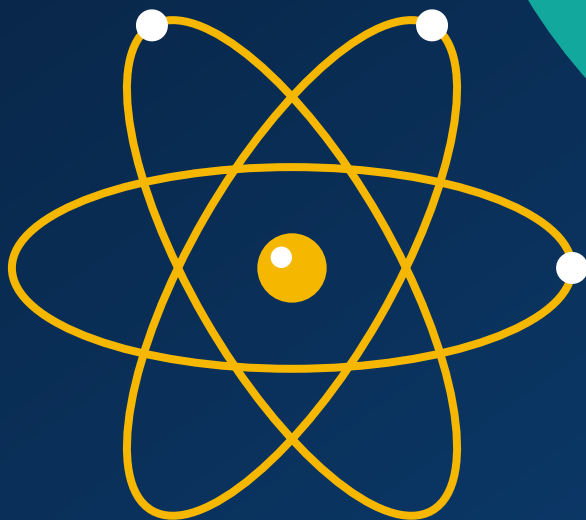


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States of Matter and Phase Changes

Chapter 01 • Class 9 Chemistry

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85

MCQs

100%

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Explanations

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Introduction & Branches of Chemistry

1

Which branch of science specifically deals with the properties, composition, and structure of substances?

☐ A) Biology

☐ B) Physics

☒ C) Chemistry

☐ D) Geology

Explanation: Chemistry is the central science that studies what matter is made of, how it is structured, and how it changes physically or chemically.

2

The determination of the percentage of elements in a substance represents:

☐ A) Its structure

☒ B) Its composition

☐ C) Its physical change

☐ D) Its energy absorption

Explanation: Finding out the exact percentages of different elements present in a sample is essentially determining its chemical composition.

3

Which branch of chemistry investigates how substances behave at atomic and molecular levels to predict reaction rates?

- ☐ A) Organic Chemistry
- ☐ B) Inorganic Chemistry
- ☒ C) Physical Chemistry
- ☐ D) Analytical Chemistry

Explanation: Physical chemistry bridges physics and chemistry, focusing on the fundamental laws that govern how atoms and molecules behave and react.

4

The study of the synthesis, composition, and structure of elements that contain little or no carbon is called:

- ☐ A) Organic Chemistry
- ☒ B) Inorganic Chemistry
- ☐ C) Biochemistry
- ☐ D) Polymer Chemistry

Explanation: Inorganic chemistry specifically focuses on non-carbon-based compounds, including metals, salts, and minerals.

5

Which branch of chemistry deals with carbon compounds, specifically hydrocarbons and their derivatives?

☐ A) Inorganic Chemistry

☐ B) Physical Chemistry

☒ C) Organic Chemistry

☐ D) Analytical Chemistry

Explanation: Organic chemistry is entirely dedicated to the study of carbon-containing compounds, which are essential for life and many synthetic materials.

6

Environmental chemistry primarily studies the sources, reactions, and effects of chemical species in:

☐ A) Only the human body

☒ B) Air, soil, and water environments

☐ C) Only outer space

☐ D) Nuclear reactors

Explanation: Environmental chemistry focuses on understanding how chemicals interact in nature and how human activities impact the environment.

7

Which branch involves the separation, identification, and quantification of components in a material using sophisticated instruments?

☐ A) Physical Chemistry

☒ B) Analytical Chemistry

☐ C) Biochemistry

☐ D) Nuclear Chemistry

Explanation: Analytical chemistry is all about analyzing substances—figuring out what is in a sample and how much of it is there.

8

Understanding life through chemical processes and studying vital processes in living organisms is known as:

☐ A) Medicinal Chemistry

☒ B) Biochemistry

☐ C) Organic Chemistry

☐ D) Geochemistry

Explanation: Biochemistry is the intersection of biology and chemistry, exploring molecules like proteins, carbohydrates, and nucleic acids within living systems.

9

Which branch deals with radioactivity, nuclear processes, and transformations in the nucleus of an atom?



A) Nuclear Chemistry



B) Physical Chemistry



C) Analytical Chemistry



D) Astrochemistry

Explanation: Nuclear chemistry focuses on the nucleus, including reactions like radioactive decay, fission, and fusion.

