Q1. The triad which is isoelectronic:

1. Na ⁺ , O ²⁻ , Ne
2. Na ⁺ , Al, N ³⁻
3. CI ⁻ , Ar, Ca
4. Mg ²⁺ , F⁻, O

Ans: 1. Na⁺, O²⁻, Ne

Explanation:

Isoelectronic Species are those atoms which have the same electronic configuration or same number of electrons. For eg- N^{3-} , O^{2-} , F^- , Ne, Na⁺, Mg²⁺, Al³⁺ are a series of isoelectronic species.

Q2. There are two species represented as ³⁵Cl and ³⁷Cl. Which of the following statement is correct regarding these 1 Mark species?

1. They have different chemical properties.

2. Their physical properties are the same.

3. They have the same number of protons.

4. They are isobars of the same element.

Ans: 3. They have the same number of protons.

Explanation:

As the mass numbers are different, the correct option is (c). They have the same number of protons.

- Q3. For an element, Z = 9. The valency of this element will be:
 - 1.4 2.2
 - 2. 2
 - 3. 1
 - 4. 3

Ans: 3. 1

Explanation:

Atomic number is 9, which means that number of electrons is also 9. Electronic configuration is 2, 7. So, the atom will gain 1 electron to complete its octet. Therefore, the valency is 1.

Q4. Rutherford's alpha particle scattering experiment led to the discovery of:

- 1. Nucleus.
- 2. Electrons.
- 3. Protons.

1 Mark

1 Mark

4. Neutrons.

Ans: 1. Nucleus.

Explanation:

Rutherford conducted an experiment using alpha particles which led to the discovery of a nucleus situated at the centre of an atom.

Q5. Elements with valency 1 are:	1 Mark
1. Always metals.	
2. Always metalloids.	
3. Either metals or non-metals.	
4. Always non-metals.	

Ans: 3. Either metals or non-metals.

Metals and non-metals both can have valency 1.

Metals which have 1 valence electron and non-metals which have 7 valence electrons, have valency 1.

It is because, metals loose its 1 electron and non-metals gain 1 electron to complete their octet.

Q6. How many neutrons are present in the nucleus hydrogen atom?

- 1. 1
- 2. 2
- 3. 3
- 4. 0

Ans: 4. 0

Explanation:

Hydrogen exists as three different isotopes. H_{-1} , H_{-2} , and H_{-3} . H_{-1} is hydrogen with a proton in the nucleus and exists in nature as H_2 . This is the most common form of hydrogen.

H₋₂, also known as deuterium, has one proton and one neutron in its nucleus.

H₋₃, also known as tritium, has one proton and two neutrons in its neucleus. Tritium is a radioactive isotope.

So while the most common form of hydrogen has no neutrons in its neucleus, other isotopes do.

Q7. Which of the following statement is correct about the atom of and element?

1. An atom can have only protons and neutrons but no electrons.

2. An atom can have only electrons ad neutrons but no protons.

3. An atom can have only electron and proton but o neutron.

4. an atom must always have a proton, neutron and electron.

Ans: 3. An atom can have only electron and proton but o neutron.

Explanation:

An atom must have a proton and an electron, but it may not have a neutron.

For example: In hydrogen atom, there is 1 proton, 1 electron but no neutron.

- Q8. There are four elements P, Q, R and S having atomic numbers of 4, 18, 10 and 16 respectively. The element which 1 Mark can exhibit covalency as well as electrovalency will be:
 - 1. P.
 - 2. Q.
 - 3. R.
 - 4. S.

Ans: 4. S.

Explanation:

Element S has electronic configuration 2, 8, 6. It can exhibit covalency as well as electrovalency.

- Q9. Which of the following are true for an element?
 - 1. Atomic number = number of protons + number of electrons.
 - 2. Mass number = number of protons + number of neutrons.
 - 3. Atomic mass = number of protons = number of neutrons.
 - 4. Atomic number = number of protons = number of electrons.

1 Mark

1 Mark

1 Mark

1. (i) and (ii)

- 2. (i) and (iii)
- 3. (ii) and (iii)
- 4. (ii) and (iv)

Ans: 1. (ii) and (iv)

Explanation:

Atomic number (Z) = number of protons = number of electrons. Since an electron has negligible mass, the mass of protons and the mass of neutrons are taken into consideration while calculating the mass number (A). Mass number (A) = number of protons + number of neutrons = number of nucleons.

