4. ELEMENTS - METALS, NON-METALS, METALLOIDS AND NOBLE GASES SOLUTIONS

TEACHING TASK

JEE MAINS LEVEL QUESTIONS

Mutliple Choice Question Type :

1. Which of the following is liquid metal at room temperature?
A) Zinc B)Mercury C)Silver D)Copper
Answer:B
Solution:Mercury is the only liquid metal at room temperature.
2. Which of the gases are colourless?
A) Hydrogen B)Nitrogen C)Oxygen D)All the above
Answer:D
Solution:Hydrogen, Nitrogen, and Oxygen are all colorless gases.
3. Tellurium is a
A)Metal B)Non-metal C)Metalloid D)Noble gas
Answer:C
Solution:Tellurium is classified as a metalloid (shows properties of both metals and non-metals).
4. A liquid metal at room temperature is
A)Gallium B)Magnesium C)Mercury D)Both A and C
Answer:D
Solution:Both Gallium (melts just above room temperature) and Mercury are liquid metals at or near room temperature.
5. ..... is the nonmetal which is good conductor of electricity
A) Iodine B)Nitrogen C) Graphite D)Diamond
Answer:C
Solution:Graphite is a non-metal that conducts electricity due to its layered carbon structure.
6. Which metal is neither malleable nor ductile ?
A)Zinc B)Copper C)Silver D)Gold
Answer:A
Solution:Zinc is brittle and thus neither malleable nor ductile compared to Copper, Silver, and Gold.
7. If a substance breaks easily, it is said to be _____.
A) Magnetic B)Conductive C) Brittle D) Ductile
Answer:C
Solution:A substance that breaks easily is called brittle.
8. Which of the following is an element?
A) Calcium oxide B)Common salt C)Ozone D)Water
Answer:C

Solution:Ozone (O_3) is an element (a form of oxygen), while the others are compounds.

9. Which of the following has low melting point?

A)Magnesium B)Sodium C)Manganese D) Calcium

Answer:B

Solution:Sodium has a relatively low melting point (98°C) compared to the other metals listed.

10. Which among the following are bad conductors of electricity?

A)Zinc B)Copper C)Aluminium D)Phosphorus

Answer:D

Solution:Phosphorus is a non-metal and a poor conductor of electricity, unlike Zinc, Copper, and Aluminium (which are metals and good conductors).

JEE ADVANCED LEVEL QUESTIONS

Mutli Correct Answer Type :

11. Which of the following are polyatomic elements?

A)Ozone B)Phosphorus C)Sulphur D)Boron

Answer:A,B,C

Solution:A) Ozone (O_3)

B) Phosphorus (P_4)

C) Sulphur (S_8)

D) Boron (B) – Boron is monoatomic in its standard state.

12. For which of the following elements atomicity is same?

A)Hydrogen B)Oxygen C)Nitrogen D)Chlorine.

Answer:A,B,C,D

Solution:Hydrogen,Oxygen, Nitrogen, and Chlorine are diatomic (atomicity = 2).

13. Which of the following are true?

A)Graphite is non-metal

B)Mercury is liquid metal at room temperature.

C) Iodine is solid

D)Bromine is liquid non-metal at room temperature.

Answer:A,B,C,D

Solution:Graphite is a non-metal but an exception due to its conductivity.

Mercury (Hg) is the only liquid metal at room temperature.

Iodine (I_2) is a solid that sublimes.

Bromine (Br_2) is the only liquid non-metal at room temperature.

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

14. Statement I : Mercury and Gallium are liquids at room temperature.

Statement II : Sodium, Potassium do not have high melting points.

Answer:B

Solution:
Statement I: True
Mercury (Hg) is a liquid at room temperature (about 25°C). Gallium (Ga) melts slightly above room temperature (~29.8°C), but in the palm of your hand or during a warm day, it becomes liquid. So it's often considered liquid near room temperature.
Statement II: True
Sodium and potassium are alkali metals with low melting points (Sodium ~98°C, Potassium ~63°C). So this statement is also true.
15. Statement I : The molecule of a monoatomic element contains only one atom.
Statement II : The number of atoms present in one molecule of an element is called its Atomicity.
Answer:A
Solution:
Statement I:Monoatomic elements (e.g., Noble gases like He, Ne, Ar) exist as single atoms (correct).
Statement II:Atomicity is indeed defined as the number of atoms in one molecule of an element (correct).
Example: O_2 (atomicity = 2), P_4 (atomicity = 4).
Relationship:Statement II correctly explains why Statement I is true (monoatomic = atomicity = 1).

