5. COMPOUNDS AND MIXTURES
SOLUTIONS

TEACHING TASK

JEE MAINS LEVEL QUESTIONS
Mutliple Choice Question Type :

1. $CuSO_4$ is a ....
A)Element B)Compound C)Atom D)Mixture.

Answer:B

Solution: Copper sulfate ($CuSO_{4)}$ is a compound made of copper, sulfur, and oxygen atoms chemically bonded.

2. The ratio of hydrogen and oxygen in water by weight is
A)1:2 B)3:1 C)1:8 D)4:1

Answer:C

Solution:Water (H_2O) has a mass ratio of Hydrogen:Oxygen = 1:8

3. Which of the following represents a Mixture?
A)Ammonia B)Marble C)Gun powder D)Hydrogen chloride

Answer:C

Solution:Gunpowder is a mixture of potassium nitrate (KNO_3), charcoal (C), and sulfur (S).

4. ..... is a mixture of carbon, sulphur and nitre.
A) Gun-powder B)Brass C)Air D)Soil

Answer:A

Solution:Gunpowder contains carbon (charcoal), sulfur, and potassium nitrate (nitre).

5. When two substances A and B are powdered together in a pestle and mortar, a substance C with average properties is formed, it is
A)Mixture B)Compound C)Element D)None of these

Answer:A

Solution:If no chemical reaction occurs, it's a mixture (retains properties of A & B).
If a new substance forms, it's a compound (requires chemical bonding).

6 Which one of the following substances is a compound?
A)Iron B)Sodium chloride C) Hydrogen D)Oxygen

Answer:B

Solution:NaCl is a compound (chemically bonded Na^+ and Cl^- ions).

7. Which one of the following statements about compounds is correct?
A) The properties of a compound are the same as the properties of the elements of which it is made up.
B) The elements in a compound are always present in the same ratio.
C) At least one of the elements in a mixture must be a gas.
D) It is easy to separate a compound into the elements that it is made from

Answer:B

Solution:Law of Definite Proportions: Compounds have fixed element ratios (e.g.,

H_2O is always 2:1 H:O).
8. Why can't a mixture be represented by a chemical formula?
A)It is not made up of atoms. B)It is not chemically combined.
C)It becomes a new substance. D) It can not be identified.
Answer:B
Solution:Mixtures are physically mixed, not chemically bonded (e.g., air, saltwater).
Compounds have fixed formulas (e.g., CO_2)
9. Carbon, hydrogen and oxygen combine together to make
A) sugar B) polythene C) chalk D)common salt
Answer:A
Solution:Sugar (glucose) = C + H + O.
Others:
Polythene $\rightarrow$ Only C + H
Chalk $\rightarrow$ $CaCO_3$ (calcium, carbon, oxygen)
Common salt $\rightarrow$ NaCl (sodium + chlorine)
10. Calcium hydroxide is also called as:
A)Lime B)Quick lime C)Lime water D)Lemonade.
Answer:C
Solution:Calcium hydroxide ($Ca(OH)_2$) in water is called lime water.
Others:
Lime $\rightarrow$ CaO (calcium oxide, quicklime)
Lemonade $\rightarrow$ Citric acid + water (unrelated)

JEE ADVANCED LEVEL QUESTIONS

Mutli Correct Answer Type :

11. Choose the correct statement(s):
A)Gun-powder is mixture of carbon, sulphur and nitre.
B)Soft drinks are homogenous in nature.
C)Alloys form a homogenous mixture.
D)Water is a mixture.
Answer:A,B,C
Solution:A)Correct: Gunpowder is a heterogeneous mixture of charcoal (carbon), sulfur, and potassium nitrate (nitre).
B)Correct: Soft drinks (e.g., soda) are homogeneous mixtures (uniform composition, but can be separated physically).
C)Correct: Alloys (e.g., brass, steel) are solid homogeneous mixtures of metals.
D)Incorrect: Water (H_2O) is a pure compound, not a mixture.
12. Among the following, Compounds are :
A)S_8 B)O_2 C)H_2O D)CO_2
Answer:C,D
Solution:C) H_2O (Water):A compound made of hydrogen and oxygen chemically bonded.
D) CO_2 (Carbon dioxide):A compound made of carbon and oxygen chemically bonded.