Q10. The number of electrons in an element X is 15 and the number of neutrons is 16. Which of the following is the 1 Mark correct representation of the element?

Option:

1.	$^{31}_{15}{ m X}$
2.	$^{16}_{15}{ m X}$
3.	${}^{16}_{15}{ m X}$
4.	${}^{15}_{16}{ m X}$

Ans: 1. $^{31}_{15}X$

Explanation:

The number of electrons are equal to the number of protons so the atomic number of the element X will be 15. For the representation purpose ${}_{15}^{31}$ X is correct for the element.

Q11. Number of valence electrons present in N^{3-} ion is:

1. 16

2. 10

3. 7

4.4

Ans: 1. 16

Explanation:

There are 16 valence electrons for the Lewis structure for N_3 .

Q12. Dalton's atomic theory successfully explained:

- 1. Law of conservation of mass.
- 2. Law of constant composition.
- 3. Law of radioactivity.
- 4. Law of multiple proportion.
- 1. (i), (ii) and (iii).
- 2. (i), (iii) and (iv).
- 3. (ii), (iii) and (iv).
- 4. (i), (ii) and (iv).

Ans: 1. Law of multiple proportion.

Explanation:

Dalton's atomic theory successfully explained the laws of chemical combination but no point about radioactivity was mentioned by Dalton in his theory.

- Q13. Goldstein's experiments which involved passing high voltage electricity through gases at very low pressure 1 Mark resulted in the discovery of:
 - 1. Electron.
 - 2. Proton.
 - 3. Nucleus.
 - 4. Neutron.

Ans: 2. Proton.

Explanation:

1 Mark

1 Mark

Goldstein's experiment, which involved passing high-voltage electricity through gases at very low pressure, resulted in the discovery of protons.

- Q14. The atomic numbers of four elements A, B, C and D are 12, 13, 15 and 3 respectively. The element which cannot 1 Mark form a cation is:
 - 1. A
 - 2. B
 - 3. C

4. D

Ans: 3. C

Explanation:

Element C has 15 electrons; so, the electronic configuration is 2, 8, 5. This element will gain 3 electrons in order to complete its octet; so, it cannot form cations.

Q15. The mass number of two atoms X and Y is the same (40 each) but their atomic numbers are different (being 20 1 Mark and 18 respectively). X and Y are examples of:

1. Chemically similar atoms.

2. Isotopes.

3. Solid and liquid metals.

4. Isobars.

Ans: 4. Isobars.

Explanation:

Isobars are the atoms of different elements with same mass number but different atomic numbers.

Q16. The particle not present in an ordinary hydrogen atom is:

- 1. Proton.
- 2. Neutron.
- 3. Nucleus.
- 4. Electron.

Ans: 2. Neutron.

Explanation:

A hydrogen atom 11HH11 has 1 proton and 1 electron, but it does not have any neutron.

Q17. Elements having valency 'one' are:

1. Always metals.

2. Always non-metals.

3. Always metalloids.

4. Either metals or non-metals.

Ans: 4. Either metals or non-metals.

Explanation:

Elements with valency 1 can be either metals or non-metals. When an atom loses one electron to gain stability, it is a metal. When an atom gains an electron to complete its octet it is a non-metal.

Q18. Different isotopes are matched with their uses as

1. Co - 60 - To treat cancer.

2. U - 238-To produce electricity.

3. I - 131 - To treat goitre.

4. Na-24-In agricultural research.

Options:

- 1. (i) and (ii)
- 2. (ii) and (iii)
- 3. (iii) and (iv)
- 4. (i) and (iii)

1 Mark

1 Mark

1 Mark

Ans: 4. (i) and (iii)

Explanation:

Solution Both Co - 60 and I - 131 are radioactive elements which emits radioactive radiations.

Q19. Which of the following statement is always correct?

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

2. An atom has equal number of electrons and neutrons

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

4. An atom has equal number of electrons protons and neutrons.

Ans: 1. An atom has equal number of electrons and protons. Explanation:

When an atom has an equal number of electrons and protons, it has an equal number of negative electric charges (the electrons) and positive electric charges (the protons). The total electric charge of the atom is therefore zero and the atom is said to be neutral.