10

The study of large molecules made by linking together a series of building blocks is called:



A) Polymer Chemistry



B) Geochemistry



C) Biochemistry



D) Inorganic Chemistry

Explanation: Polymer chemistry focuses on macromolecules like plastics, proteins, and cellulose, which are made of repeating structural units.

11

The study of the chemical composition of the Earth and its minerals is called:

☐ A) Environmental Chemistry

☒ B) **Geochemistry**

☐ C) Astrochemistry

☐ D) Analytical Chemistry

Explanation: *Geochemistry applies chemical principles to study the Earth's crust, rocks, and minerals.*

12

Which branch designs and synthesizes drugs for the treatment of diseases?

☐ A) Biochemistry

☒ B) **Medicinal Chemistry**

☐ C) Organic Chemistry

☐ D) Analytical Chemistry

Explanation: *Medicinal chemistry involves the discovery, design, and development of pharmaceutical compounds.*

13

The study of molecules and ions occurring in space and interstellar space is known as:



A) Astrochemistry



B) Nuclear Chemistry



C) Geochemistry



D) Physical Chemistry

Explanation: Astrochemistry studies the abundance and reactions of chemical elements and molecules in the universe.

14

A lunar mission brought samples from the Moon. Determining their composition relates to which branch?



A) Physical Chemistry



B) Analytical Chemistry



C) Organic Chemistry



D) Nuclear Chemistry

Explanation: Determining the exact composition of unknown samples requires analytical techniques to separate and identify the components.

States of Matter

15

Anything that has weight and occupies volume is called:

- ☐ A) Energy
- ☒ B) Matter
- ☐ C) Plasma
- ☐ D) Radiation

Explanation: Matter is defined as anything that has mass (weight) and takes up space (volume).

16

Which of the following is NOT a primary state of matter in our everyday life?

- ☐ A) Solid
- ☐ B) Liquid
- ☐ C) Gas

☒ D) Plasma

Explanation: While plasma exists in the universe, the everyday states we commonly observe on Earth are solid, liquid, and gas. Plasma is considered the fourth state but is not commonly encountered in daily life.

17

In which state of matter are molecules very widely apart with no order and very weak intermolecular forces?

- ☐ A) Solid
- ☐ B) Liquid
- ☒ C) Gas
- ☐ D) Plasma

Explanation: Gases have negligible intermolecular forces and large distances between particles, allowing them to expand to fill any container.

18

Why are gases easily compressible?

- ☐ A) Because they have high density
- ☒ B) Because they have large empty spaces between molecules
- ☐ C) Because they have strong intermolecular forces
- ☐ D) Because they have a fixed volume

Explanation: The large distances between gas molecules mean there is plenty of empty space, allowing them to be squeezed together easily.

19

Which state of matter has molecules that are closely attached but can move randomly, having significant intermolecular forces?

- ☐ A) Solid
- ☒ B) Liquid
- ☐ C) Gas
- ☐ D) Plasma

Explanation: Liquids have stronger intermolecular forces than gases, holding molecules close together while still allowing them to flow.

20

Solids have a definite shape and fixed volume because:

- ☐ A) Their particles are widely spaced
- ☒ B) Their particles are closely packed with strong attractive forces
- ☐ C) They are highly compressible
- ☐ D) They have low density

Explanation: In solids, strong intermolecular forces hold particles in fixed positions, giving them a rigid structure and definite volume.

21

Which state of matter is considered the most dense?

- ☐ A) Gases
- ☐ B) Liquids
- ☒ C) Solids
- ☐ D) Plasma

Explanation: Because solid particles are tightly packed together in a regular arrangement, they have the highest density among the primary states.

22

The state of matter composed of highly kinetic energy particles, existing in fluorescent tubes and lightning, is:

- ☐ A) Gas
- ☐ B) Liquid
- ☐ C) Solid

☒ D) Plasma

Explanation: Plasma is an ionized gas containing free electrons and ions, making it highly conductive and responsive to electromagnetic fields.

23

Which of the following is an example of an intermediate state of matter?

