Structure of The Atom

Periodic Test

Q.1. What are the canal rays?

Answer: The radiations that are present in a gas discharge are canal rays. These are the positively charged radiations that ultimately lead to the discovery of protons.

Q.2. Name the three subatomic particles of an atom.

Answer: The three subatomic particles in an atom are:

i. Neutrons

ii. Protons

iii. Electrons

Q.3. Why is atom considered as a neutral particle?

Answer: There are three subatomic particles in an atom which are the electrons, protons and the neutrons. Neutron is electrically neutral and proton is positively charged and an electron is negatively charged. In an atom, the number of protons is equal to the number of electrons and hence, the overall charge in an atom is zero and it is a neutral particle.

Q.4. Write the distribution of electrons in sodium and chlorine atoms.

Answer: The atomic number of sodium and chlorine is: 11 and 17.

The distribution of electrons in sodium and chlorine atoms is as follows: -

Sodium- K shell: 2 electrons

L shell: 8 electrons

M shell:1 electron

Chlorine- K shell: 2 electrons

L shell: 8 electrons

M shell: 7 electrons

Q.5. If K, L and M shell of an atom is full, then what would be the total number of electrons in the atom?

Answer: K shell can accommodate a maximum of 2 electrons. L shell can accommodate a maximum of 8 electrons and M shell can accommodate a maximum of

8 electrons. Hence, If K, L and M shell of an atom are full, then the total number of electrons in the atom would be: 2+8+8=18 electrons.

Q.6. How will you find the valency of sodium, chlorine, and argon?

Answer: The combining capacity of an atom is called its valency.

Now, sodium has only one electron in its outermost shell which it can lose very easily to gain an octet configuration. Hence, the valency of sodium is 1.

Chlorine has seven electrons in its outermost shell and it could complete its octet by gaining one electron. Hence, the valency of Chlorine is 1.

Argon has fully filled outermost hell with no vacancy available for an extra electron. Hence, it's valency is 0.

Q.7. Give Reasons for the Following:

Why Ernest Rutherford selected a gold foil for his experiments?

Answer: Ernest Rutherford selected a gold foil for his experiments because he wanted as thin a layer as possible. The gold foil that they had used was only 1000 atoms thick.

Q.8. Give Reasons for the Following:

Why Ernest Rutherford got unexpected results from his experiment?

Answer: According to Thomson's atomic model electrons were embedded in a sphere of positive charge. This implies that according to Rutherford's gold foil experiment in which the alpha particles which are positively charged must be reflected or deflected in large numbers but after performing the experiment it was being found out that most of the alpha particles pass straight through. This observation clearly meant that most of the space inside an atom is empty which was contrary to that predicted in Thompson's model. Hence, Ernest Rutherford got unexpected results from his experiment.

Q.9. Give Reasons for the Following:

Why those atoms show little chemical activity who have their outermost shell completely filled?

Answer: An atoms chemical reactivity is mostly based upon its desire to have a fully filled outermost shell become stable. If an atom is having a completely filled outermost shell it is already stable and hence shows less chemical activity.

Q.10. Give Reasons for the Following:

Why Thomson's model of an atom was rejected?

Answer: According to Thomson's model of the atom electrons were embedded in a sphere of positive charge and negative and positive charges are equal in magnitude. But after performing Rutherford's gold foil experiment it was concluded that most of the

space inside an atom is empty because most of the alpha particles pass straight through without getting deflected which was in contrary to what has been predicted by Thomson's model. Hence, Thomson's model of an atom was rejected.

Q.11. Give Reasons for the Following:

What was the drawback of Rutherford's model of an atom?

Answer: The drawback of Rutherford's model of an atom are: -

The orbital revolution of electrons is not expected to be stable. Any particle in a circular orbit would undergo acceleration. During acceleration, charged particles would radiate energy. Thus, the revolving electrons would lose energy and finally fall into the nucleus. If this were so the atom would be highly unstable and hence matter would not have existed but as we know the atoms are quite stable.