Q20. Four elements W, X, Y and Z contain 8, 11, 9 and 17 protons per atom respectively. The element which cannot 1 Mark form an anion is most likely to be:

- 1. W
- 2. X
- 3. Y
- 4. Z

Ans: 2. X

Explanation:

Element X can't form anions as the outermost orbit contains only 1 electron. The atom will rather lose this electron to complete its octet and will become a cation.

Q21. Identify the Mg²⁺ ion from the Fig. where, n and p represent the number of neutrons and protons respectively. 1 Mark



Ans: 4.

Explanation:

The atomic number (Z) of magnesium is 12 and the mass number (A) is 24 (p = 12 and n = A - Z = 24 - 12 = 12). Electronic configuration of Mg atom is 2, 8, 2. So, the electronic configuration of Mg²⁺ ion is 2, 8 (the positive charge is acquired from the loss of 2 electrons). The number of protons and the number of neutrons inside the magnesium atom remain unaffected by the formation of a magnesium ion by the magnesium atom. Option (b) and option (c) do not represent the number of neutrons (n) and the number of protons (p) correctly.

- Q22. The isotope of carbon which has same number of neutrons as ${}_{8}^{16}$ O, is used in radiocarbon dating to determine 1 Mark age of old samples of living organisms.
 - 1. 12C
 - 2. 13C
 - 3. 14C
 - 4. 15C

Ans: 3. 14C

Explanation:

Radiocarbon dating involves determining the age of an ancient fossil or specimen by measuring its carbon-14 content. Green plants absorb the carbon dioxide, so the population of carbon-14 molecules is continually replenished until the plant dies. Carbon-14 is also passed onto the animals that eat those plants.

Q23. The isotopes of hydrogen which contain same number of electrons, protons and neutrons:

- 1. Protium.
- 2. Deuterium.

3. Tritium.

4. None of these.

Ans: 2. Deuterium.

Explanation:

Contains has three isotopes, Protium, Deuterium, and Tritium. All these contain only one electron and one proton. The only difference is in their neutron number.

Protium contains one electron, one proton, and zero neutrons.

Deuterium contains one electron, one proton, and one neutron.

Tritium contains only one proton and electron, and two neutrons.

So, Deuterium is the isotope which has an equal number of electrons, protons and neutrons.

Q24. Isotopes of an element have:

1. Same physical properties.

- 2. Different chemical properties.
- 3. Different number of neutrons.
- 4. Different atomic numbers.

Ans: 3. Different number of neutrons.

Explanation:

Isotopes are atoms with the same number of protons but that have a different number of neutrons. Since the atomic number is equal to the number of protons and the atomic mass is the sum of protons and neutrons, we can also say that isotopes are elements with the same atomic number but different mass numbers.

Q25. Cathode rays have:

- 1. Charge only.
- 2. Mass only.
- 3. Charge as well as mass.
- 4. Neither charge nor mass.

Ans: 1. Charge only.

Explanation:

A cathode ray is a beam of electrons in a vacuum tube traveling from the negatively charged electrode (cathode) at one end to the positively charged electrode (anode) at the other, across a voltage difference between the electrodes. They are also called electron beams.

Q26. In a sample of ethyl ethanoate (CH₃COOC₂H₅) 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?

- 1. One of the oxygen atoms has gained electrons.
- 2. One of the oxygen atoms has gained two neutrons.
- 3. The two oxygen atoms are isotopes.
- 4. The two oxygen atoms are isobars.

Ans: 3. The two oxygen atoms are isotopes.

Explanation:

Isotopes are the elements which have the same atomic number or protons but different mass numbers. In ethyl ethanoate the two oxygen atoms have same electrons that means have same number of protons but different neutrons which lead to different mass numbers for both of them.

Q27. Which of the following represents the correct electron distribution in magnesium ion?

1 Mark

1 Mark

1 Mark

- 1. 2, 8 2. 2, 8, 1
- 3. 2, 8, 8
- 4. 2, 8, 7

Ans: 1. 2, 8

Explanation:

Magnesium ion, Mg^{2+} has 10 electrons; so, its electronic configuration is 2, 8.

