**Chapter 3**

**Atoms and Molecules**

1. The atomic number of three elements A, B and C are 9, 10 and 13 respectively, which of them forms a Cation and why?
2. Carbon dioxide collected from different sources contains carbon and oxygen in the same proportion. Which law of chemical combination governs this? State the law.
3. Two elements B and C combine to form BC in the ratio 1: 35.5 by mass. What mass of C will combine with 2 grams of B?
4. What do you understand by the statement” relative atomic mass of sulphur is 33”?
5. Calcium salt of a hypothetical anion B has the molecular formula Ca3B2.What is the valency of B and what would be the molecular formula of aluminium salt of B?
6. How many molecules are present in 12 gm of H2O?
7. Give the formulae of the compounds formed from the following sets of elements
8. Calcium and fluorine
9. Nitrogen and hydrogen
10. Which of the following symbols of elements are incorrect? Give their correct symbols.
11. Copper CU
12. Sulphur s
13. Sodium So
14. You are provided with a fine white powder which is either sugar or salt. How will you be able identify without tasting it?
15. Calculate the moles of hydrogen chloride that will be produced when 2 moles of hydrogen reacts completely with excess of chlorine.
16. Calculate the number of molecules in 4 g of methane. (Atomic mass of C= 12u, H=1u)
17. State any four postulates of Dalton’s atomic theory of matter. Which of his postulates does not hold correct at present?
18. Differentiate between anion and cation.
19. Find the number of moles in
20. 132g of carbon dioxide
21. 24.088 X 1023number of carbon dioxide
22. If there is an element Y and has a valency 1.
23. Write the chemical formula of its carbonate
24. Write the chemical formula of its chloride
25. What is element Y i.e. metal or non-metal?
26. Define the following terms
27. Molecule
28. Ion
29. Mole
30. Atomic mass unit.
31. Avogadro’s number
32. What is mass of :
33. 0.4 mole of oxygen atom
34. 0.6mole of water molecule
35. Verify the given statements with the help of calculation
36. 4 moles of CO2 and 4 moles of water do not have the same mass
37. 240 grams of calcium and 240 grams of magnesium elements have a mole ratio of 3:5.
38. What do you understand molecular formula? With the help of example state the information that can be derived from molecular formula
39. a) Differentiate between atoms and molecules.

b) why does not atomic mass of an element represent the actual mass of the atoms

c) ‘The atomic mass of an element is in fraction? What does the mean?

1. Ram took 4moles of Na and Shyam took 4 moles of Fe atoms in different containers of same weight. (At. Mass of Na=23u, Fe=56u)
2. Which container is heavier?
3. Which container has more number of atoms
4. What is the relationship between mole, mass and Avogadro’s number?
5. Multiple choice questions

A. Which of the following statement is not true about an atom?

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D. The chemical symbol of nitrogen gas is

a) Ni b)N2 c)Ne d)N

1. The chemical symbol of sodium is
2. So b)Sd c)NA d)Na
3. Which of the following would weigh the highest?

a)0.2 moles of sucrose b)2 moles of CO2 c)2 moles CaCO3  d)10 moles of H2O

1. Which of the following has maximum number of atoms?

a)18 g of H20 b)18g of O2 c)18g of CO2 d)18g of CH4

1. Which of the following contains maximum number of molecules?
2. 1g of CO2  b)1g of N2 c) 1g of H2  d)1g of CH4
3. A change in the physical state can be brought about
4. only when energy is given to the system b)only when energy is taken out of system c)when energy is given or taken out from the system d)without any energy change