Q.12. Compare the properties of electrons, protons, and neutrons.

Answer:

Electrons	Protons	Neutrons
It is electrically negatively charged.	It is electrically positively charge.	It is electrically neutral.
Its mass is negligible.	Its mass is taken as one unit.	Its mass is also taken as one unit.
It is found revolving outside the nucleus.	It is present inside the nucleus.	It is also present inside the nucleus.
It is represented as e.	It is represented as p.	It is represented as n.
It was discovered by J.J.Thomson.	It was discovered by Ernest Rutherford.	It was discovered by J.Chadwick.

Q.13. Compare the models of an atom proposed by Thomson, Rutherford and Neils Bohr.

Answer:

Thomson	Rutherford	Neils Bohr
An atom consists of a sphere of positive charge with negatively charged electrons embedded in it.	There is a positively charged, dense center in an atom called the nucleus. Nearly the whole mass of an atom resides in the nucleus.	Only certain special orbits known as discrete orbits of electrons are allowed inside an atom.
The positive and the negative charges in an atom are equal in magnitude due to which an atom as a whole is electrically neutral.	The electrons revolve around the nucleus in a circular path.	While revolving in discrete orbits the electrons do not radiate energy.
	The size of the nucleus is very small as compared to the size of an atom.	

Q.14 A. What were the conclusions drawn by Rutherford from his α-particle scattering experiment?

Answer: The conclusions drawn by Rutherford from alpha particle scattering experiment are: -

i. There is a positively charged center in an atom called the nucleus. Nearly all the mass of an atom resides inside the nucleus.

ii. The electrons revolve around the nucleus in well-defined orbits.

iii. The size of the nucleus is very small as compared to the size of an atom.

Q.14 B. What were the drawbacks of Rutherford's model of the atom?

Answer: The drawback of Rutherford's model of an atom are: -

The orbital revolution of electrons is not expected to be stable. Any particle in a circular orbit would undergo acceleration. During acceleration, charged particles would radiate energy. Thus, the revolving electrons would lose energy and finally fall into the nucleus. If this were so the atom would be highly unstable and hence matter would not have existed but as we know the atoms are quite stable.

Q.15 A. Describe

Thomson's model of an atom.

Answer: Thomson's model of an atom: -

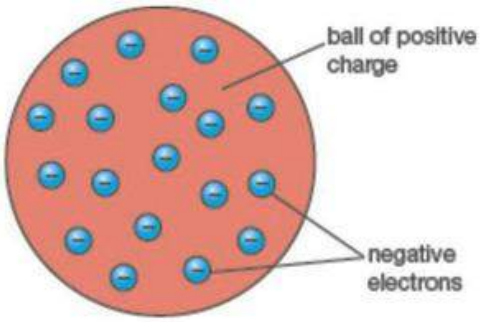
Thomson proposed the model of an atom to be similar to that of a Christmas pudding. The electrons in a sphere of positive charge, where like currants (dry fruits) in a spherical Christmas pudding.

Thomson proposed that: -

i. An atom consists of a sphere of positive charge with negatively charged electrons embedded in it.

ii. The positive and the negative charges in an atom are equal in magnitude due to which an atom as a whole is electrically neutral.

The diagram is shown below:



Thomson's 'plum-pudding' model of the atom

Q.15 B. Describe

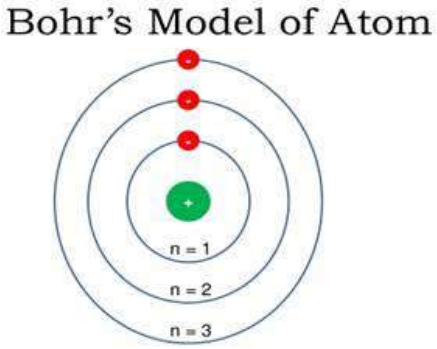
Bohr's model of an atom.

Answer: Bohr's model of an atom: -

i. Only certain special orbits known as discrete orbits of electrons are allowed inside an atom.

ii. While revolving in discrete orbits the electrons do not radiate energy. These orbits are known as energy levels.