Q28. The four atomic species can be represented as follows. Out of these, the two species which can be termed isobars 1 Mark

are:

- $\begin{array}{c} \textbf{1.} \ \begin{array}{c} 201 \\ 60 \end{array} \textbf{X} \\ \textbf{2.} \ \begin{array}{c} 201 \\ 61 \end{array} \textbf{X} \\ \textbf{3.} \ \begin{array}{c} 200 \\ 58 \end{array} \textbf{X} \\ \textbf{4.} \ \begin{array}{c} 203 \\ 60 \end{array} \textbf{X} \end{array}$
- (i) and (ii)
 (ii) and (iii)
 (i) and (iii)
 (i) and (iii)
- 4. (i) and (iv)

Ans: 2. (ii) and (iii)

 $^{201}_{61} {
m X} ~{
m and} ~^{200}_{58} {
m X}$ are isobars because they have the same mass number but different atomic numbers.

Q29. Which of the following correctly represent the electronic distribution in the Mg atom?

- 1. 3, 8, 1. 2. 2, 8, 2. 3. 1, 8, 3.
- 4. 8, 2, 2.

Ans: 2. 2, 8, 2.

Explanation:

Explanation: Atomic number and the number of electrons in magnesium atom is 12.

So, electronic configuration is 2, 8, 2 (because 12 = 2 + 8 + 2).

Q30. The first model of an atom was given by:

- 1. Neils Bohr
- 2. Ernest Rutherford
- 3. J.J. Thomson
- 4. Eugen Goldstein

Ans: 3. J.J. Thomson

Explanation:

- J.J. Thompson gave the first model of an atom.
- Q31. In a sample of ethyl ethanoate (CH₃COOC₂H₂), 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?
 - 1. One of the oxygen atoms has gained electrons.
 - 2. One of the oxygen atoms has gained protons.
 - 3. The two oxygen atoms are isotopes.
 - 4. The two oxygen atoms are isobars.

Ans: 3. The two oxygen atoms are isotopes.

Explanation:

As the number of protons is same but the number of neutrons is different, the mass number of the two oxygen atoms is different. So, these two are isotopes of each other.

- Q32. The number of electrons in an element X is 15 and the number of neutrons is 16. Which of the following is the 1 Mark correct representation of the element?
 - 1. ${}^{31}_{15}$ x
 - 2. $\frac{^{10}_{31}}{^{16}_{16}}$ x
 - 3. $\frac{16}{15}$ x
 - 4. ${}^{15}_{16}$ x

Ans: 1. $^{31}_{15}x$

Explanation:

Given that, number of electrons in element X = 15 and number of neutrons = 16 Atomic number = number of protons = number of electrons in neutral atom = 15 Mass number = number of protons + number of neutrons = 15 + 16 = 31.

Q33. Which of the following has the highest n/p ratio:

1 Mark

1 Mark

1 Mark

1 Mark

1. ${}^{3}_{1}$ H 2. ${}^{235}_{92}$ U 3. ${}^{14}_{6}$ C 4. ${}^{222}_{88}$ Ra

Ans: 2. $^{235}_{92}U$

Explanation:

Every element has a proton, neutron, and electron. The number of protons is equal to the atomic number, and the number of electrons is equal the protons, unless it is an ion. To determine the number of neutrons in an element you subtract the atomic number from the atomic mass of the element.

chronological order:

- 1. Rutherford's atomic model.
- 2. Thomson's atomic model.
- 3. Bohr's atomic model.
- 1. (i), (ii) and (iii)
- 2. (ii), (iii) and (i)
- 3. (ii), (i) and (iii)
- 4. (iii), (ii) and (i)

Ans: 3. (ii), (i) and (iii)

Explanation:

The correct order of the improvements in atomic models is as Thomson's atomic model (ii), Rutherford's atomic model (i) and Bohr's atomic model (iii).

Q35. The following diagram depicts Rutherford's experiment. Why was zinc sulphide screen in used in the experiment? 1 Mark



1. To block α -particles from going straight.

- 2. To detect deflection of α -particles.
- 3. To further deflect α -particles as the gold foil did.
- 4. To absorb α -particles and utilise it again.

Ans: 2. To detect deflection of α -particles.

Explanation:

Zinc sulphide screen was placed behind the gold foil to detect the deflection of the alpha particles from the gold foil. Every time any alpha particle hits the Zinc sulphide screen it shows fluorescence in that part which made it easy to detect the deflection of the alpha particles.

