UNIT 8: Model of Matter - Atoms and Molecules

Section: A

1. C	**7.** A	**13.** A	**19.** C	**25.** B
2. D	**8.** B	**14.** A	**20.** C	**26.** D
3. D	**9.** B	**15.** D	**21.** B	**27.** B
4. B	**10.** C	**16.** B	**22.** C	**28.** A
5. C	**11.** A	**17.** B	**23.** C	
6. B	**12.** C	**18.** B	**24.** D	

Section: B

1. **(a)** The chemical formula of a molecule shows the number and types of atoms contained in it. Chemical formula is used to represent a molecule of an element or a compound.

(b) The number of protons in an atom is called the proton number.

2. **(i)** 12, Sodium

(ii) 18.5, Chlorine

(iii) 20, Potassium

(iv) 8, Oxygen

(v) 12, Magnesium

(vi) 10, Fluorine

(vii) 4, Lithium

3. (a) Carbon, Oxygen – 3

(b) Nitrogen, Hydrogen – 4

(c) Calcium, Carbon, Oxygen – 5

(d) Magnesium, Sulfur, Oxygen – 6

(e) Iron, Oxygen – 5

4. (a) O_2

(b) CO_2

(c) Cu

(d) H_2O

(e) NaCl

5. The atom changes to an atom of a different element when its proton number changes. E.g. Oxygen's proton number is 8. If it changes to 9 then the atom is no longer oxygen, it becomes fluorine.

6. (a) KNO_3 - Elements: Potassium(K), Nitrogen(N), Oxygen(O)

No of atoms in each molecule: 5

(b) $Ca(OH)_2$ - Elements : Calcium(Ca), Oxygen(O), Hydrogen(H)

No of atoms in each molecule: 5

(c) $NaC_2H_3O_2$ - Elements: Sodium(Na), Carbon(C), Hydrogen(H), Oxygen(O)

No of atoms in each molecule: 8

(d) $(NH_4)_2CO_3$ - Elements: Nitrogen(N), Hydrogen(H) Carbon(C), Oxygen(O)

No of atoms in each molecule: 14

7.

Element	*Chemical symbol*	*Number of protons in each atom*
Lithium	Li	3
Bromine	Br	35
Helium	He	2
Magnesium	Mg	12
Copper	Cu	29

8. protons; electrons; position; same

9.

	Protons	*Neutrons*	*Electrons*	*Name of the element*
(i)	26	30	26	Iron
(ii)	53	74	53	Iodine
(iii)	2	2	2	Helium
(iv)	20	20	20	Calcium
(v)	78	117	78	Platinum

10. (a) All three substances are gases.
All three substance exist as molecules.

(b) Substances A and B have molecules that are made of the same type of atoms.
Substance C have molecules that contains atoms from substances A and B.

(c) Substance A - Oxygen (O_2)
Substance B - Hydrogen (H_2)
Substance C - Water (H_2O)

11. (a)

Particle	*Number of particles in one atom*	*Name of the particle*	*Relative mass of particle*	*Relative charge on particle*
×	6	electron	$\frac{1}{1837}$ (negligible)	–
●	6	neutron	1	0
○	6	proton	1	+

(b) The number of protons (positive charge) is equal to the number of electrons (negative charge).

12 (a)

Carbon	*Nitrogen*
Electrons - 6	Electrons - 7
Protons - 6	Protons - 7
Neutrons - 6	Neutrons - 7

(b) Both are non-metals
They both have the same number for each of the three different type of particles in each atom.

(c) Carbon is a solid at room temperature.
Nitrogen is a gas at room temperature.

(d) When carbon gains one more proton, it becomes the colourless nitrogen gas.
*[One element cannot be changed to another element easily.]

13. (a) A molecule is a group of two or more atoms that are chemically joined together.

(b) Particle X represents a molecule of a compound as it is made of two different types of atoms. [A compound is a substance which is made of two or more different types of atoms.]

(c) Particle Y represents ozone as it has 3 atoms of oxygen which matches the chemical formula O_3.

14. (a) 22 protons

(b) P is carbon and Q is oxygen. The chemical formula is CO_2.

(c) Carbon dioxide

15. (a) The metal is in solid state.

(b) The atoms are closely packed and arranged in an orderly manner which is characteristic of solids.

(c) (i) True
(ii) True
(iii) False
(iv) True
(v) True

16.

	Chemical formula of the compound	*Name of the compound*	*Symbol of the elements present in the compound*	*Name of the elements in the compound*
(i)	$CuSO_4$	Copper (II) Sulfate	Cu, S, O	Copper, Sulfur, Oxygen.
(ii)	Fe_2O_3	Iron (III) Oxide	Fe, O	Iron, Oxygen
(iii)	H_2SO_4	Sulfuric acid	H, S, O	Hydrogen, Sulfur, Oxygen
(iv)	$MgCl_2$	Magnesium chloride	Mg, Cl	Magnesium, Chlorine
(v)	KNO_3	Potassium nitrate	K, N, O	Potassium, Nitrogen, Oxygen

17. P - phosphorus
Na - Sodium
K - Potassium
Ag - Silver
Sn - Tin

Section: C

1. (a) A - Electron
B - Neutron
C - Proton

(b) A - Negative charge (–ve)
B - Neutral
C - Positive charge (+ve)

2. (a) Proton Number or atomic number
(b) Nucleon Number or mass number
(c) Number of protons - 11
Number of neutrons - 12
Number of electrons - 11

3. (a) A molecule is a group of two or more atoms chemically joined together.
(b) The two types of molecules are :
molecule of an element e.g H_2, O_2
molecule of a compound e.g CO_2, H_2O

4. (a) (i) Calcium hydroxide
(ii) Sulfuric acid
(iii) Magnesium chloride
(iv) Zinc carbonate
(v) Sodium chloride
(b) (i) $FeSO_4$
(ii) CuO
(iii) KNO_3
(iv) NH_4Cl
(v) $PbCO_3$