Comprehension Type :

Metalloids are the elements which exhibits the properties of both metals and non-metals.Metals are ductile,malleable,lustre in nature.Non-metals are non-lustre,non-ductile and non-malleable in nature.
16. Which of the following are metalloids?
A)Boron B)Beryllium C)Manganese D)Neon.
Answer:A
Solution:Metalloids are elements that exhibit properties of both metals and non-metals.
The classic metalloids are: Boron (B), Silicon (Si), Germanium (Ge), Arsenic (As), Antimony (Sb), and Tellurium (Te).
Boron is a well-known metalloid, while the other options are either pure metals (Beryllium, Manganese) or non-metals (Neon).

Integer Type :

17. Atomicity of sulphur is .....
Answer:8
Solution:Sulphur exists as S_8 molecules (8 atoms bonded in a ring structure). Hence, its atomicity = 8.
18. Elements are classified into ..... types.
Answer:4
Solution:Elements are classified into 4 types. They are
i) Metals ii) Non metals iii) Metalloids iv) Noble gases.

Matrix Matching Type:

19.

Column - I	Column - II
a) Metal	i) Bromine
b) Non-metal	ii) Iodine
c) Liquid nonmetal	iii) Graphite
d) Lustrous nonmetal	iv) Potassium
	v) Hydrogen

Answer:a-iv,b-i,ii,iii,v,c-i,d-ii,iii

Solution:

a) Metal	iv) Potassium
b) Non-metal	i) Bromine,ii) Iodine, iii) Graphite,v) Hydrogen
c) Liquid nonmetal	i) Bromine
d) Lustrous nonmetal	ii) Iodine,iii) Graphite

20. Column - I	**Column - II**
A)Monoatomic elements	i) Phosphorus
B)Diatomic elements	ii) Ozone
C)Triatomic elements	iii) Oxygen
D)Tetra atomic elements	iv) Silver
	v)Copper.

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

Solution:

A)Monoatomic elements	v)Copper,iv) Silver
B)Diatomic elements	iii) Oxygen
C)Triatomic elements	ii) Ozone
D)Tetra atomic elements	i) Phosphorus

LEARNERS TASK

CONCEPTUAL UNDERSTANDING QUESTIONS (CUQ's)

Mutliple Choice Question Type :

1. Atomicity of Ozone is:

A) 2 B) 1 C) 3 D)4

Answer:C

Soluion:Ozone is O_3 (3 oxygen atoms bonded together).

2. Which of the following is noble gas?

A)H B)He C)O D)Li

Answer:B

Soluion:Helium (He) is a noble gas.

3. Which of the following is non-metal?

A) Iron B) Calcium C) Nitrogen D)Aluminium.

Answer:C

Soluion:Nitrogen (N) is a non-metal; others are metals (Iron, Calcium, Aluminium).

4. He,Ne,Ar,.... are known as

A) Rare gases B)Inert gases C)Noble gases D)All the above.

Answer:D

Soluion:He,Ne,Ar are called Noble gases, Inert gases, and Rare gases

5. Which of the following is characteristic of nonmetal?

A)Non-lustrous B)Bad conductor C)Non-ductile D)All the above.

Answer:D

Soluion:Non-metals are non-lustrous, bad conductors, and non-ductile.

6. Which of the following is diatomic molecule?

A)Phosphorus B)Ozone C)Oxygen D)Copper.

Answer:C

Soluion:Oxygen exists as O_2 (diatomic); others are:
Phosphorus (P_4, polyatomic),
Ozone (O_3, triatomic),
Copper (monoatomic).

7. Atomicity of Phosphorus

A)3 B)2 C)4 D)8

Answer:C

Soluion:Phosphorus exists as P_4 (4 atoms in a tetrahedral structure).

8. Elements which exhibits some properties of metals and nonmetals are called

A)Metals B)Non-metals C) Metalloids D)Noble gases.

Answer:C

Soluion:Elements which shows both metallic and nonmetallic properties are called Metalloids.

9. Bromine is a

A)Liquid metal B)Liquid non-metal C)Liquid metalloid D)None of these.

Answer:B

Soluion:Bromine (Br_2) is the only liquid non-metal at room temperature.

10. Which of the following is a metalloid?

A)Po B)He C)H D)N

Answer:A

Soluion:Polonium is sometimes classified as a metalloid, but more commonly as a metal due to its conductivity and appearance.