Q36. Rutherford's 'alpha (α) particles scattering experiment' resulted in to discovery of:

1 Mark

- 1. Electron.
- 2. Proton.
- 3. Nucleus in the atom.
- 4. Atomic mass.

Ans: 3. Nucleus in the atom.

Explanation:

The observation that some alpha particles returned on their original path showed the presence of nucleus in the centre of an atom.

Q37. The electron distribution in an aluminium atom:

2, 2, 8, 3
 2, 2, 8, 2
 3, 8, 2, 3
 4, 2, 3, 8

Ans: 1. 2, 8, 3

Explanation:

Aluminium atom has 13 protons and 13 electrons.

KLM

Therefore, Electronic configuration of $_{13}AI = 2, 8, 3$

Q38. The number of valence electrons in a sulphide ion, S^{2-} , is:

1 Mark

1. 16

2. 10

3. 9

4. 8

Ans: 4. 8

Explanation:

Atomic number of a sulphur atom S is 16. It has 6 electrons in its outermost orbit. After gaining 2 electrons it becomes S²⁻. So, now the outermost orbit will have 8 electrons.

Q39. An element has electronic configuration 2, 8, 4. It will be classified as:

- 1. Metal.
- 2. Non-metal.
- 3. Metalloid.
- 4. Noble gas.

Ans: 3. Metalloid.

Explanation:

Quartz, an abundant ingredient in sand, is made up of non-crystallized silica. Silicon is neither metal nor non-metal; it's a metalloid, an element that falls somewhere between the two. Silicon is a semiconductor, meaning that it does conduct electricity.

z	Element	No. of electrons/shell
14	Silicon	2, 8, 4

- Q40. The atomic number of an element is 13 and its mass, mass number is 27. The correct order representing the number of electrons, protons and neutrons respectively in this atom is:
 - 1. 13, 13, 14
 - 2. 14, 13, 13
 - 3. 27, 13, 13
 - 4. 27, 14, 13

Ans: 1. 13, 13, 14

Explanation:

Given, Atomic number= 13

We know that, Z= Atomic Number= Number of protons.

Therefore, number of proton=13

We know that Mass no. of an atom = No. of protons + No. of neutrons.

Mass no= atomic mass= 27u

27u = 13 + n Or, n = 27-13 = 14

Thus, Number of proton=13 and number of neutron= 14

Q41. Which one of the following is a correct electronic configuration of sodium?

2,8
 8,2,1
 2,1,8
 2,8,1.

1 Mark

1 Mark

1 Mark

Q42. The difference between isotopes and isobars:

- 1. Isotopes have same chemical properties but isobars have different.
- 2. Both have same physical properties.
- 3. Isotopes have same physical properties but isobars have different.
- 4. Isobars have same chemical properties but isotopes have different chemical properties.

Ans: 1. Isotopes have same chemical properties but isobars have different.

Explanation:

Isotopes have same atomic number whereas isobars have different atomic number. Isotopes have different mass number whereas isobars have same mass number. Isotopes show same chemical properties whereas isobars show different chemical properties.

Q43. 'A' has 9 protons, 9 electrons and 10 neutrons. 'B' has 12 protons, 12 electrons and 12 neutrons. Formula 1 Mark between A and B is:

1.	BA_2
2.	AB ₂
3.	B_2A_3
4.	AB₄

Ans: 1. BA₂

Explanation:

ATOMIC NUMBER OF A = NUMBER OF PROTONS = 9 THE ELEMENT 'A' IS FLUORINE ATOMIC NUMBER OF B = NUMBER OF PROTONS = 12 THE ELEMENT 'B' IS MAGNESIUM THE FORMULA BETWEEN F AND MG IS MgF₂ or A₂B

Q44. Which of the following is the correct electronic configuration of sodium?

1 Mark

1 Mark

1.	2,	8,	1
2.	8,	2,	1
3.	2,	1,	8
4.	2,	8,	2

Ans: 1. 2, 8, 1

Explanation:

2, 8, 1 is the correct electronic configuration as the first shell can accommodate 2 electrons and second shell can accommodate 8 electrons. When the inner shell is full, electrons are filled in the outer shell.

Q45. The electron distribution in an aluminium atom is:

1. 2, 8, 3. 2. 2, 8, 2.

3. 8, 2, 3.