The diagram is shown below:



Q.16. Explain Rutherford's nuclear model of an atom.

Answer: Rutherford's nuclear model of an atom: -

i. There is a positively charged center in an atom called the nucleus. Nearly all the mass of an atom resides inside the nucleus.

ii. The electrons revolve around the nucleus in well-defined orbits.

iii. The size of the nucleus is very small as compared to the size of an atom.

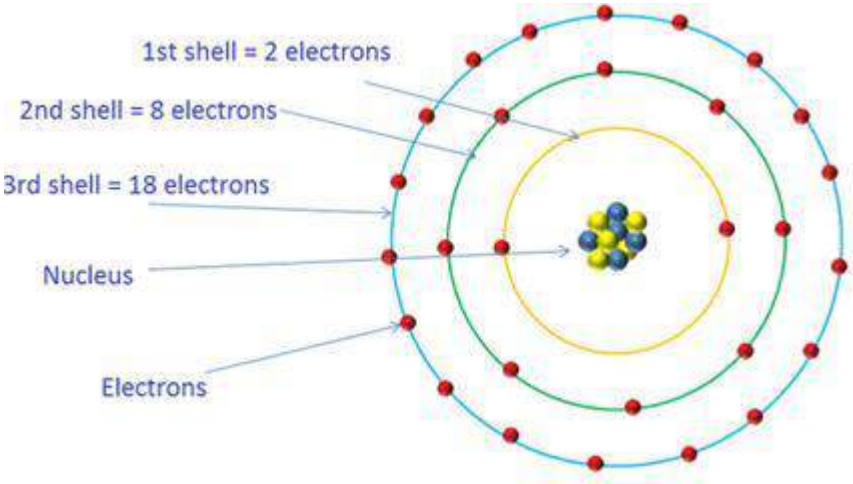
Q.17. Explain Bohr-Bury scheme.

Answer: Bohr-Bury scheme –

i. The maximum number of electrons that could be present in a shell is given by the rule 2n2, where n is the orbit number or energy level.

Example, in first shell, n = 1, then number of electrons = 2

Similarly, for other shells, the diagram is shown below:



ii. The maximum number of electrons that can be accommodated in the outermost orbit is 8.

iii. Electrons are not accommodated in a given shell unless all the inner shells are completely filled.

Q.18. What are isotopes? Where do they find applications?

Answer: Atoms of the same element having a same atomic number but different mass numbers are known as isotopes.

Applications of isotopes: -

i. An isotope of uranium is used as a fuel in nuclear reactors.

ii. An isotope of cobalt is used in the treatment of cancer.

iii. An isotope of iodine is used in the treatment of goiter.

Q.19. Define the following:

(a) Atomic number

(b) Atomic mass

(c) Isobars.

Answer: a. Atomic number:

The number of protons present in an atom is called its atomic number. It is represented by the symbol: Z.

b. Atomic mass:

Atomic mass is the sum of the total number of protons and neutrons present in the nucleus of an atom.

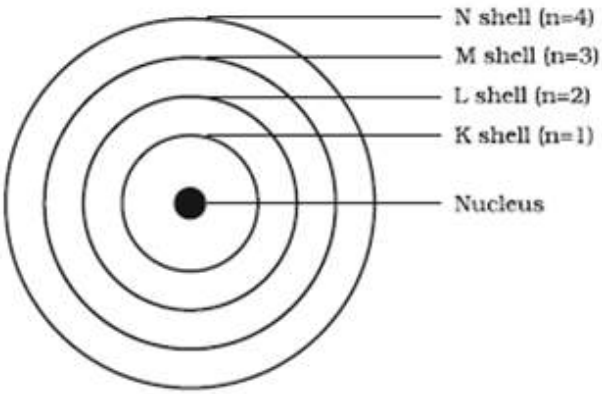
c. Isobars:

Isobars are the atoms of different elements having a different atomic number but the same mass number.