**Chapter 4**

**Structure of Atom**

1. How many electrons can be present in the first shell of an atom?
2. Which charge is present in the nucleus of an atom?
3. Is it possible for an atom to have one proton, one neutron and one electron, if yes give an example.
4. Even though the isotopes of an element have same atomic number they have different physical properties, why?
5. How many electrons will be present in K, L and M energy shells of atoms of elements with atomic number i) 13 and ii) 16.
6. What is the name given to an element having 8 electrons in its valence shell?
7. Even though the Helium atom has 2 electrons in its valence shell its valency is not 2, explain.
8. What is the name given to pair of elements having different atomic number but same mass number?
9. What is the number of valence electrons in
10. Potassium ion K+
11. Chlorine ion Cl--
12. Differentiate an isotope from an isobar.
13. If an element X has mass number 24 and atomic number 11, how many neutrons does an atom contain?
14. If an atoms has 6 electrons and 7 neutrons. What would be the atomic number, mass number, the number of electrons and valency electrons of this atom?
15. Complete the given table

|  |  |  |  |
| --- | --- | --- | --- |
| S. N | Element | Atomic number | Electronic configuration |
| 1 | A | 8 |  |
| 2 | B | 17 |  |
| 3 | C | 11 |  |
| 4 | D | 13 |  |

1. Do isobars also have identical properties like isotopes? State reason.
2. A and B are two atoms in whose nuclei the number of neutrons and protons are:

Atoms Protons Neutrons

A 6 6

B 6 7

Which element/ elements do they represent and what is the relation between them?

1. Two elements X and Y have the following configuration:

Elements Shells

K L M N

X 2 7

Y 2 8 8 1

Give the chemical formula of compound formed between X and Y. Which element is oxidised and reduced?

1. On the basis of Thomson’s model of atom, explain how the atom is electrically neutral?
2. The table given below represents the distribution of electrons, protons and neutrons in atoms of four elements A, B, C, D

|  |  |  |  |
| --- | --- | --- | --- |
| Element | Protons | Neutrons | Electrons |
| A | 10 | 10 | 10 |
| B | 11 | 12 | 11 |
| C | 12 | 12 | 12 |
| D | 13 | 14 | 13 |

1. Write the electronic distribution in atoms of elements A and D.
2. Element A is an inert gas, why?
3. What is the valency of element C?
4. In gold foil experiment of Geiger and Marsden, that paved the way for Rutherford’s model of an atom,--1.00% of the particles were found to deflect at angles 500. If one mole of α- particles were bombarded on the gold foil, compute the number of α- particles that would deflect at angles less than 500.
5. An element has an atomic number 12 and an atomic mass number 26. Draw a diagram showing the distribution of electron in the orbits and the nuclear composition of the neutral atom of the element. What is the valency of the element and why is it so?
6. Multiple choice questions
7. Which of following represent the electronic distribution in the Mg atom?

a)3,8,1 b)2,8,2 c)1,8,3 d)8,2,2

1. Rutherford alpha particles scattering experiment resulted in discovery of

a)electrons b)protons c)nucleus in the atom d)atomic mass

1. Dalton’s atomic theory successfully explained

i) law of conservation of mass ii)law of constant composition iii) law of radioactivity iv) law of multiple proportion

a)i, ii and iii b)i , iii , iv c)ii, iii and iv d)i, ii and iv

1. The ion of an element has 3 positive charges. Mass number of the atom is27 and the number of neutron is 14. What is the number of electrons in the ion?

a )13 b)10 c)14 d)16

1. Which of the following are true of an element?

i)atomic number =number of electrons +number of protons ii)Mass number =number of protons +number of neutrons. iii)Atomic mass =number of protons =number of neutrons. (iv ) atomic number=number of protons = number of electrons.

a)i and ii b)i and iii c)ii and iii d)ii and iv

1. In the Thomson‘s model of atom which of the following statement is correct?

i)the mass of the atom is assumed to be uniformly distributed over the atom . ii)the positive charge is assumed to be uniformly distributed over the atom . iii)the electrons are uniformly distributed in the positively charged sphere. (iv )the electrons attract each other to stabilise the atom .

a)i, ii and iii b)i and iii c)i and iv d)i ,iii and iv