4. 2, 3, 8.

Ans: 1. 2, 8, 3.

Explanation:

The atomic number of aluminium is 13 and the first shell can have at the most two electrons. Hence, option (a) is correct.

Q46.	Atomic models have been improved over the years. Arrange the following atomic models in the order of their	1 Mark
	chronological order:	

- 1. Rutherford's atomic model.
- 2. Thomson's atomic model.
- 3. Bohr's atomic model.
- 1. (i), (ii) and (iii)
- 2. (i), (ii) and (i)
- 3. (ii), (i) and (iii)
- 4. (iii), (ii) and (i)

Explanation:

1. 2
 2. 4
 3. 3
 4. 5

J.J. Thomson identified in his experiment that the atom was not a simple, indivisible particle but contained at least one subatomic particle called electron. Rutherford put forward the model of an atom which had a positively charged centre called nucleus. It also had the electrons which revolved around the nucleus in well-defined orbits. According to Bohr's model of an atom, only certain or special orbits of electrons were allowed in an atom. During revolving around these orbits, the electrons do not radiate energy.

Q47. The number of valence electrons in a graphite atom is:

1 Mark

Ans: 2. 4

1.

Graphite is an allotrope of carbon. It is made up of all C atoms. The atomic number of carbon is 6; so, the number of valence electrons is 4.

Q48. Which of the following in figure do not represent Bohr's model of an atom correctly?

1 Mark



Explanation:





According to the the Bohr model, hydrogen atoms absorb light when an electron is excited from a low-energy orbit (such as n = 1) into a highter energy orbit (n = 3). Atoms that have been excited by an electric discharge can give off light when an electron drops from a high-energy orbit (such as n = 6) into a lower energy orbit (such as n = 1). the energy of the photon absorbed or emitted when the electron moves from one orbit to another is equal to the difference between the energies of the orbits.

Q49. Which of the following elements does not exhibit electrovalency?

1. Calcium.

2. Chromium.

3. Carbon.

4. Cadmium.

Ans. J. Carbon.

Carbon has 4 electrons in its outermost orbit. It completes its octet by sharing 4 electrons.

 Q50. Atomic number is equal to: 1. Number of electrons. 2. Number of protons. 3. Number of neutrons. 4. Difference in mass number and number of electrons. 	1 Mark
Ans: 2. Number of protons.	
The atomic number of an element is equal to the number of protons in the nucleus.	
Q51. The electronic configuration of Cl ⁻ ion is: 1. 2, 8, 7 2. 2, 8, 8 3. 2, 8, 6 4. 2, 8, 8, 1	1 Mark
 Ans: 2. 2, 8, 8 Explanation: Chlorine atom (Cl) has atomic number 17. It contains 17 protons and 17 electrons. Chlorine ion (Cl⁻) is formed when Cl gains one electron. So, Cl⁻ has 18 electrons and 17 protons. Therefore, the electronic configuration of Cl⁻ = 2, 8, 8. 	
 Q52. The subatomic particle called electron was discovered by: 1. J.J. Thomson 2. Neils Bohr 3. James Chadwick 4. D. E. Goldstein 	1 Mark
Ans: 1. J.J. Thomson Explanation: J.J. Thompson discovered electrons by conducting a cathode-ray experiment.	
 Q53. The ion of an element has 3 positive charges. The mass number of atom of this element is 27 and the number of neutrons is 14. What is the number of electrons in the ion? 1.13 2.10 3.14 4.16 	1 Mark

Ans: 2. 10

Explanation:

Mass number of the element = 27

Number of neutrons = 14

Number of protons = mass number - number of neutrons

= 27 - 14 = 13

As the ion of this element has 3 positive charges, it means that it has lost 3 electrons. Therefore, there are now 10 electrons in the ion.

Q54. In the Thomson's model of atom, which of the following statments are correct?

- 1. The mass of the atom is assumed to be uniformaly distributed over the atom.
- 2. The positive charge is assumed to be uniformaly distributed over the atom.
- 3. The electrons are uniformaly distributed in the positively charged sphere.
- 4. The electrons attract each other to stabilise the atom.

(i), (ii) and (iii)
 (i) and (iii)
 (i) and (iv)
 (i), (iii) and (iv)

Ans: 1. (i), (ii) and (iii)

Explanation:

According to Thomson' model of the atom, an atom consists of a sphere of positively charge with negatively charged electrons embedded in it. These negative and positive charges in an atom are equal in magnitude, due to which an atom is electrically neutral.