Q.20. (A) Draw the sketch of Bohr 's model of an atom.

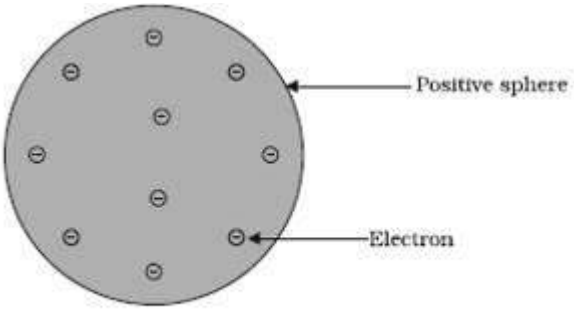
(B) Draw the sketch of Thomson's model of an atom.

Answer: A.



Sketch of Bohr's model of an atom

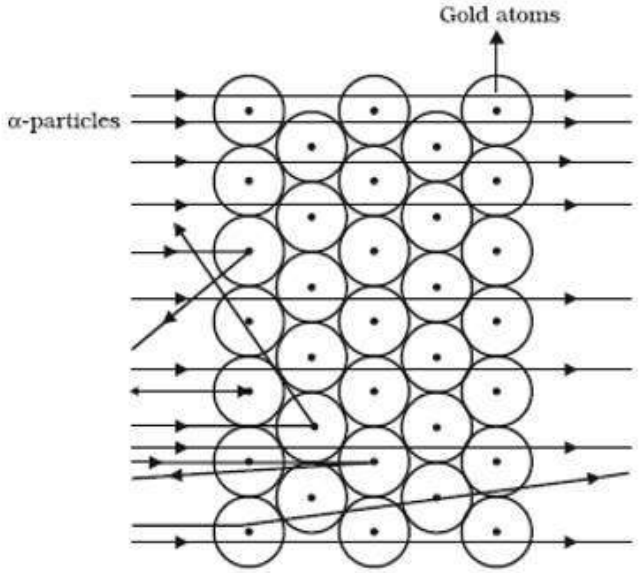
B.



Sketch of Thomson's model of an atom

Q.21. Draw the sketch of Rutherford's α- particle scattering experiment.

Answer:

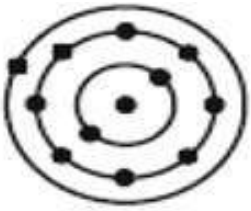


Sketch of Rutherford's α - particle scattering experiment

Q.22 A. Draw the atomic structure of the following elements:

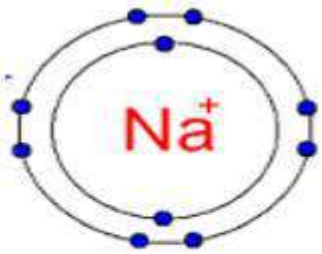
Sodium atom and Sodium Ion

Answer:



Na

Sodium atom

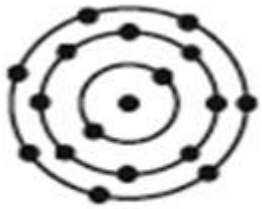


Sodium Ion

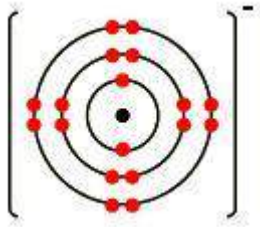
Q.22 B. Draw the atomic structure of the following elements:

Chlorine atom and Chloride ion

Answer:



Chlorine atom

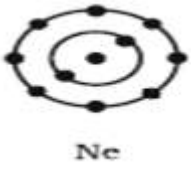


Chloride ion

Q.22 C. Draw the atomic structure of the following elements:

Neon atom and Helium atom

Answer:



Neon atom

Helium atom

Q.23. What do you think would be the observation if the α-particle scattering experiment is carried out using a foil of a metal other than gold?

