



CHEMISTRY

BOOKS - NCERT CHEMISTRY (HINGLISH)

STRUCTURE OF THE ATOM

Structure Of The Atom

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

Answer: B



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2. Rutherford's alpha(α) particles scattering experiment resulted into discovery of

A. electron

B. proton

C. nucleus in the atom

D. atomic mass

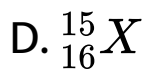
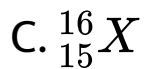
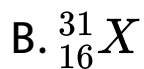
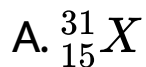
Answer: C



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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 ?



Answer: A



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4. 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: D



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5. Which of the following statement 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: A



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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 number = 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: D



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7. In the Thomson's model of atom, which of the following statements are 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)

Answer: A



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8. 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: B



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9. 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

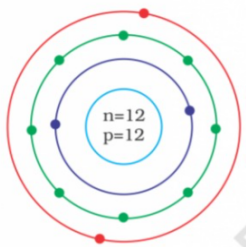
D. 16

Answer: B

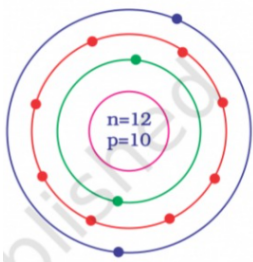


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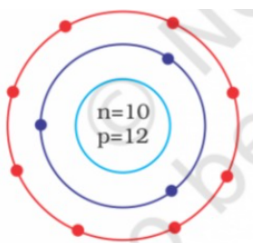
10. Identify the Mg^{2+} ion from the figure where, n and p represent the number of neutrons and protons respectively.



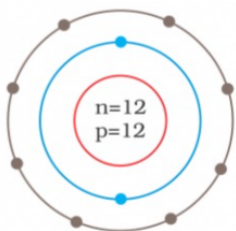
A.



B.



C.



D.

Answer: D



11. 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 have 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: C



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12. Elements with valency 1 are

A. always metals

B. always metalloids

C. either metals or non-metals

D. always non-metals

Answer: C



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13. The first model of an atom was given by

A. N Bohr

B. E Goldstein

C. Rutherford

D. JJ Thomson

Answer: D



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

A. 3

B. 7

C. 1

D. 4

Answer: C



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15. The electron distribution in an aluminium atom is

A. 2, 8, 3

B. 2, 8, 2

C. 8, 2, 3

D. 2, 3, 8

Answer: A



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16. Which of the following in figure 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: C



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17. 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: A



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18. 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: C



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19. Is it possible for the atom of an element to have one electron, one proton and no neutron. If so, name the element.



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20. Write any two observations which support the fact that atoms are divisible.



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21. Will ^{35}Cl and ^{37}Cl have different valencies?

Justify your answer.



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22. Why did Rutherford select a gold foil in his α -ray scattering experiment ?



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23. Find out the valency of the atoms represented by the Figure (a) and (b).



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24. One electron is present in the outermost shell of the atom of an element X. What would be the nature and value of charge on the ion formed if this electron is removed from the outermost shell?





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25. Write down the electron distribution of chlorine atom. How many electrons are there in the L-shell ? Atomic number of chlorine is = 17.



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26. In the atom of an element X, 6 electrons are present in the outermost shell. If it acquires noble gas configuration by accepting requisite

number of electrons, then what would be the charge on the ion so formed ?



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27. What information do you get from the figure about the atomic number, mass number and valency of atoms X, Y and Z ? Give your answer in a tabular form.



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28. In response to a question, a student stated that in an atom, the number of protons is greater than the number of neutrons, which in turn is greater than the number of electrons. Do you agree with the statement ? Justify your answer.




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29. Calculate the number of neutrons present in the nucleus of an element X which is represented as ${}_{15}^{31}\text{X}$.



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30. Match the names of the Scientists given in Column A with their contributions towards the understanding of the atomic structure as given in Column B. 



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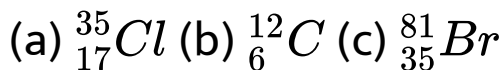
31. The atomic number of calcium and argon are 20 and 18 respectively, but the mass

number of both these elements is 40. What is the name given to such a pair of elements?



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32. Complete the table on the basis of information available in the symbols given below.



Element n_p n_n



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33. Helium atom has 2 electrons in its valence shell but its valency is not 2. Explain.



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34. Fill in the blanks in the following statements.

(a) Rutherford's α -particle scattering experiment lead to the discovery of the

(b) Isotopes 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..... .



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35. An element X has a mass number 4 and atomic number 2. Write the valency of this element.



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36. Why do helium, neon and argon have a zero valency?



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37. The ratio of the radii of hydrogen atom and its nucleus is $\sim 10^5$.

Assuming the atom and the nucleus to be spherical.

(a) What will be the ratio of their sizes ?

(b) If atom is represented by planet earth

' R_e ' = $6.4 \times 10^6 m$, estimate the size of the nucleus.



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38. Enlist the conclusions drawn by Rutherford from his α -ray scattering experiment.



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39. In what way is the Rutherford's atomic model different from that of Thomson's

atomic model ?



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40. What were the drawbacks of Rutherford's model of an atom?



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41. What are the postulates of Bohr's model of an atom?



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42. Show diagrammatically the electron distributions in a sodium atom and a sodium ion and also give their atomic number.



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43. In the gold foil experiment of Geiger and Marsden, that paved the way for Rutherford's model of an atom, $\sim 1.00\%$ of the α -particles were found to deflect at angles $> 50^\circ$. 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 50° .



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