2. INTERCONVERSION OF STATES OF MATTER
SOLUTIONS

TEACHING TASK

JEE MAINS LEVEL QUESTIONS

1. Matter is made up of one kind of particles is called .....
A) Substance B) Mixture C) Element D) Compound
Answer:A
Solution:A substance (pure) consists of only one type of particle (element or compound).
2. The temperature at which liquid changes to solid is known as .....
A) Condensation point B) Freezing point
C) Melting point D) Boiling point
Answer:B
Solution:Freezing point is the temperature where a liquid solidifies.
3. The temperature at which the solid starts melting is called
A) Boiling point B) Freezing point
C) Melting point D) Sublimating point
Answer:C
Solution:Melting point is the temperature where a solid begins to liquefy.
4. What are the properties of matter?
A) No mass but occupies space. B) Mass but occupies no space.
C) Mass and occupies space. D) No mass and occupies no space
Answer:C
Solution:Matter is defined by having mass and volume (occupies space).
5. Ice needs ___ to convert into water.
A) bucket B) heat C) steam D) None of the above
Answer:B
Solution:Ice melts to water by absorbing heat energy (endothermic process).
6. $Water \xrightarrow[Temperature]{Rising} Water\ Vapour$ The above reaction is ?
A) Evaporation B) Condensation
C) Precipitation D) Freezing
Answer:A
Solution:Evaporation is the phase change from liquid to gas (below boiling point).

7. Shiela made a cup of tea for herself. But her phone rang and she started talking on the phone. In the mean while she covered her mug of tea with a lid. After ten minutes, she removed the lid to drink tea. She observed small water droplets on the inner side of the lid. Now which process is shown in the above paragraph?

A) Melting B) Precipitation C) Evaporation D) Condensation

Answer:D

Solution:The water vapour from hot tea condensed into liquid droplets on the cooler lid.

8. Which of the following is true ?

A) $Water \xrightarrow{heat\,heat} Steam \xrightarrow{heat} Ice$

B) $Water \xrightarrow{cool\,cool} Ice \xrightarrow{heat} Steam$

C) $Steam \xrightarrow{cool\,cool} water \xrightarrow{cool} ice$

D) $Steam \xrightarrow{heat\,cool} ice \xrightarrow{heat} Water$

Answer:C

Solution: $Steam \xrightarrow{cool\,cool} water \xrightarrow{cool} ice$

9. Solid which undergoes sublimation is

A) Argon B) Iodine C) Sodium chloride D) Water.

Answer:B

Solution:Iodine (I_2) is a solid that sublimes (directly changes from solid to gas without becoming liquid).

10. Solid to Liquid : Melting :: _____ : Freezing

A) Gas to Liquid B) Liquid to Gas C) Solid to Gas D) Liquid to Solid.

Answer:D

Solution:Melting = Solid $\rightarrow$ Liquid.

Freezing = Liquid $\rightarrow$ Solid (exact reverse process).

11. What is the primary role of wind currents in the movement of clouds?

A) To disperse clouds evenly across the sky

B) To carry moisture-laden clouds from sea to land

C) To create turbulence within the clouds

D) To prevent clouds from forming rain

Answer:B

Solution:Wind currents transport clouds (containing water vapor) from oceans to land, enabling precipitation.