Answer: Gold is one of the most malleable metal we have and we could extract thin foils from it but other metals are not that malleable. So, if we use a metal other than gold in the alpha-particle scattering experiment we would not being able to get a thin foil. A comparatively thick foil means that the number of atoms per unit volume would be large and hence the number of alpha particles passing through the foil without being deflected would decrease and those getting deflected would increase in comparison with the gold foil.

Q.24. On the basis of Thomson's model of an atom, explain how the atom is neutral as a whole.

Answer: On the basis of Thomson's model of an atom, an atom consists of an electrically positively charged sphere in which negative charges are embedded. The magnitude of the positive and negative charges are equal and hence, the atom as a whole is electrically neutral.

Q.25. On the basis of Rutherford's model of an atom, which subatomic particle is present in the nucleus of an atom?

Answer: On the basis of Rutherford's model of an atom all the positive charge and mass of an atom resides inside the nucleus. More particularly we could say that on the basis of Rutherford's model of an atom proton is present in the nucleus.

Comprehensive Exercises (MCQ)

Q.1. The number of valence electrons in CL ion are:

A. 7

B. 8

C. 1

D. 6

Answer: Distribution of electrons in chloride ion are: -

Chlorine ion - K shell: 2 electrons

L shell: 8 electrons

M shell: 8 electrons

Hence, the number of valence electrons in chloride ions are 8 as its outermost orbit contains 8 electrons.

Q.2. An atom with atomic number 9 and mass number 19 will have the following constituents:

A. 9p, 9n, 9e

B. 9p, 10n, 9e

C. 10p, 9n, 9e

D. 9p, 9n, 10e

Answer: We know that,

Atomic number = Number of protons = 9.

Hence, 9p

Mass number = Number of protons + Number of neutrons

⇒ 19 = 9 + Number of neutrons

⇒ Number of neutrons = 19-9 =10

Hence, 10n

Now, Number of electrons = Number of protons

⇒ Number of electrons =9

Hence, 9e

Therefore, the correct option is B

Q.3. An alpha particle is also known as:

A. subatomic particle

B. an unionised helium atom

C. a neutral particle

D. a doubly-charged helium ion

Answer: An alpha particle is obtained by removing 2 electrons from a helium atom. So, an alpha particle is doubly-charged helium ion.

Hence, the correct option is D.

Q.4. In the Thomson's model of atom, which of the following statements are correct?

(i) The mass of the atom is assumed to be uniformaly distributed over the atom

(ii) The positive charge is assumed to be uniformaly distributed over the atom

(iii) The electrons are uniformaly 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)

Answer: Thomson proposed the model of an atom to be similar to that of a Christmas pudding. The electrons in a sphere of positive charge, where like currants (dry fruits) in a spherical Christmas pudding.

Thomson proposed that: -

i. An atom consists of a sphere of positive charge with negatively charged electrons embedded in it.

ii. The positive and the negative charges in an atom are equal in magnitude due to which an atom as a whole is electrically neutral.

Hence, the statements i, ii, iii are correct and the correct option is A.

Q.5. Rutherford's α- particle scattering experiment showed that:

(i) Electrons have negative charge

(ii) The mass and positive charge of the atom is concentrated in the nucleus

(iii) Neutron exists in the nucleus

(iv) Most of the space in atom is empty

Which of the above statements are correct?

A. (i) and (iii)

B. (ii) and (iv)

C. (i) and (iv)

D. (iii) and (iv)

Answer: The conclusions drawn by Rutherford from alpha particle scattering experiment are: -

i. There is a positively charged centre in an atom called the nucleus. Nearly all the mass of an atom resides inside the nucleus.

ii. The electrons revolve around the nucleus in well-defined orbits.

iii. The size of the nucleus is very small as compared to the size of an atom.

Hence, statements ii and iv are correct and the correct option is B.

Q.6. In a sample of ethyl ethanoate ($CH_3COOC_2H_5$), the two oxygen atoms have the same number of electrons but different number of neutrons. Which of the following is the correct reason for it?