☒ A) Supercritical fluids

☐ B) Ice

☐ C) Water vapor

☐ D) Iron rod

Explanation: Supercritical fluids are intermediate states that exhibit both gas-like and liquid-like properties.

24

Supercritical fluids show properties of:

☐ A) Solids and liquids

☒ B) Liquids and gases

☐ C) Solids and gases

☐ D) Only gases

Explanation: These fluids exist at high pressure and temperature, behaving like a liquid in density but like a gas in viscosity and diffusivity.

25

Liquid crystals are a state of matter whose properties are between those of:

- ☐ A) Gases and solids
- ☒ B) Conventional liquids and crystalline solids
- ☐ C) Plasmas and gases
- ☐ D) Elements and compounds

Explanation: Liquid crystals flow like liquids but maintain some of the ordered molecular structure of crystalline solids.

26

Graphene is an example of a:

- ☐ A) Three-dimensional crystal
- ☒ B) Two-dimensional crystal
- ☐ C) Amorphous solid
- ☐ D) Supercritical fluid

Explanation: Graphene is a single layer of carbon atoms arranged in a hexagonal lattice, making it a 2D material.

27

Which of the following is considered an exotic state of matter?



A) Bose-Einstein condensate



B) Liquid water



C) Ice



D) Steam

Explanation: Exotic states like Bose-Einstein condensates occur under extreme conditions and are not commonly encountered in everyday life.

Elements, Compounds, and Mixtures

28

The simplest form of matter that cannot be broken down into simpler substances by ordinary chemical reactions is a(n):



A) Compound



B) Mixture



C) Element



D) Solution

Explanation: Elements are the fundamental building blocks of matter, consisting of only one type of atom.

29

Most elements found in the world exist in which state?

- ☐ A) Liquid
- ☒ B) Solid
- ☐ C) Gas
- ☐ D) Plasma

Explanation: The vast majority of naturally occurring elements are solids at room temperature, such as metals and metalloids.

30

Which of the following is NOT a pure substance?

- ☐ A) Element
- ☐ B) Compound
- ☒ C) Mixture
- ☐ D) Distilled Water

Explanation: Mixtures are impure substances because they contain more than one type of element or compound physically combined.

31

A pure substance made up of two or more different elements chemically combined in a fixed ratio is a(n):

☐ A) Mixture

☒ B) Compound

☐ C) Allotrope

☐ D) Solution

Explanation: Compounds have a specific, fixed chemical formula (like H_2O), meaning the elements are always combined in the same proportion by mass.

32

The properties of a compound are always:

☐ A) The same as its constituent elements

☒ B) Different from its constituent elements

☐ C) A mixture of its constituent elements

☐ D) Physical only

Explanation: When elements chemically bond to form a compound, they create entirely new substances with unique properties (e.g., sodium and chlorine form table salt).

33

A mixture in which the composition is uniform throughout is called a:

☐ A) Heterogeneous mixture

☒ B) Homogeneous mixture

☐ C) Compound

☐ D) Suspension

Explanation: Homogeneous mixtures (solutions) have the same uniform composition and properties throughout the sample.

34

Which of the following is an example of a heterogeneous mixture?

☐ A) Saltwater

☐ B) Air

☒ C) Rock

☐ D) Milk

Explanation: A rock has different types of minerals concentrated in different parts, making its composition non-uniform.

35 In a mixture, the components:

- ☐ A) Are chemically bonded together
- ☒ **B) Retain their individual identities and properties**
- ☐ C) Always exist in a fixed ratio
- ☐ D) Cannot be separated by physical means

Explanation: Unlike compounds, the components of a mixture are simply physically combined, so they keep their original properties and can be separated physically.

36 Which of the following is an example of a homogeneous mixture?

- ☐ A) Chocolate
- ☐ B) Rock
- ☒ **C) Salt and water solution**
- ☐ D) Sand and iron filings

Explanation: Saltwater is a homogeneous mixture because the salt completely dissolves and distributes evenly throughout the water.

37

Elements like sodium and calcium are represented by:

- ☐ A) Numbers
- ☒ B) Symbols
- ☐ C) Formulas
- ☐ D) Equations

Explanation: Each element has a unique one or two-letter symbol (e.g., Na for Sodium, Ca for Calcium).