12. What is a common indicator of impending rainfall mentioned in the text?

A) Decrease in wind speed B) Change in the color of clouds

C) Increase in atmospheric pressure D) Clear skies

Answer:B
Solution:Darkening/graying of clouds (due to water density) signals rain.
13. What is the primary reason for the noticeable shift in weather patterns mentioned in the text?
A) Increased cloud seeding activities B) Human-induced climate change
C) Changes in ocean currents D) Natural fluctuations in weather patterns
Answer:B
Solution:Human activities (e.g., greenhouse gas emissions) are the dominant cause of modern climate shifts.
14. What role does evaporation play in the water cycle?
A) It transforms water vapor into clouds.
B) It replenishes bodies of water like ponds and lakes.
C) It causes rainwater to flow into rivers.
D) It converts water into groundwater.
Answer:A
Solution:Evaporated water rises, cools, and condenses into clouds.
15. How do environmental factors such as deforestation and pollution impact the water cycle?
A) They increase rainfall and replenish water sources.
B) They accelerate the evaporation process.
C) They hinder the cooling of clouds, leading to a decrease in rainfall.
D) They promote condensation, resulting in heavy rainfall.
Answer:C
Solution:Deforestation:
Reduces transpiration (water release from plants), decreasing atmospheric moisture.
Disrupts local humidity, reducing cloud formation and rainfall.
Pollution (e.g., aerosols):
Particles can inhibit cloud condensation, making droplets smaller and less likely to fall as rain.
Some pollutants reflect sunlight, cooling the surface and reducing evaporation.
Why not other options?
A) Incorrect: Deforestation/pollution typically reduce rainfall, not increase it.
B) Incorrect: These factors generally slow evaporation by altering surface conditions.
D) Incorrect: While pollution can sometimes enhance condensation, the net effect is often reduced rainfall due to disrupted droplet growth.

JEE ADVANCED LEVEL QUESTIONS

Multi correct answer type:

16. Sublimable solids are

A) Water B) Common salt C) Iodine D) Naphthalene.

Answer:C,D

Solution:Iodine (C) and Naphthalene (D) are solids that sublime (directly convert from solid to gas without becoming liquid).

Water (A) and Common salt (B) do not sublime (they melt to liquid first).

17. Conversion of matter to various forms depends on....

A) Temperature B) Volume C) Pressure D) Mass

Answer:A,C

Solution:Temperature (A): Determines phase changes (e.g., melting, boiling).

Pressure (C): Affects boiling/sublimation points (e.g., high pressure can liquefy gases).

Volume (B) and Mass (D): These are properties of matter, not factors driving phase changes.

Statement Type:

18. Statement-I : Solids do not diffuse.

Statement-II : There are strong intermolecular force of attractions

Answer:D

Solution:Statement I is false – Solids do diffuse, but very slowly. For example, zinc can diffuse into copper at elevated temperatures.

Statement II is true – Solids have strong intermolecular forces, which is why their particles are closely packed.

19. Statement-I : Substances containing particles of only one kind are called Pure substances.

Statement-II : Sodium chloride is sublimable solid.

Answer:C

Solution:

Statement I is true – A pure substance contains only one type of particle (atom or molecule).

Statement II is false – Sodium chloride (NaCl) is not a sublimable solid. Sublimable solids (like iodine or camphor) change directly from solid to gas. NaCl does not sublimate under normal conditions.

Comprehension Type:

Comprehension I:

20. On heating,ice changes to .....

A) Liquid B) Solid C) Gas D) Plasma.

Answer:A

Solution:Ice is the solid state of water. When heated, it undergoes melting and converts

to liquid water at 0°C (at standard pressure).
Further heating would convert it to gas (steam), but the immediate change from ice is to liquid.
21. The combination of two or mor elements in any ratio is called....
A) Compound B) Element C) Mixture D) Matter.
Answer:C
Solution:A mixture is formed when two or more elements or compounds are physically combined in any ratio (e.g., air, saltwater).
Integer type:
22. Freezing point of water is .....^{o}C.
Answer:0
Solution:Water freezes into ice at 0°C under standard atmospheric pressure (1 atm).
23. Boiling point of water is .....^{o}C.
Answer:100
Solution:Water boils and converts to steam at 100°C under standard atmospheric pressure (1 atm).
Matrix Matching Type:
24. Answer:A-q,B-r,C-s,D-p
Solution:

Column - I	Column - II
A. Solid	q. do not diffuse
B. Liquid	r. acquire shape of container.
C. Gases	s. highly compressible.
D. Pure substances	p. only one kind of particles.

25**.Answer:A-r,B-s,C-p,D-q**
Solution:

Column - I	Column - II
A. Liquid to Solid	r. Freezing
B. Vapour to Liquid	s. Condensation.
C. Solid to Liquid	p. Melting
D. Liquid to Vapour	q. Vapourisation

LEARNERS TASK
CONCEPTUAL UNDERSTANDING QUESTIONS (CUQ's)

1. Which of the following are types of matter based on physical classification?
A) Solids B) Liquids C) Gases D) All.

Answer:D

Solution:Matter is physically classified into solids, liquids, and gases (the three primary states).