Q55. An atom with 3 protons and 4 neutrons will have a valency of:

1. 3 2. 7

3. 1

4.4

Ans: 4. 1

Explanation:

Atomic number = Number of protons = 3 Mass number = Number of protons + number of neutrons =3 + 4 = 7 Electronic configuration of the atom is 2, 1(K,L) Hence, its valency is 1.

Q56. The first model of an atom was given by:

1. N. Bohr.

2. E. Goldstein.

3. Rutherford.

4. J.J. Thomson.

Ans: 3. J.J. Thomson.

Explanation:

The first model of an atom was given by JJ Thomson. According to him, an atom consists of a sphere of positive charge with negatively charged electrons embedded in it.

Q57. Which of the following in Fig. do not represent Bohr's model of an atom correctly?



1. (i) and (ii)

- 2. (ii) and (iii)
- 3. (ii) and (iv)

4. (i) and (iv)

1 Mark

1 Mark

1 Mark

Ans: 3. (ii) and (iv)

Explanation:

Figures (ii) and (iv) not correctly represent the Bohr's model of an atom. It is because maximum number of electrons in K (I) shell is 2, not 4, so (ii) is wrong and maximum capacity of L (II) shell is 8 electrons, not 9. So, (iv) is also wrong.

Q58. Rutherford's α -particle scattering experiment showed that:

1. Electrons have negative charge.

2. The mass and positive charge of the atom is concentrated in the nucleus.

3. Neutron exists in the nucleus.

4. Most of the space in atom is empty.

Which of the above statements are correct?

1. (i) and (iii)

2. (ii) and (iv)
 3. (i) and (iv)
 4. (iii) and (iv)

Ans: 2. (ii) and (iv)

Explanation:

An atom consists of a positively charged, dense and very small nucleus which have all the protons and neutrons. Positive charge is due to protons, as neutrons have no charge. Most of the space is empty because most of the alpha particles pass straight through the gold foil without any deflection.

Electrons have negative charge, it was explained by Thomson. The existance of neutron was discovered by Chadwick.

Q59. Which of the following statements about Rutherford's model of atom are correct?

1 Mark

- 1. Considered the nucleus as positively charged.
- 2. Established that the α -particles are four times as heavy as a hydrogen atom.
- 3. Can be compared to solar system.
- 4. Was in agreement with Thomson's model.
- 1. (i) and (iii)
- 2. (ii) and (iii)
- 3. (i) and (iv)
- 4. only (i)

Ans: 1. (i) and (iii)

Explanation:

Alpha particles are positively charged and were deflected by the nucleus. This showed that nucleus is positively charged. Rutherford also postulated that electrons are arranged in an atom around the nucleus, in the same way as planets are arranged around the Sun in the Milky Way.

- Q60. The isotopes of an element contain:
 - 1. Same number of neutrons but different number of protons.
 - 2. Same number of neutrons but different number of electrons.
 - 3. Different number of protons as well as different number of neutrons.
 - 4. Different number of neutrons but same number of protons.
- **Ans:** 4. Different number of neutrons but same number of protons.

Explanation:

Isotopes are the atoms of the same element with the same atomic number but different mass numbers. It means that they have the same number of protons and electrons but different number of neutrons.

- Q61. The radioactive isotope used in the treatment of cancer is:
 - 1. Plutonium–239
 - 2. Arsenic–74
 - 3. Cobalt–60
 - 4. lodine–131

1 Mark

1 Mark

Explanation:

Cobalt-60 is used in the treatment of cancer. High-energy gamma rays emitted by cobalt-60 isotopes destroy cancerous tumours.

Q62. The correct electronic configuration of a chloride ion is:

1 Mark

2, 8 2, 2, 8, 4 3, 2, 8, 8 4, 2, 8, 7

Ans: 3. 2, 8, 8

Explanation:

Chloride ion, Cl⁻ has 18 electrons so, its electronic configuration is 2, 8, 8.