Statement Type :

A) Statement-I, is True, Statement - II is True; Statement - II is a correct explanation for Statement-I

B) Statement - I is True, Statement is True; Statement -II is NOT a correct explanation for Statement - I

C) Statement - I is True, Statement - II , is False

D) Statement - I is False, Statement - II is True

13. Statement I : One molecule of sulphur dioxide has one atom of sulphur and two atoms of oxygen.

Statement II : Formula of compound tells the elements and number of atoms of each element in the compound.

Answer:A

Solution:Statement I is TRUE: SO_2 indeed contains 1 S atom and 2 O atoms.

Statement II is TRUE: Chemical formulas show the elements and their atomic ratios.

Does II explain I? YES: The formula SO_2 (mentioned in II) directly explains the atomic composition stated in I.

14. Statement I : The constituents of mixture retain their individual properties.

Statement II : The constituents do not undergo chemical change in a mixture.

Answer:A

Solution:

Statement I is TRUE: In mixtures (e.g., saltwater), components keep their properties (salt stays salty, water stays wet).

Statement II is TRUE: Mixtures involve physical mixing, not chemical bonding.

Does II explain I? YES: Because no chemical change occurs (II), the properties remain unchanged (I).

15. Statement I : Air is a mixture of several gases.

Statement II : The composition of air changes from place to place.

Answer:B

Solution:Statement I is TRUE: Air = N_2 + O_2 + CO_2 + others (a mixture).

Statement II (assumed): "Air can be separated by fractional distillation." $\rightarrow$ TRUE.

Does II explain I? YES: Separability by physical methods (II) confirms it's a mixture (I).

Comprehension Type :

Comprehension - I:

Compounds are always composed of two or more elements in fixed ratio.

16. Which of the following is not a compound?

A)Marble B)Washing soda C)Quick lime D)Coal.

Answer:D

Solution:Coal is not a compound; it is a mixture of carbon, hydrocarbons, and other organic/inorganic impurities.

Comprehension - II:

If two or more elements are mixed in any ratio , do not undergo chemical change ,but retains their properties to form mixture.

17. The constituents of compound can be seperated by:

A)Solubility B)Filtration C)Electrolysis D)Magnetic seperation

Answer:C

Solution:Compounds are chemically bonded, so they require chemical methods like electrolysis (e.g., splitting H_2O into H_2 and O_2).

18. The constituents of mixture can be seperated by

A)Electrolysis B)Distillation C)Evaporation D)Both B and C

Answer:D

Solution: Mixtures are physically combined, so physical methods work:

B) Distillation (e.g., separating alcohol and water).

C) Evaporation (e.g., obtaining salt from seawater).

Integer Type

19. The number of oxygen atoms present in sugar .....

Answer:11

Solution:The number of oxygen atoms present in a molecule of table sugar (sucrose) is 11. The chemical formula for sucrose is $C_{12}H_{22}O_{11}$, indicating that each molecule contains 12 carbon atoms, 22 hydrogen atoms, and 11 oxygen atoms

Matrix Matching Type:

20.

Column - I	Column - II
A)Nitrogen dioxide	i) CH_4
B)Steam	ii) CO
C)Carbon monoxide	iii) H_2O
D)Methane	iv) NO_2

Answer:A-iv,B-iii,C-ii,D-i

Solution:

A)Nitrogen dioxide	iv) NO_2
B)Steam	iii) H_2O
C)Carbon monoxide	ii) CO
D)Methane	i) CH_4

LEARNERS TASK

CONCEPTUAL UNDERSTANDING QUESTIONS (CUQ's)

Mutliple Choice Question Type :

1. A mixture in which constituents are not mixed uniformly is called .....

A)Homogenous mixture B)Compound C)Heterogenous mixture D)Element

Answer:C

Solution:In a heterogeneous mixture, the components are not evenly distributed.

2. Which of the following is a compound?

A)Hydrogen B)Water C)Chlorine D)Helium

Answer:B

Solution:Water (H_2O) is a compound made from hydrogen and oxygen chemically combined in a fixed ratio.

