iodine is a non-volatile solid (remains as solid when chloroform evaporates)

Integer type:

18. How many methods are there for separation of solid - liquid mixtures ?

Answer:6

Solution:

Filtration (e.g., sand + water)

Sedimentation & Decantation (e.g., mud + water)

Evaporation (e.g., salt + water)

Distillation (e.g., salt + water to obtain pure water)

Centrifugation (e.g., separating blood components)

Chromatography (e.g., separating dissolved solids like pigments in a liquid solvent)

19. Among chalk and water, sand and saw dust, sea water. How many are solid, liquid mixtures ?

Answer:2

Solution:Chalk and water $\rightarrow$ Solid-liquid mixture (chalk is a solid, water is liquid)

Sand and sawdust $\rightarrow$Solid-solid mixture

Sea water $\rightarrow$ Solid-liquid mixture (salts dissolved in water)

20. Among sand, salt, iodine, water how many are volatile in nature ._____

Answer:2

Solution:Water (volatile - evaporates easily)

Iodine (sublimes/volatilizes at room temperature)

Sand and salt are non-volatile

21. The following are using for separation of solid - liquid mixtures ._____

A) sublimation B) distillation C) gravity

D) evaporation E) filtration .

Answer:4

Solution:A) Sublimation :Not used for solid-liquid mixtures. It's for solid-solid mixtures where one sublimes.

B) Distillation:Can be used when the solid is dissolved in the liquid (e.g., salt in water).Involves boiling the liquid and condensing its vapor.

C) Gravity :Gravity separation (also called sedimentation/decantation) is used when solid is heavier and settles down in liquid.

D) Evaporation :Used when the solid is dissolved in liquid. Liquid is evaporated, solid remains.

E) Filtration :Used when solid is insoluble and suspended in a liquid.

KEY

				TEACHING TASK					
				JEE MAINS LEVEL QUESTIONS					
1	2	3	4	5	6	7	8	9	10
B	B	D	B	C	C	B	C	C	C
				JEE ADVANCED LEVEL QUESTIONS					
11	12	13	14	15	16	17	18	19	
A,C,D	B,C,D	D	A	B	A	A	D	A-5,B-2,C-1,D-3	
20									
A-5,B-4,C-2,3,D-1									
				LEARNING TASK					
				CONCEPTUAL UNDERSTANDING QUESTIONS (CUQ's)					
1	2	3	4	5	6	7	8	9	10
C	D	D	B	A	B	A	C	D	B
				JEE MAINS LEVEL QUESTIONS					
1	2	3	4	5	6	7	8	9	10
C	C	A	C	D	C	A	C	C	D
				JEE ADVANCED LEVEL QUESTIONS					
11	12	13	14	15	16	17	18	19	20
A,B,C	A,B,C	C	B	C	A	D	6	2	2
21									
4									