A. One of the oxygen atoms has gained electrons

B. One of the oxygen atoms has gained two neutrons

C. The two oxygen atoms are isotopes

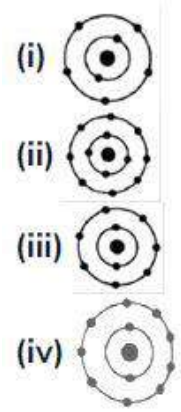
D. The two oxygen atoms are isobars

Answer: Atoms of the same element having same atomic number but different mass numbers are known as isotopes.

As the charge is zero implies that there is no change in the number of electrons and also the number of protons in the two-oxygen atom is the same as they have the same atomic number. Different number of neutrons implies that they are isotopes.

Hence, the correct option is C.

Q.7. Which of the following in Fig. do not represent Bohr's model of an atom correctly?



A. (i) and (ii)

B. (ii) and (iii)

C. (ii) and (iv)

D. (i) and (iv)

Answer: The maximum number of electrons that can be accommodated in the first shell is 2 and that in the 2^{nd} shell is 8.

In fig ii, the number of electrons in the first shell is 4 and in fig iv the number of electrons in the second shell is 9 both of which are above the allowed capacity. So, they do not represent Bohr's model of an atom correctly.

Hence, the correct option is C.

Q.8. Which of the following statement is always correct?

A. An atom has equal number of electrons and protons.

B. An atom has equal number of electrons and neutrons

C. An atom has equal number of protons and neutrons.

D. An atom has equal number of electrons, protons and neutrons.

Answer: An atom always has equal number of electrons and protons to maintain the electrical neutrality.

Hence, the correct option is A.

Q.9. The charge on an electron is equal to:

A. 1.6×10^{-19} C of –ve charge

B. 2.6×10^{-19} C of –ve charge

C. 1.6×10^{-22} C of –ve charge

D. 1.6×10^{-23} C of –ve charge

Answer: The charge on an electron is equal to 1.6 x 10-19 C of –ve charge which is a calculated value which always stands to be true whatever the atom may be.

Hence, the correct option is A.

Q.10. The isotope of cobalt used in the treatment of cancer and iodine used in the treatment of goiter respectively are:

A. I – 132 and Co – 61

B. I – 132 and Co – 60

C. I – 131 and Co – 60

D. I – 131 and Co – 61

Answer: I – 131 and Co – 60 are respectively the isotope of iodine and cobalt used in the treatment of cancer and goiter.

Hence, the correct option is C.

Q.11. The isotope of uranium used as a fuel in nuclear reactors and carbon used in radiocarbon dating are:

A. U – 233 and C – 14

B. U – 235 and C – 13

C. U – 233 and C – 13

D. U – 235 and C – 14

Answer: U – 235 and C – 14 are respectively the isotope of uranium used as a fuel in nuclear reactors and carbon used in radiocarbon dating.

Hence, the correct option is D.

Q.12. Elements with valency 1 are:

A. always metals

B. always metalloids

C. either metals or non-metals

D. always non-metals

Answer: The elements with valency +1 are always metals present in the left most corner of the periodic table in group I. They have only one electron in their outermost shell which they could lose easily to get an outermost shell with the maximum number of allowed electrons. But a -1 valency could be shown by the group 17 nonmetals also which have 7 electrons in their outermost shell and require only one electron to complete their octet.

Hence, the correct option is C.

Q.13. The first model of an atom was given by:

A. N. Bohr

B. E. Goldstein

C. Rutherford

D. J.J. Thomson

Answer: J.J. Thomson proposed the first model of the atom to be similar to that of a Christmas pudding. On the basis of Thomson's model of an atom, an atom consists of an electrically positively charged sphere in which negative charges are embedded. The

magnitude of the positive and negative charges is equal and hence, the atom as a whole is electrically neutral.

Q.14. An atom with 3 protons and 4 neutrons will have a valency of:

A. 3

B. 7

C. 1

D. 4

Answer: An atom with 3 protons would have 2 electrons in its innermost shell and 1 proton in its outermost shell. The outermost proton could be easily given away by the atom to attain a stable two electron inner shell configuration. So, the valency would be 1.