JEE MAINS LEVEL QUESTIONS

Mutliple Choice Question Type :

1. Which of the following are chemically inert?

A) All metals B)All non-metals C)All metalloids D)Noble gases

Answer:D

Solution:Noble gases (He, Ne, Ar, etc.) are chemically inert due to their stable electron configuration.

2. Which of the following are metalloids?

A)Boron B)Nitrogen C)Sulphur D)Neon

Answer:A

Solution:Boron is a metalloid; others are non-metals (Nitrogen, Sulphur, Neon).
3. Germanium is a .....
A)Metal B) Gas C)Liquid D)Metalloid
Answer:D
Solution:Germanium (Ge) exhibits properties of both metals and non-metals.
4. Which of the following is pair of soft metals?
A)Sodium, Potassium. B)Potassium, Magnesium
C)Magnesium, Calcium. D)Calcium,Manganese.
Answer:A
Solution: Sodium, Potassium ,Both are alkali metals and are soft enough to be cut with a knife.
5. Non-metals are generally
A) Liquids B)Gases C)Solids and Gases. D)Gases and Liquids
Answer:C
Solution:Non-metals exist as solids (Sulphur, Phosphorus) and gases (Oxygen, Nitrogen).
Bromine is the only liquid non-metal.
6. All metals are solids except
A) Sodium B)Calcium C)Mercury D)Hydrogen.
Answer:C
Solution:Mercury (Hg) is the only liquid metal at room temperature.
7. If a metal is _____ it can be drawn into a wire
A) Conductive B) Malleable C)Magnetic D) Ductile
Answer:D
Solution:Ductility is the ability to be stretched into wires.
8. Ringing bells in the temples are made up of
A) Non-Metals B)Metalloids C) Metals D) None of the above
Answer:C
Solution:Bells are made of metals (e.g., bronze) because metals are sonorous (produce sound).
9. The atomicity of which among the following is maximum?
A) Helium B)Flourine C)Ozone D)Sulphur
Answer:D
Solution:Sulphur (S_8, atomicity=8) > Ozone (O_3, 3) > Fluorine (F_2, 2) > Helium (He, 1).
10. The property of elements producing sound is called as
A)Sonorous B)Ductile C)Metalloids D)Malleable.
Answer:A
Solution:Metals are sonorous (produce ringing sound when struck).

JEE ADVANCED LEVEL QUESTIONS

Mutli Correct Answer Type:

11. Which of the following are characteristics of metal?
A)They are malleable B)They are ductile
C)They have non- lustre. D)They have high melting point and boiling point.
Answer:A,B,D
Solution:Metals are lustrous, ductile and malleable in nature.It has high melting

and boiling point.

Comprehension Type :

Comprehension - I :

Generally elements exist in single atom,sometimes two or more atoms of an element combine with one another to form compound.

12. Identify which of the following is monoatomic element?

A)Ozone B)Phosphorus C)Nitrogen D)Silver

Answer:D

Solution:Silver exists as individual atoms (Ag) in its natural state, making it monoatomic.

13. The molecule which contains two atoms is called..... molecule.

A)Monoatomic B)Diatomic C)Triatomic D)Polyatomic

Answer:B

Solution:Diatomic = 2 atoms (e.g., O_2, N_2).

Comprehension - II :

Metalloids are the elements which exhibits the properties of both metals and non-metals.Metals are ductile,malleable,lustre in nature.Non-metals are non-lustre,non-ductile and non-malleable in nature.

14. Metals are

A)Non-ductile B)Non-malleable C)Ductile D)Bad conductor of electricity.

Answer:C

Solution:Metals are ductile,malleable,lustre in nature and good conductor of electricity.

Integer Type :

15. Atomicity of sulphur is .....

Answer:8

Solution:Sulphur exists as S8 molecules (8 atoms in a ring structure).

16. Elements are classified into ..... types.

Answer:4

Solution:Elements are classified into 4 types. They are

i) Metals ii) Non metals iii) Metalloids iv) Noble gases.

17. Among Helium, Hydrogen,Neon,Nitrogen and Argon. How many are inert gases?.....

Answer:3

Solution:Inert gases (Noble gases): Helium (He), Neon (Ne), Argon (Ar) $\rightarrow$ 3

Non-inert gases: Hydrogen (H_2), Nitrogen (N_2) $\rightarrow$ Reactive

KEY

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