38

Which of the following is a noble gas that exists as a mono-atomic molecule?

- ☐ A) Nitrogen
- ☐ B) Oxygen
- ☒ C) Helium
- ☐ D) Chlorine

Explanation: Noble gases like Helium and Argon are stable on their own and exist as single, isolated atoms rather than bonding in pairs.

39

Compounds like NaCl and SiO_2 exist in the form of:

- ☐ A) Independent molecules
- ☒ B) Network arrangements of atoms
- ☐ C) Single atoms
- ☐ D) Heterogeneous mixtures

Explanation: Ionic compounds like NaCl form giant lattice structures, while covalent network solids like SiO_2 form continuous networks of bonded atoms.

40

The properties of a mixture are:

- ☐ A) Always fixed
- ☒ B) The sum of the properties of its components
- ☐ C) Completely different from its components
- ☐ D) Always uniform

Explanation: Since the components of a mixture retain their identities, the overall mixture exhibits a combination of their individual properties.

Allotropic Forms of Substances

41

The phenomenon where an element exists in more than one structural form with different physical and chemical properties is called:

- ☐ A) Isomerism
- ☒ B) Allotropy
- ☐ C) Polymorphism
- ☐ D) Isotopy

Explanation: Allotropy refers to the existence of an element in multiple different structural forms in the same physical state.

42

Oxygen exists in two allotropic forms, which are:

- ☒ A) O_2 and O_3
- ☐ B) O_2 and O_4
- ☐ C) O and O_2
- ☐ D) O_3 and O_4

Explanation: Oxygen exists as diatomic oxygen (O_2) and triatomic ozone (O_3).

43

Which of the following is NOT an allotrope of carbon?

- ☐ A) Diamond
- ☐ B) Graphite
- ☐ C) Buckminsterfullerene



D) Silica

Explanation: Silica (SiO_2) is a compound of silicon and oxygen, not an allotrope of carbon.

44

Diamond has a giant molecular structure, whereas graphite has a:



A) Layered structure of hexagonal rings

- ☐ B) Cage-like structure
- ☐ C) Single-layer structure
- ☐ D) Amorphous structure

Explanation: Graphite consists of layers of carbon atoms arranged in hexagonal rings that can slide over each other, making it soft and slippery.

45

Buckminsterfullerene (C_{60}) consists of spheres made of atoms arranged in:

- ☐ A) Hexagons only
- ☒ B) Pentagons and hexagons
- ☐ C) Triangles only
- ☐ D) Squares and hexagons

Explanation: The fullerene molecule is shaped like a soccer ball, combining pentagons and hexagons to form a spherical cage.

46

Which allotrope of carbon is a single layer of carbon atoms arranged in a hexagonal pattern?

- ☐ A) Diamond
- ☐ B) Graphite
- ☒ C) Graphene
- ☐ D) Fullerene

Explanation: Graphene is essentially a single layer of graphite, known for being incredibly strong and flexible.

47

Elemental sulphur exists in two crystalline allotropic forms:



A) Rhombic and monoclinic



B) Diamond and graphite



C) O_2 and O_3



D) White and red

Explanation: Sulphur can crystallize into rhombic (more stable at room temperature) and monoclinic forms.

48

Which of the following is true about fullerene (C_{60})?



A) It has a high melting point



B) It is soluble in organic solvents



C) It conducts electricity well



D) It has unpaired electrons

Explanation: Fullerenes are covalent molecules, making them soluble in organic solvents, but they are not charged and have no unpaired electrons.

Solution, Colloidal Solution, and Suspension

49

A mixture in which solute particles completely homogenize in the solvent and cannot be seen by the naked eye is a:

- ☐ A) Suspension
- ☒ B) True solution
- ☐ C) Colloidal solution
- ☐ D) Heterogeneous mixture

Explanation: True solutions have particles at the molecular or ionic level, making them completely transparent and stable.

50

If a suspension is kept for some time, what happens to the solute particles?

- ☐ A) They dissolve completely
- ☒ B) They settle down
- ☐ C) They become invisible
- ☐ D) They pass through filter paper

Explanation: Suspended particles are large enough that gravity eventually pulls them down, causing them to settle at the bottom.