2. A substance which is formed by chemical combination of two or more elements in a fixed ratio is called....
A) Atom B) Compound C) Mixture D) Element.

Answer:B

Solution:Compounds (e.g., H_2O) are formed by chemical bonding in fixed proportions.

3. The conversion of a liquid to solid on cooling is called.....
A) Boiling B) Melting C) Freezing D) Condensation.

Answer:C

Solution:Freezing is the phase change from liquid $\rightarrow$ solid (e.g., water $\rightarrow$ ice).

4. The process by which liquid converts to gas is called .....
A) Vapourisation B) Melting C) Freezing D) Cooling.

Answer:A

Solution:Vaporization includes both evaporation (at any temperature) and boiling (at boiling point).

5. Melting point of ice is .....
A) $0^{O}C$ B) 20 ^{O}C C) 100 ^{O}C D) $75^{O}C$

Answer:A

Solution:Ice melts to water at 0°C under standard pressure.

6. Boiling point of water is .....
A) $0^{O}C$ B) 20 ^{O}C C) 10 ^{O}C D) $100^{O}C$

Answer:D

Solution:Water boils to steam at 100°C (at 1 atm pressure)

7. ..... cannot diffuse.
A) Solids B) Liquids C) Gases D) None of the above.

Answer:A

Solution:Solids do not diffuse under normal conditions due to fixed particle positions.

8. Which of the following are sublimable in nature?
A) Camphor B) Naphthalene C) Iodine D) All the above.

Answer:D

Solution:Camphor, naphthalene, and iodine sublime (solid $\rightarrow$ gas directly).

9. The process of converting solid directly to gas without liquid state is called___
A) Melting B) Sublimation C) Condensation D) Freezing.
Answer:B
Solution:Sublimation bypasses the liquid phase
10. Matter is made up of smaller particles are called....
A) Molecules B) Compound C) Mixture D) Pure substance.
Answer:A
Solution:Molecules are the smallest units of matter that retain its chemical properties.

JEE MAIN LEVEL QUESTIONS

1. .....melts to form water.
A) Ice B) Solid C) Gas D) Substance.
Answer:A
Solution: Ice (solid water) melts to form liquid water at 0°C.
2. The molecules of .....have large space between them.
A) Solid B) Liquid C) Gases D) Substance.
Answer:C
Solution: Gas molecules have the largest intermolecular spaces, allowing compressibility.
3. ..... state of matter is incompressible.
A) Solid B) Liquid C) Gas D) Plasma.
Answer:A
Solution:Solids are nearly incompressible due to tightly packed particles.
4. The temperature at which solid changes to liquid is called.....
A) Melting point B) Boiling point
C) Evaporation D) Condensation
Answer:A
Solution: Melting point is the temperature where a solid becomes a liquid.
5. Find the odd one out.
A) Wood B) Brick C) Book D) Milk
Answer:D
Solution:Milk is a liquid, while wood, brick, and book are solids.
6. Which of the following does not take the shape of the container it is in?
A) A pen B) Oil C) Water D) None of these.
Answer:A
Solution: A pen (solid) maintains its shape, unlike oil (liquid) or water (liquid).
7. During which state will the shape of the matter take on the shape of the area/ container?

A) Solids B) Liquids C) Gases D) None of these.
Answer:B
Solution: Liquids adapt to container shapes due to fluidity (gases fill entirely).
8. We can melt solids by the process of _____.
A) cooling B) heating C) both A and B D) None of the above
Answer:B
Solution:Melting requires heat energy to overcome intermolecular forces.
9. Particles of matter moves faster due to high _____
A) Energy B) Mass C) Color D) Weight
Answer:A
Solution:Increased kinetic energy (from heat) speeds up particle motion.
10. Which of the following is a property of diffusion?
A) Slowest in liquids B) Fastest in gases
C) Based on motion of particles D) All of the above.
Answer:D
Solution:Slowest in liquids (A), fastest in gases (B), and depends on particle motion (C).
11. How do clouds transform into rain?
A) By condensing into ice crystals
B) Through evaporation from the ground
C) By accumulating moisture from the ocean
D) Through cooling and condensation of water droplets
Answer:D
Solution: Rain forms when cloud droplets cool, condense, and coalesce
12. What atmospheric changes are commonly observed before rainfall?
A) Increase in temperature and humidity
B) Descending clouds and a cool breeze
C) Clear skies and high wind speeds
D) Formation of thunderclouds
Answer:B
Solution: Before rainfall, typical atmospheric changes include:Clouds descending and becoming darker or thicker.A cool breeze begins to blow as a result of pressure and temperature changes.Humidity increases, and sometimes thunderclouds may form (especially in storms), but that's not always the case.
13. According to the text, what measures can help communities cope with the impacts of changing weather patterns?
A) Building more dams and reservoirs
B) Implementing strict water rationing policies
C) Investing in climate-resilient infrastructure
D) Promoting deforestation and land degradation