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

1. ${}^{31}_{15}X$ 2. ${}^{31}_{16}X$ 3. ${}^{16}_{15}X$ 4. ${}^{15}_{16}X$

Ans: 1. $^{31}_{15}$ X

Explanation:

In an atom, the number of electrons is equal to number of protons, which in turn is equal to the atomic number of the element. Also, the sum of number of protons and neutrons represents the mass number of the element.

Q64.	The ion of an element has 3 positive charges. Mass number of the atom is 27 and the number of neutrons is 14.	1 Mark
	What is the number of electrons in the ion?	

1. 13.

2. 10.

3. 14.

4. 16.

Ans: 2. 10.

Explanation:

Mass number (A) of the element = 27

Number of neutrons in the atom = 14

Hence, the number of electrons in atom

= Mass number (A) – number of neutrons in the atom

= 27 - 14 = 13

Since the ion of the element has 3 positive charges, so number of electrons in the ion is 13 - 3. The number of electrons in the ion is 10.

Q65. Which of the following statements is false?

1. Nucleus of atom contains only nucleons (neutrons and protons) was proposed by Rutherford.

2. Neutron is sum of electrons and protons, therefore it is neutral.

3. Mass of electron is 1/1840 times that of proton.

4. Matter is electrically neutral in nature.

Ans: 1. Nucleus of atom contains only nucleons (neutrons and protons) was proposed by Rutherford.

Explanation:

Thomson proposed that the nucleus of an atom contains only nucleons.

Q66. Which of the following are isotopes and which are isobars?

Argon (Ar), Deuterium (D), Calcium (Ca), Tritium (T), Protium (P)

1. Ar, Ca are isotopes and D, T, P are isobars.

- 2. Ar, Ca are isobars and D, T, P are isotopes.
- 3. D, P are isotopes.

4. Ar, P, T are isobars.

Ans: 2. Ar, Ca are isobars and D, T, P are isotopes.

Explanation:

Isotopes - Protium, Tritium and Deuterium are isotopes of hydrogen.

Isobars - Argon and calcium; both have mass equal to 40.

Since isotopes have identical electronic configuration containing same number of valence electrons, they have similar chemical properties, but because the masses are slightly different hence, the physical properties (density, melting pt., boiling pt, etc) are different.

Q67. The cathode ray experiment was done for the first time by:

1 Mark

1 Mark

1 Mark

1. Goldstein.

2. J. J. Thomson.

3. Dalton.

4. Rutherford.

Ans: 2. J. J. Thomson.

Explanation:

The first model of an atom was given by J.J. Thomson. According to him, an atom consists of a sphere of positive charge with negatively charged electrons embedded in it.

Q68. The number of valence electrons determines:

- 1. Physical properties of elements.
- 2. Chemical properties of elements.
- 3. Both physical and chemical properties of elements.
- 4. Neither physical nor chemical properties of elements.

Ans: 2. Chemical properties of elements.

Explanation:

Valence electrons of an atom are those electrons that are involved in chemical bonding. When forming chemical bonds, atoms may lose, gain, or share valence electrons. An element's chemical properties, including its reactivity, depend on how easily its atoms gain, lose, or share valence electrons.

Q69. The atomic number of an element X is 8 and that of element Y is 4. Both these elements can exhibit a valency of: 1 Mark

- 1. 1 2. 2 3. 3
- 4.4

Ans: 2. 2

Explanation:

Atomic number of element X is 8.

Electronic configuration is 2, 6. It will gain 2 electrons to complete its octet; so, its valency is 2.

Atomic number of Y is 4.

Electronic configuration is 2, 2. It will lose 2 electrons in order to completely fill its outermost orbit. So, the valency of Y is also 2.

Q70. In the Thomson's model of the atom, which of the following statements are correct?

1 Mark

- 1. The mass of the atom is assumed to be uniformly distributed over the atom.
- 2. The positive charge is assumed to be uniformly distributed over the atom.
- 3. The electrons are uniformly distributed in the positively charged sphere.
- 4. The electrons attract each other to stabilize the atom.

Options:

- 1. (i), (ii) and (iii)
- 2. (i) and (iii)
- 3. (i) and (iv)
- 4. (i), (iii) and (iv)

Ans: 1. (i), (ii) and (iii)

Explanation:

According to Thomson' model of the atom, an atom consists of a sphere of positively charge with negatively charged electrons embedded in it. These negative and positive charges in an atom are equal in magnitude, due to which an atom is electrically neutral.