3. Pure substances are ..... in nature.

A)Homogenous B)Heterogenous C)Mixture D)Both B and C.

Answer:A

Solution:Pure substances (elements or compounds) are uniform in composition, hence homogeneous.

4. Two or more substances are mixed in indefinite ratio and do not undergo chemical change are called....

A)Element B)Mixture C)Compound D)Both A and B.

Answer:B

Solution:Mixtures have no fixed ratio and no chemical change occurs between the components.

5. An example of compound is

A)H_2O B)CO C)SO_2 D)All the above.

Answer:D

Solution:H_2O (Water), CO (Carbon monoxide), and SO_2 (Sulphur dioxide) are all compounds.

6. Mixtures are the substances obtained by mixing two or more substances in .....proportion.

A)Fixed B)Definite C)Any D)Percentage.

Answer:C

Solution:Mixtures can be made in any proportion.

7. Chemical formula of methane is

A)CO B)CH C)CH_4 D)CH_5

Answer:C

Solution:Methane consists of 1 carbon and 4 hydrogen atoms.

8. Molecular formula of water is

A)HO B)H_2O C) H_2O_2 D)HO_2.

Answer:B

Solution:Water is made of 2 hydrogen and 1 oxygen atom.

9. Water is a .....

A)Element B)Compound C)Mixture D)Atom.

Answer:B

Solution:Water is a compound formed by the chemical combination of hydrogen and oxygen.

10. Formula of sulphuric acid

A) H_2SO_3 B)H_2SO C)H_2SO_4 D)HCl.

Answer:C

Solution:Sulphuric acid has the chemical formula H_2SO_4.

JEE MAINS LEVEL QUESTIONS

Mutliple Choice Question Type :

1. Which of the following are compounds?

A)HgS B)CO C)HCl D)All the above

Answer:D

Solution:HgS (Mercury sulfide), CO (Carbon monoxide), and HCl (Hydrogen

chloride) are all compounds (chemically bonded elements).
2. Air is a
A)Compound B)Mixture C)Symbol D)Element.
Answer:B
Solution:Air is a homogeneous mixture of gases (N_2, O_2, CO_2, etc.).
3. Mixtures may be
A)Homogenous B)Heterogenous C)Compound D)Both A and B
Answer:D
Solution:Homogeneous: Uniform composition (e.g., saltwater).
Heterogeneous: Non-uniform composition (e.g., sand + iron filings).
4. Water is a compound because
A)It is homogenous
B)The constituents of water cannot be seperated by physical means.
C)Hydrogen and Oxygen in water are in the ratio 1:8 by weight
D)All the above.
Answer:D
Solution:Water is:Homogeneous
Cannot be separated by physical methods
Has a fixed ratio of hydrogen to oxygen (2:16 by mass $\rightarrow$ 1:8)
5. Potassium nitrate is also known as
A)Acid B)Nitre C)Water D)Soda ash.
Answer:B
Solution:Potassium nitrate (KNO_3) is commonly called nitre or saltpetre.
6. ..... gas dissolved in water is called carbonated water.
A)Methane B)Oxygen C)Carbon-dioxide D)Sulphur dioxide.
Answer:C
Solution:Carbonated water is water with CO_2 gas dissolved under pressure.
7. Iron can be separated by the mixture of iron and sulphur by:
A)Filtration B)Evaporation C)Magnet D)Distillation.
Answer:C
Solution:Iron is magnetic; magnet can separate it from sulfur.
8. Syrup is a mixture of ..... in water.
A)Sugar B)Salt C)Carbon D)Nitrogen.
Answer:A
Solution:Syrup = Sugar + Water (a homogeneous mixture)
9. Hydrogen and Chlorine elements are combined chemically and forms
A)Hydrogen peroxide B)Hydrogen chloride C)Water D)All the above.
Answer:B
Solution:$H_2 + Cl_2 \rightarrow 2HCl$ (Hydrogen chloride, a compound)
10. What two elements make up common table salt?
A) Sodium and oxygen B) Sodium and hydrogen
C) Chlorine and hydrogen D) Chlorine and sodium
Answer:D
Solution:Table salt = Sodium chloride (NaCl)
Made from sodium (Na) and chlorine (Cl).