Hence the correct option is C.

Q.15. The electron distribution in an aluminum atom is:

A. 2, 8, 3

B. 2, 8, 2

C. 8, 2, 3

D. 2, 3, 8

Answer: The atomic number of aluminums is 13.

Hence, the electron distribution in an aluminum atom would be 2, 8, 3.

So, A is the correct option.

Q.16. According to Bohr-Bury scheme, the maximum number of electrons which can be accommodated in a given shell is given by the formula:

A. $2n^2$

B. n^2

C. $3n^2$

D. 2n

Answer: According to Bohr-Bury scheme, the maximum number of electrons which can be accommodated in a given shell is given by the formula $2n^2$.

Hence, the correct option is A.

Q.17. The nucleus of hydrogen atom is known as:

A. Proton

B. Positron

C. Nucleon

D. Neutrino

Answer: The nucleus of hydrogen contains only one proton and hence it is known as a proton.

Hence, the correct option is A.

Q.18. Which of the following statements about Rutherford's model of atom are correct?

(i) Considered the nucleus as positively charged.

(ii) Established that the α - 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 (iii)

C. (i) and (iv)

D. only (i)

Answer: Rutherford's atomic model has the following features: -

i. There is a positively charged centre in an atom called the nucleus. Nearly all the mass of an atom resides inside the nucleus.

ii. The electrons revolve around the nucleus in well-defined orbits which can be compared to solar system.

iii. The size of the nucleus is very small as compared to the size of an atom.

Hence, statement I and iii are correct t.

So, the correct option is A.

Q.19. 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)

Answer: Mass number is always equal to the number of protons plus the number of neutrons and Atomic number is always equal to the number of protons which is equal to the number of electrons to maintain the neutrality of the atom.

Hence, option D is correct.

Q.20. Atomic models have been improved over the years. Arrange the following atomic models in the order of their chronological order:

(i) Rutherford's atomic model

(ii) Thomson's atomic model

(iii) Bohr's atomic model

A. (i), (ii) and (iii)

B. (ii), (iii) and (i)

C. (ii), (i) and (iii)

D. (iii), (ii) and (i)

Answer: Thomson proposed the first atomic model followed by Rutherford and Bohr.

Hence, option C is the correct option.

Q.21. The presence of protons and neutrons at the centre of the atom was suggested by:

A. Protons by J. Chadwick and neutrons by J.J. Thomson

B. Protons by E. Goldstein and neutrons by J. Chadwick

C. Protons by E. Goldstein and neutrons by J.J. Thomson

D. Protons by J. Chadwick and neutrons by E. Goldstein

Answer: The presence of protons was suggested by J. Chadwick and the presence of neutrons at the centre of the atom was suggested by J.J. Thomson.

Hence, option A is correct.

Q.22. The presence of electrons outside the nucleus and nucleus at the centre of the atom was suggested by:

A. Electrons by J.J. Thomson and nucleus by E. Goldstein

B. Electrons by J. Chadwick and nucleus by E. Rutherford

C. Electrons by J.J. Thomson and nucleus by E. Rutherford

D. Electrons by E. Rutherford and nucleus by J.J. Thomson

Answer: The presence of electrons outside the nucleus was suggested by J.J. Thomson and the presence of nucleus at the centre of the atom was suggested by E. Rutherford.

Hence, the correct option is C.

Q.23. 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?

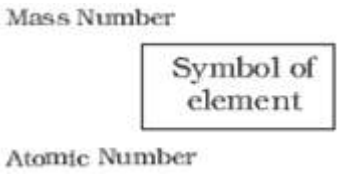
A. $\frac{31}{15}X$

B. $\frac{31}{16}X$

C. $\frac{16}{15}X$

D. $\frac{15}{16}X$

Answer: Any element is represented symbolically as:



Here mass number = 15 + 16 = 31

Atomic number = number of protons = 15

Hence, the correct representation of the element with 15 electrons and 16 neutrons is $\frac{31}{15}X$.