Answer:C
Solution:Resilient infrastructure adapts to extreme weather (e.g., floods/droughts).

14. What is the primary function of condensation in the water cycle?
A) To transform rainwater into groundwater.
B) To evaporate water from bodies of water.
C) To form clouds from water vapor.
D) To replenish streams and rivers
Answer:C
Solution:Condensation converts water vapor into cloud droplets.
15. What is the significance of the continuous water cycle in nature?
A) It prevents the formation of clouds.
B) It ensures the depletion of water sources.
C) It maintains the balance of water distribution on Earth.
D) It accelerates global warming.
Answer:C
Solution: The cycle ensures sustainable water availability across ecosystems.

JEE ADVANCED LEVEL QUESTIONS

Multi correct answer type:

16. Sublimable solids are
A) Water B) Common salt C) Iodine D) Naphthalene.
Answer:C,D
Solution:Iodine (C) and Naphthalene (D) are solids that sublime (directly convert from solid to gas without becoming liquid).
17. The temperature at which solid converts to liquid and vice-versa is called
A) Melting point B) Boiling point
C) Freezing point D) Condensation point.
Answer:A,C
Solution:Melting point (A): Solid$\rightarrow$ Liquid.
Freezing point (C): Liquid $\rightarrow$ Solid (reverse process).
Boiling point (B): Liquid $\rightarrow$ Gas.
Condensation point (D): Gas $\rightarrow$ Liquid.
Comprehension Type:
18. The process of converting liquid to vapour at a particular temperature is called...
A) Melting B) Boiling
C) Condensation D) Freezing.

Answer:B

Solution:Boiling is the process where a liquid converts to vapor at a specific temperature (boiling point) under given pressure

19. The substance which contain atoms of only one kind is called....

A) Molecule B) Atom

C) Pure substance D) Mixture.

Answer:C

Solution:A pure substance consists of only one type of atom or molecule:

Elements: Contain atoms of one kind (e.g., gold, oxygen).

Compounds: Contain molecules of one kind (e.g., H_2O, NaCl).

Integer type:

20. Based on physical classification, matter is of ..... types.

Answer:5

Solution:Matter is physically classified into five states:

Solid ,Liquid,Gas,plasma,Bose einstein condensate.

21. Among Iodine,Naphthalene ,ice . how many are sublimable in nature?.....

Answer:2

Solution:Iodine and Naphthalene sublime (solid $\rightarrow$ gas directly).

Ice melts to water first (does not sublime under normal conditions).

22. Among wood, air, perfume, how many can diffuse easily?.....

Answer:2

Solution:Air (gas) and perfume vapor (gas) diffuse rapidly.

Wood (solid) does not diffuse.

KEY

				TEACHING TASK					
1	2	3	4	5	6	7	8	9	10
A	B	C	C	B	A	D	C	B	D
11	12	13	14	15	16	17	18	19	20
B	B	B	A	C	C,D	A,C	D	C	A
21	22	23	24		25				
C	0	100	A-q,B-r,C-s,D-p		A-r,B-s,C-p,D-q				
				LEARNERS TASK		(CUQ's)			
1	2	3	4	5	6	7	8	9	10
D	B	C	A	A	D	A	D	B	A
				JEE MAIN LEVEL QUESTIONS					
1	2	3	4	5	6	7	8	9	10
A	C	A	A	D	A	B	B	A	D
11	12	13	14	15	16	17	18	19	20
D	B	C	C	C	C,D	A,C	B	C	5
21	22								
2	2								