51

Which of the following will NOT pass through the pores of filter paper?

- ☐ A) True solution
- ☐ B) Colloidal solution
- ☒ C) Suspension
- ☐ D) Solvent

Explanation: Suspension particles are too large to pass through the tiny pores of standard filter paper and can be collected as residue.

52 In a colloidal solution, the solute particles:

- ☐ A) Settle down upon standing
- ☐ B) Are smaller than those in a true solution
- ☒ **C) Are large enough to scatter light but small enough to pass through filter paper**
- ☐ D) Are completely invisible under all conditions

Explanation: Colloidal particles are intermediate in size. They don't settle out and pass through filter paper, but they are large enough to scatter a beam of light (Tyndall effect).

53 Which of the following is a common example of a colloidal solution?

- ☐ A) Saltwater
- ☐ B) Chalk in water
- ☒ **C) Starch solution**
- ☐ D) Air

Explanation: Starch solution and egg white are classic examples of colloids, where the particles are dispersed but not truly dissolved.

54 A mixture of chalk in water is an example of:

- ☐ A) True solution
- ☒ **B) Suspension**
- ☐ C) Colloidal solution
- ☐ D) Homogeneous mixture

Explanation: Chalk does not dissolve in water; it forms a suspension that eventually settles down.

Solubility, Saturation, and Temperature Effects

55 A solution that can dissolve more solute at a particular temperature is called:

- ☐ A) Saturated solution
- ☒ **B) Unsaturated solution**
- ☐ C) Supersaturated solution
- ☐ D) Colloidal solution

Explanation: An unsaturated solution has not reached its maximum capacity for dissolving solute at that specific temperature.

56 A saturated solution is one in which:



A) No more solute can be dissolved at a particular temperature



B) The solute completely settles at the bottom



C) The solvent has evaporated



D) The concentration is zero

Explanation: At saturation, the solution is in dynamic equilibrium, and any additional solute added will simply remain undissolved.

57 If 36g of sodium chloride dissolves in 100g of water at 20°C to form a saturated solution, what is the solubility of NaCl at this temperature?



A) 20g/100g water



B) 36g/100g water



C) 100g/100g water



D) 136g/100g water

Explanation: Solubility is defined as the maximum grams of solute that can dissolve in 100g of solvent at a specific temperature. Here, it's 36g.

58

Why is the solubility of table sugar much higher than sodium chloride in water at 20°C?

☐ A) Sugar molecules are smaller than salt ions

☒ B) Sugar molecules are larger, so more water molecules can surround them

☐ C) Sugar is an inorganic compound

☐ D) Salt is an organic compound

Explanation: The text explains that sugar molecules are larger than salt ions, allowing more water molecules to surround and dissolve a single sugar molecule, resulting in higher solubility.

59

Generally, how does an increase in temperature affect the solubility of solids in liquids?

☐ A) It decreases

☒ B) It increases

☐ C) It remains exactly the same

☐ D) It fluctuates randomly

Explanation: For most solid solutes (like KNO_3 , AgNO_3), raising the temperature provides more kinetic energy to break the crystal lattice, increasing solubility.

60

Which of the following compounds shows a decrease in solubility with an increase in temperature?

☐ A) Potassium Nitrate (KNO_3)

☐ B) Sodium Chloride (NaCl)

☒ C) Lithium Carbonate (Li_2CO_3)

☐ D) Silver Nitrate (AgNO_3)

Explanation: The text explicitly states that compounds like lithium carbonate and calcium chromate decrease in solubility as temperature rises, unlike most other solids.

61

How does an increase in temperature affect the solubility of gases in water?

☐ A) It increases

☒ B) It decreases

☐ C) It stays the same

☐ D) It becomes infinite

Explanation: Higher temperatures give gas molecules more kinetic energy to escape the liquid phase, decreasing their solubility.

62

Why are soda water bottles stored in the refrigerator?



A) To increase the solubility of CO_2 gas



B) To decrease the solubility of CO_2 gas



C) To make the bottle colder to touch



D) To prevent the bottle from exploding

Explanation: Lower temperatures increase the solubility of gases. Storing soda in the fridge keeps the carbon dioxide dissolved in the water for longer.

