Relative atomic mass is an average of the masses of all the isotopes of the element.

In any mixture of pure chlorine, 75% of Cl^{35} and 25% of Cl^{37} is present.

.: Relative atomic mass = 75% of Cl^{35} + 25% Cl^{37}

Relative atomic mass of chlorine

$$= \frac{75}{100} X\ 35 + \frac{25}{100} X\ 37$$

$$= \frac{35X3}{4} + \frac{37}{4}$$

$$= \frac{1}{4}(105+34)$$

$$= \frac{1}{4} X142 = 35.5u$$

Isobars

Isobars are the atoms of those elements which have the same mass number but different atomic numbers are called isobars. $^{40}_{20}$ Ca and $^{40}_{18}$ Ar have same mass number and different atomic number. $^{24}_{11}$ Na and $^{24}_{12}$ Mg are another examples.

QUESTIONS

VERY SHORT ANSWER TYPE QUESTIONS

1. Who discovered electron, proton and neutron?
2. What is the ratio of mass of electron to mass of proton?
3. Mention the charges on electron and proton?
4. What are alpha (*a*) rays?
5. The total number of electrons in Nitrogen are 7. What is its valency?
6. What name is given to pair of atoms such as $^{14}_{7}$ N and $^{15}_{7}$ N ?
7. Name the subatomic particles present in an atom.

8. Which part of atom was discovered by Rutherford's alpha particles scattering experiment.
9. Which subatomic particle has no charge on it.
10. What name is given to pair of atoms such as $^{40}_{20}Ca$ & $^{40}_{18}Ar$?

SHORT ANSWER TYPE QUESTIONS

1. Why is an atom neutral inspite of the presence of charged particles in it?
2. How does a proton differ from an electron?
3. An element has atomic number 7. What is the valency of the element. Also name the element.
4. Differentiate between isotopes and isobars.
5. Draw the electronic configuration of Mg^{++}. [at- no. = 12]
6. Describe Thomson's model of atom. Which subatomic particle was not present in Thomson's model of atom?
7. Draw the electron distribution of following elements - (dot structure)
   (a) Na (at no. = 11) (c) Cl (at no. = 17)
   (b) Al (at no. = 13) (d) O (at no. = 8)
8. Is it possible for the atom of an element to have one electron, one proton and no neutron. If so, name the element.
9. Write down the electron distribution of Chlorine atom. How many electrons are there in L-Shell? (At no. of chlorine = 17)
10. In the atom of an element x, 6 electrons are present in the outermost shell. If this atom acquires nobel gas configuration by accepting requisite number of electrons, then what would be the charge on the ion so formed?

LONG ANSWER TYPE QUESTIOS

1. On the basis of Thomson's atomic model of an atom, explain how the atom is neutral as a whole.
2. What do you think would be the observation, if the *a* particle scattering experiement is carried out usinkg a foil of metal other than gold?
3. (a) Helium atom has an atomic mass of u. It has two protons in its nuclens. How many neutrons does it have?
   (b) What are the limitations of Rutherford's model of an atom.
6. Define valency by taking examples of sodium and chlorine.
7. Mg^{+2} has completely filled K and L shells. Explain what do you understand by this statement.
8. Why do Helium, Neon and Argon have zero valency?
9. Enlist the conclusion drawn by Rutherford from his *a*-scattering experiment.
10. What are the postulates of Bohr's model of an atom?

Ch-4 Structure of the Atom

Objective Type Questions :

1. Which of the following correctly represent the electronic distribution in the Mg atom ?

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

2. Rutherford's 'alpha (*a*) particles scattering experiment' resulted in to discovery of

   a) Electron (b) Proton c) Nucleus in the atom d) Atomic mass

3. The number of electrons in an element X is 15 and the number of neutrons is 16. Which of the following is the correct representation of the element?

   a. $_{15}X^{31}$.
   b. $_{16}X^{31}$
   c. $_{16}X^{15}$
   d. $_{15}X^{16}$

Dalton's atomic theory succesfully 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 and iv
   c. ii, iii and iv d. i, ii and iv

5. Which of the following statements about Rutherford's model of atom are correct?

   i. considered the nucleus as positively charged
   ii. established that the *a*-particles are four times as heavy as a hydrogen atom
   iii. can be compared to solar system
   iv. was in agreement with Thomson's model

   a. i and iii. b. ii and iiii
   c. i and iv. d. only i

6. Which of the following are true for an element?

   i. Atomic number = number of protons + number of electrons
   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

7. The ion of an element has 3 positive charges. Mass number of the atom is 27 and the number of neutrons is 14. What is the number of electrons in the ion?
   a. 13
   b. 10
   c. 14
   d. 16

8. An atom with 3 protons and 4 neutrons will have a valency of
   a. 3 b. 7 c. 1 d. 4
9. The electron distribution in an aluminium atom is
   a. 2, 8, 3. b. 2, 8, 2 c. 8, 2, 3 d. 2, 3, 8
10. Fill in the blanks in the following statements
    a. Rutherford's *a*-particle scattering experiment led to the discovery of the .....
    b. Istopes have same.....but different.....
    c. Neon and chlorine have atomic numbers 10 and 17 respectively. Their valencies will be.....and.....respectively.
    d. The electronic configuration of silicon is.....and that of sulphur is .....