JEE ADVANCED LEVEL QUESTIONS

Mutli Correct Answer type :

11. Which of the following are Mixtures?
A)Soil B)Common salt C)Brass D)Water

Answer:A,C

Solution: A) Soil:Soil is a heterogeneous mixture of minerals, organic matter, and air.
C) Brass:Brass is a homogeneous mixture (alloy) of copper and zinc.
B) Common salt (NaCl): It is a compound, not a mixture.
D) Water (H_2O):It is a pure compound

12. Which of the following are common names of calcium carbonate?
A) Marble B)Limestone C)Lime water D)Chalk.

Answer:A,B,D

Solution: A) Marble:Marble is a form of $CaCO_3$ (calcium carbonate).
B) Limestone:Limestone primarily consists of $CaCO_3$.
D) Chalk:Chalk is also composed of $CaCO_3$.
C) Lime water:Lime water is $Ca(OH)_2$ (calcium hydroxide), not calcium carbonate.

13. Which of the following compounds contain three elements?
A)Nitric acid B)Nitrous acid C)Sulphuric acid D)Sulphurous acid.

Answer:A,B,C,D

Solution:A) Nitric acid (HNO_3) $\rightarrow$Contains hydrogen, nitrogen, oxygen.
B) Nitrous acid (HNO_2) $\rightarrow$Contains hydrogen, nitrogen, oxygen.
C) Sulphuric acid (H_2SO_4) $\rightarrow$ Contains hydrogen, sulfur, oxygen.
D) Sulphurous acid (H_2SO_3) $\rightarrow$Contains hydrogen, sulfur, oxygen.

Comprehension Type :

Compounds are always composed of two or more elements in fixed ratio.

14. In CO_2, How many types of elements are present?
A)2 B)3 C)4 D)5

Answer:A

Solution: CO_2 contains:1 Carbon atom (C),2 Oxygen atoms (O)

Integer Type :

15 Mixture is classified into ..... types.

Answer:2

Solution: Mixtures are classified into:
Homogeneous (uniform composition, e.g., saltwater).
Heterogeneous (non-uniform composition, e.g., sand + iron filings).

16. How many parts by weight of oxygen burn with one part of hydrogen (by weight) to form water ?....

Answer:8

Solution: Water (H_2O) has a mass ratio of Hydrogen:Oxygen = 1:8.

17. How many oxygen atoms present in sulphur dioxide?.....

Answer:2

Solution:Sulphur dioxide formula = SO_2 $\rightarrow$1 S atom + 2 O atoms.

18. The number of hydrogen atoms present in methane.....

Answer:4

Solution: Methane formula = $CH_4 \rightarrow 1$ C atom + 4 H atoms.

Matrix Matching Type :

19. Column - I Column - II

A)Homogenous mixture i) Water

B)Heterogenous mixture ii) Brass

C)Alloy iii) Sugar+Water

D)Compound iv) Oil+Water.

Answer:A-iii,B-iv,C-ii,D-i

Solution:

A)Homogenous mixture iii) Sugar+Water

B)Heterogenous mixture iv) Oil+Water.

C)Alloy ii) Brass

D)Compound i) Water

KEY

			TEACHING TASK						
			JEE MAINS LEVEL QUESTIONS						
1	2	3	4	5	6	7	8	9	10
B	C	C	A	A	B	B	B	A	C
			JEE ADVANCED LEVEL QUESTIONS						
11	12	13	14	15	16	17	18	19	
A,B,C	C,D	A	A	B	D	C	D	11	
20									
A-iv,B-iii,C-ii,D-i									
			LEARNERS TASK						
			CUQ'S						
1	2	3	4	5	6	7	8	9	10
C	B	A	B	D	C	C	B	B	C
			JEE MAINS LEVEL QUESTIONS						
1	2	3	4	5	6	7	8	9	10
D	B	D	D	B	C	C	A	B	D
			JEE ADVANCED LEVEL QUESTIONS						
11	12	13	14	15	16	17	18	19	
A,C	A,B,D	A,B,C,D	A	2	8	2	4	A-iii,B-iv,C-ii,D-i	