63

The solubility of a solute is defined as the amount of solute that can dissolve in:



A) 100g of solvent at a particular temperature



B) 100g of solvent at any temperature



C) 1000g of solvent at boiling point



D) 1L of solvent at room temperature

Explanation: Solubility is a specific measurement: the maximum grams of solute per 100 grams of solvent at a given temperature.

64

Which of the following gases is more soluble in water at low temperatures?

☐ A) Oxygen

☒ B) Carbon dioxide

☐ C) Nitrogen

☐ D) Helium

Explanation: The text highlights that carbon dioxide is more soluble in water at low temperatures, which is why it stays fizzy in cold drinks.

65

If a saturated solution of sugar is heated, what happens to its solubility?

☐ A) It decreases

☐ B) It remains saturated

☒ C) It increases and can dissolve more sugar

☐ D) The sugar precipitates out

Explanation: Heating provides energy to overcome intermolecular forces, allowing the solvent to hold more solute than it could at room temperature.

66

The solubility curve of KNO_3 in water shows that its solubility:

- ☐ A) Decreases with temperature
- ☒ B) Increases significantly with temperature
- ☐ C) Remains constant regardless of temperature
- ☐ D) Is unaffected by temperature changes

Explanation: Looking at the graph provided, the curve for KNO_3 slopes steeply upwards, indicating a sharp increase in solubility as temperature rises.

67

Which of the following is a practical application of the variation of solubility with temperature?

- ☒ A) Purification of solids through crystallization
- ☐ B) Increasing gas solubility by boiling
- ☐ C) Separating mixtures using magnets
- ☐ D) Creating plasma

Explanation: By dissolving a solid at high temperature and then cooling it, the solubility drops, forcing the pure solid to crystallize out, leaving impurities behind.

68

What is the expected state of a solution if it contains more dissolved solute than a saturated solution at the same temperature?

☐ A) Unsaturated

☒ B) **Supersaturated**

☐ C) Precipitated

☐ D) Colloidal

Explanation: A supersaturated solution is an unstable state where more solute is dissolved than should normally be possible at that temperature, often achieved by cooling a saturated solution slowly.

More Practice Questions

69

Which of the following elements is created artificially in laboratories?

☐ A) Oxygen

☒ B) Technetium

☐ C) Iron

☐ D) Gold

Explanation: The text mentions Technetium as the first element created by scientists in a laboratory, as it is not found naturally on Earth.

70

Which of the following is a homogeneous mixture?

☐ A) Rock

☒ B) Air

☐ C) Chocolate

☐ D) Sand and water

Explanation: Air is a homogeneous mixture of gases (nitrogen, oxygen, etc.) that is uniform in composition throughout.

71 The particles in a colloidal solution are:

- ☐ A) Smaller than true solution particles
- ☐ B) Larger than suspension particles
- ☒ **C) Intermediate in size between true solution and suspension**
- ☐ D) Always visible to the naked eye

Explanation: Colloidal particles are larger than individual molecules/ions (true solution) but smaller than suspended particles that settle out.

72 In a suspension, the solute particles:

- ☒ **A) Do not dissolve and settle down upon standing**
- ☐ B) Dissolve completely
- ☐ C) Pass through filter paper
- ☐ D) Are invisible under a microscope

Explanation: Suspensions are heterogeneous mixtures where the large particles remain suspended temporarily but eventually settle due to gravity.

73

Which of the following is an example of a heterogeneous mixture?

- ☐ A) Saltwater
- ☐ B) Air
- ☒ C) Rock
- ☐ D) Sugar solution

Explanation: Rocks are made of different minerals with varying concentrations in different parts, making them heterogeneous.

74

What happens to the solubility of cerium sulfate when the temperature increases?

- ☐ A) It increases
- ☒ B) It decreases
- ☐ C) It remains constant
- ☐ D) It becomes zero

Explanation: The text mentions that some compounds, like cerium sulfate, show a decrease in solubility with an increase in temperature, contrary to the general trend.

75 Which of the following is a pure substance?

☐ A) Air

☐ B) Milk

☒ **C) Water (H_2O)**

☐ D) Tap water

Explanation: Water is a compound made of hydrogen and oxygen in a fixed ratio. Air, milk, and tap water are mixtures.