Hence, the correct option is – A

Q.24. 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) and (iv)

C. (ii), (iii) and (iv)

D. (i), (ii) and (iv)

Answer: Postulates of Dalton's atomic theory.

● The matter is made up of indivisible particles known as atoms.

● The properties of all the atoms of a given element are same including mass. This can also be stated as all the atoms of an element have identical mass while the atoms of different elements have different masses.

● Atoms of different elements combine in fixed ratios to form compounds.

● Atoms are neither created nor destroyed. This implies that during chemical reactions, no atoms are created nor destroyed.

● The formation of new products (compounds) results from the rearrangement of existing atoms (reactants).

● Atoms of an element are identical in mass, size and many other chemical or physical properties, but atoms of two-different elements differ in mass, size and many other chemical or physical properties.

Hence, the correct option is D.

Q.25. 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

Answer: Given that the Mass number of the atom is 27.

⇒ Number of protons + number of neutrons = 27

⇒ Number of protons + 14 = 27

⇒ Number of protons = 13

Therefore, number of electrons in a neutral atom = 13

The ion of the element has 3 positive charges.

⇒ Number of electrons = 13 – 3 = 10

Hence, option B is correct.

Comprehensive Exercises (T/F)

Q.1. Write true or false for the following statements:

Atomic radius is measured in nanometers, 1m = 10^9nm

Answer: True

The above statement is true as 1m = 109nm.

Q.2. Write true or false for the following statements:

Atoms of a given element are identical in mass but different in their chemical properties.

Answer: False

Atoms of a given element may be identical in mass or may not as isotopes are also the atoms of the same element but have different masses, but all the atoms have same chemical properties.

Hence, the above statement is false.

Q.3. Write true or false for the following statements:

Atoms combine in the ratio of small whole numbers to form compounds.

Answer: True

According to Dalton's theory atoms combine in the ratio of small whole numbers to form compounds.

Hence, the above statement is true.

Q.4. Write true or false for the following statements:

In water, the ratio of the mass of hydrogen to the mass of oxygen is always 1:8, whatever is the source of water.

Answer: True

According to the postulates of Dalton's atomic theory atoms of different elements combine in fixed ratios to form compounds. So, in water, the ratio of the mass of hydrogen to the mass of oxygen is always 1:8, whatever is the source of water.

Hence, the above statement is true.

Q.5. Write true or false for the following statements:

In a chemical substance, the elements are always present in varying proportions by mass.

Answer: False

According to the postulates of Dalton's atomic theory atoms of different elements combine in fixed ratios by mass to form compounds. So, in chemical substance, the elements are always present in fixed proportions by mass.

Hence, the above statement is false.

Q.6. Write true or false for the following statements:

One atomic mass unit is a mass unit equal to exactly one-twelfth (1/12th) the mass of one atom of carbon-12.

Answer: True

One atomic mass unit is a mass unit which is equal to the mass of exactly one-twelfth (1/12th) of the mass of one atom of carbon-12 isotope.

Hence, the above statement is true.

Q.7. Write true or false for the following statements:

The relative atomic masses of all elements have been found with respect to an atom of oxygen-16.

Answer: False

The relative atomic masses of all elements have been found with respect to the mass of exactly one-twelfth (1/12th) of the mass of one atom of carbon-12 isotope.

Hence, the above statement is false.

Q.8. Write true or false for the following statements:

The relative number and kinds of atoms are varying in a given compound.

Answer: False

According to the postulates of Dalton's atomic theory the relative number and kinds of atoms are fixed in a given compound.

Hence, the above statement is false.

Q.9. Write true or false for the following statements:

Each isotope of an element is an impure substance.

Answer: False

Each isotope of an element is a pure substance.

Hence, the above statement is false.

Q.10. Write true or false for the following statements:

An atom of each element has a definite combining capacity, called its valency.

Answer: True

The combining capacity of an atom is called its valency. Thus, atoms of each element have a definite combining capacity which is determined by its valency.

Hence, the above statement is true.