

QB365

Important Questions - Structure of the Atom

9th Standard CBSE

Science

Reg.No. :

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Time : 01:00:00 Hrs

Total Marks : 50

Section-A

- 1) Positive charge is carried by 1
(a) X-rays (b) cathode rays (c) γ -rays (d) anode rays
- 2) which one is not true of two isotopes? 1
(a) similar mass number (b) similar atomic number (c) similar chemical properties
(d) similar electronic configuration
- 3) Outermost shell of an atom cannot accommodate more electrons than 1
(a) 2 (b) 8 (c) 18 (d) 16
- 4) The charge to mass ratio on cathode rays in the discharge tube is constant because electrons are common constituents of all matter. 1
(a) assertion is correct and reason is correct (b) assertion is correct but reason is wrong
(c) assertion is wrong but reason is correct (d) assertion is wrong and reason is wrong
- 5) The nucleus of an atom is approximately 1
(a) 10^{-5}m (b) 10^{-8}m (c) 10^{-10}m (d) 10^{-15}m
- 6) The size of an atom is decided by: 1
(a) mass of the atom (b) no. of protons (c) no. of protons and neutrons (d) no. of electrons
- 7) Calcium has 20 electrons. These K, L, M and N shells. Which shell or shells are incomplete? 1
(a) L, M, N shells (b) M, N shells (c) N shell (d) K, L, M, N shells
- 8) Rutherford's alpha-particle scattering experiment was responsible for the discovery of 1
(a) Atomic nucleus (b) Electron (c) Proton (d) Neutron
- 9) Isotopes of an element have 1
(a) the same physical properties (b) different chemical properties (c) different number of neutrons
(d) different atomic numbers
- 10) Which one of the following is a correct electronic configuration of sodium? 1
(a) 2,8 (b) 8,2,1 (c) 2,1,8 (d) 2,8,1

Section-B

- 11) Substance having similar chemical properties, but different physical properties are called 2
- 12) According to Rutherford, the force of attraction between the moving electrons and is counter balanced by the centrifugal force of electrons. 2

- 13) The extranuclear part of the atom in which electrons are revolving are called 2
- 14) The fundamental particle not present in a hydrogen atom is..... 2
- 15) The neutron has charge 2
- 16) An alpha particle is charged helium atom 2
- 17) What is a discharge tube? 2
- 18) What are important properties of cathode rays? 2
- 19) Give four characteristics of cathode rays 2
- 20) What happens when the cathode rays are passed through an electric field between two parallel plates? Can one determine the nature of charge of the particles constituting the cathode rays from this experiment? If so how? 2

Section-C

- 21) What are cathode rays and positive rays? 5
- 22) What is a nucleus? 5
- 23) Which constituent particles of the atom determine the following: 5
- (i) Mass of the atom
- (ii) Size of the atom
- (iii) Charge on the nucleus
- 24) An element ${}_{12}^{24}X$ loses two electrons to form a cation which combines with the anion of element ${}_{12}^{24}Y$ formed by gaining an electron. 5
- (i) write the electronic configuration of element X.
- (ii) write the electronic configuration of the anion of element Y.
- (iii) write the formula of the compound formed by the combination of X and Y

Section-A

- 1) (b) cathode rays 1
- 2) (a) similar mass number 1
- 3) (b) 8 1
- 4) (a) assertion is correct and reason is correct 1
- 5) (d) $10^{-15}m$ 1
- 6) (d) no. of electrons 1
- 7) (b) M,N shells 1
- 8) (a) Atomic nucleus 1
- 9) (c) different number of neutrons 1
- 10) (d) 2,8,1 1

Section-B

- 11) isotopes 2
- 12) nucleus 2

- 13) orbits or energy levels 2
- 14) neutron 2
- 15) no 2
- 16) positively or doubly. 2
- 17) 2

A discharge tube is a glass tube about 70cm long and having a diameter of 5cm. Two metal electrodes are sealed at the two ends, one of which is connected to the negative terminal of a battery and the other to the positive terminal. A side tube is fused at the centre of the glass tube which serves to pump out air from it, using a suction pump.

- 18) 2
- (i) Cathode rays travel in straight lines and thus cast shadows of objects placed in their path.
 - (ii) Cathode rays possess material particles because they can rotate a light paddle wheel placed in their path.
 - (iii) They are deflected towards positive plate thus showing that these are negatively charged particles known as electrons
 - (iv) They ionise gas through which they pass
 - (v) They are deflected by magnetic fields.
 - (vi) The nature of cathode rays is independent of the material of cathode. Hence they are common constituents of all matter
 - (vii) They can penetrate through thin metallic sheet
 - (viii) They can produce X-rays
 - (ix) The mass of a cathode ray particle is very-very small as compared to the mass of the atom from which it is formed

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- 20) 2
- When the cathode rays are passed through an electric field between two parallel plates, cathode rays are deflected towards positive plate. This determines the charge of the particles constituting the cathode rays. As these are deflected towards positive plates, the particles of cathode rays are negatively charged.

Section-C

21)

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Cathode rays are made up of negatively charged particles called electrons. The nature of cathode rays does not depend on the nature of the gas from which these are produced. The mass of a cathode ray particle is very small compared to the mass of the atom from which it is formed. These particles were found to be about 2000 times smaller in mass than the hydrogen atom.

Anode rays are a stream of positively charged particles. The mass of an anode ray particle is equal to the mass of the atom from which it is formed. The nature of the anode rays depends on the gas from which these are produced.

22)

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The small positively charged central part of an atom is called nucleus. All the protons and neutrons are present in this region. This is 10^5 times smaller than the size of the atom.

23) (i) Protons and neutrons

(ii) Electrons

(iii) Protons

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24) (i) 2, 8, 2 (Atomic no. 12)

(ii) 2, 8, 7 (Atomic no. 17). Anion Y^{1-} is (2, 8, 8)

(iii) XY_2

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