76 Which state of matter has the highest intermolecular forces?

☐ A) Gas

☐ B) Liquid

☒ **C) Solid**

☐ D) Plasma

Explanation: Solids have the strongest intermolecular forces, which hold the particles tightly in fixed positions.

77

Which branch of chemistry is used to predict and change the rates of reactions to optimize industrial processes?

☐ A) Analytical Chemistry

☒ B) Physical Chemistry

☐ C) Organic Chemistry

☐ D) Biochemistry

Explanation: Physical chemistry deals with reaction kinetics and thermodynamics, which are crucial for optimizing industrial manufacturing.

78

What is the primary difference between a compound and a mixture?

☐ A) Compounds are physically combined, mixtures are chemically combined

☒ B) Compounds have a fixed composition, mixtures can have variable compositions

☐ C) Mixtures are always homogeneous

☐ D) Compounds can be separated by physical means

Explanation: Compounds have a fixed ratio of elements bonded chemically, while mixtures can have any ratio of components physically combined.

79

The allotropic form of carbon that is a good conductor of electricity and used as a lubricant is:

- ☐ A) Diamond
- ☒ B) Graphite
- ☐ C) Fullerene
- ☐ D) Graphene

Explanation: Graphite's layered structure allows electrons to move freely between layers, making it a good conductor, and the layers can slide over each other, making it a good lubricant.

80

Which of the following is NOT a characteristic of a true solution?

- ☐ A) It is homogeneous
- ☐ B) Solute particles pass through filter paper
- ☒ C) Solute particles settle down upon standing
- ☐ D) Solute particles cannot be seen with the naked eye

Explanation: True solutions are stable, and their particles do not settle down over time. This is a characteristic of suspensions, not true solutions.

81

Which of the following is an example of an element?

- ☐ A) Water
- ☐ B) Carbon dioxide
- ☒ C) Copper wire
- ☐ D) Air

Explanation: Copper is a pure element (Cu). Water and carbon dioxide are compounds, and air is a mixture.

82

The "exotic state of matter" known as Bose-Einstein condensate occurs at:

- ☐ A) Extremely high temperatures
- ☒ B) Extremely low temperatures
- ☐ C) Room temperature
- ☐ D) Standard pressure

Explanation: Bose-Einstein condensates form when atoms are cooled to temperatures very close to absolute zero, causing them to clump together into a single quantum state.

83

What is the chemical symbol for the element Sodium?

☐ A) So☐ B) S☒ C) Na☐ D) Sn

Explanation: Sodium is represented by the symbol Na (from its Latin name, Natrium).

84

The solubility of a gas in a liquid is directly proportional to the pressure of the gas. This statement relates to:

☒ A) Henry's Law☐ B) Raoult's Law☐ C) Dalton's Law☐ D) Graham's Law

Explanation: Henry's Law states that the solubility of a gas in a liquid is directly proportional to the partial pressure of that gas above the liquid.

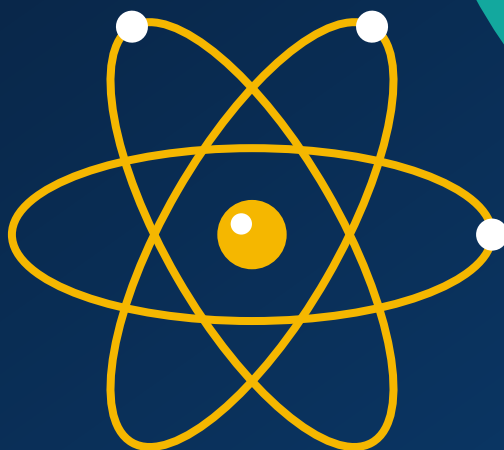
85

The process of separating a mixture based on differences in boiling points is called:

- ☐ A) Filtration
- ☒ B) Distillation
- ☐ C) Sublimation
- ☐ D) Crystallization

Explanation: Distillation involves heating a mixture to evaporate the component with the lower boiling point, then condensing it back into a liquid.

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Thank You!

You have completed all 85 MCQs of
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