CHEMISTRY

BOOKS - S DINESH & CO CHEMISTRY (HINGLISH)

STRUCTURE OF ATOM

Example

1. There are 15 protons and 16 neutrons in the nnucleus of an element .Calculate its atomic

number and mass number .How will you represent the element?

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2. The symbol of oxygen atom is $^{16}_{8}O$

(i) What is the name given ot the number of protons in the nucleus of the atom?

(ii) What is the name given to the number of protons plus number of neutons in the nucleus of the atom?

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3. The atom of an element has 9 protons , 9 electrons and 10 neutorns.

(i) What is the atomic number of the element?

(ii) what is the mass number of the element?

(iii) Name the element and gives its electronic configuration

(iv) Predict the valenecy of the element.

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4. Atomic number of Alis 13 and mass number is 27 .Calculate the number of electrons protons and neutrons in the ion formed Represent the ion.What will be its valency?

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5. What is the fraction of the mass of water due to neutrons?

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6. The element sulphur has atomic number 16 and mass number 32 state the number of protons electrons and neutons in it. Give the arrangement of the elctons in different energy shells. What is the valency of the element?

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7. Find the number of electrons protons and neutorns in Na^+ and CI^- ions.

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8. Fill in the gaps in the following incompleate table

Mass number	Atomic number	No. of protons	No. of electrons	Name of the element
19	9	—	—	—
24	—	12	—	—
35	—	—	17	—

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9. An ion M^{2+} contains 10 electrons and 12 neutrons .What is the atomic number and mass number the element M? Name the element.

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10. ${}^{24}_{12}Mg$ and ${}^{26}_{12}Mg$ are symbols of two isotopes of magnesium. Compare these isotopes with respect to:

(i) composition of the nuclei

(ii) Electronic configuration and valence

(iii) Chemical properites

(iv) Physical properites.

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11. The element bron occurs in nature as two isotopes havein atomic masses 10 u and 11 u . What are the percentage abundances of these isotopes in a sample of boron having average atomic mass of 10.8 u?

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12. The average atomic mass of copper is 63.5. It exists as two isotopes which are

$._{29}^{63}Cu$ and $._{29}^{65}Cu$. Calculate the percentage of each isotope present in it.

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N C E R T In Text Problems

1. What are canal rays?

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2. If an atom contains one electron and one proton, will it carry any charge or not?

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

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4. On the basis of Rutherford's model of an atom, which sub- atomic particle is present in the nucleus of an atom?

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5. Draw a sketch of Bohr's model of an atom with three shells.

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6. 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 ?

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7. Name the three sub-atomic particles of an atom.

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8. Helium atom has an atomic mass of 4u and two protons in its nucleus. How many neutrons does it have ?

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9. Write the distribution of electrons in carbon and sodium atoms.

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10. If K and L shells of an atom are full, then what would be the total number of electrons in the atom?

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11. If number of electrons in an atom is 8 and number of protons is also 8, then (i) what is the atomic number of the atom? and (ii) what is the charge on the atoms ?

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12. For the symbol H,D and T tabulate three sub-atomic particles found in each of them.

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13. Write the electronic configuration of any one pair of isotopes and isobars.

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N C E R T End Exercise

1. Compare the properties of electrons, protons and neutrons.

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2. What are the limitations of J.J. Thomson's model of the atom?

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3. What are the limitations of Rutherford's model of the atom ?

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

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5. Compare all the proposed models of an atom given in this chapter.

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6. Summarise the rules for writing the distributiion of electones in varius shells for first eighteen elements

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7. Define valency by taking the examples of silicon and oxygen.

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8. Explain with examples (i) Atomic number (ii) Mass number (iii) Isotopes, and (iv) Isobars. Give any two uses of isotopes.

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9. Na^+ has completely filled K and L shells. Explain.

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10. Bromine occurs in nature mainly in the form of two isotopes $._{35}^{79}Br$ and $._{35}(81)Br$. If the abundance of $._{35}^{79}Br$ isotope is 49.7 ^% and that of $._{35}^{81}Br$ isotope is 50.3 %, calculate the average atomic mass of bromine.

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11. The average atomic mass of a sample of an element X is 16.2 μ. What is the percentage of each isotope ${}^{18}_{8}X$ and ${}^{18}_{8}X$ in the sample?

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12. If Z = 3, what would be the valency of the element? Also, name the element

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13. Composition of the nuclei of two atomic species X and Y are given as under

	X	Y
Protons =	6	6
Neutrons =	6	8

Give the mass numbers of X and Y. What is the relation between the two species?

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14. For the following statements, write T for true and F for false :

(a) J.J. Thomson proposed that the nucleus of an atom contains only nucleons

(b) A neutron is formed by an electron and a proton combining together. Therefore, it is neutral

(c) The mass of an electron is about $\frac{1}{2000}$ times that of a proton

(d) A radioactive isotope of iodine is used for making tincture iodine, which is used as a medicine.

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15. Rutherford's alpha particle scattering experiment was responsible for the discovery of

(a) Atomic Nucleus , (b) Electron ,(c) Proton , (d) Neutron.

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16. Isotopes of an element have :

(a) the same physical properties

(b) different chemical properties

(c) different number of neutrons

(d) different atomic numbers

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17. Number of valence electrons in Cl^- ion are:

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

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19. Complete the following table:

Atomic Number	Mass Number	Number of Neutrons	Number of Protons	Number of Electrons	Name of the atomic species
9	—	10	—	—	—
16	32	—	—	—	Sulphur
—	24	—	12	—	0
—	2	—	1	—	—
—	1	0	1	0	—

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Very Short Answer Questions

1. Out of the three sub atomic particles known which is called universal particle?

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2. Name a species which has (i) one proton and one electron (ii) one proton and two electrons

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3. How many electrons are present in the species He^{2+} ions? Suggest another name for it.

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4. How many times is radius of extra unclear protiion more than that of the nucleus of an atom?

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5. Is atomic number of an atom alwayus equal to the number of electons?

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6. Out of proton and neutron which is heavier?

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7. Explain why chlorine has relative atomic mass of about 35.5 u?

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8. Why is proton so named?

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9. The cation is represented as M^{3+} .What is the difference between the number of protons and electons present?

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10. If k and L shells of an atom are completely filled what will be its name?

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11. Do isobars have also identical chemical characteristics like isotopes?

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12. The electoni configuration of an element is : 2(K),8(L),5(M). Predict its valency.

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

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14. What is the basic difference between the isotopes of an elements?

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15. The element aluminium is written by the symbol ${}^{27}_{13}AI$.write the number of protons, electrons and neutrons present in it.

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16. What is the number of electrons in the valence shell of chlorine (Z-17)?

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17. The radioactive isotope used in the treatment of cancer is :

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18. Out of c-12 and c-14 isotopes of carbon which is of radioactive nature?

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19. If an atom has one proton and one electron state the charge on the atom. Justify your answer.

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20. The electronic configuration of an element Z is 2,8,6.How many electons does it require to have a stable configuration?

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21. Will ${}^{12}_{6}C$ and ${}^{14}_{6}C$ have different valencies?

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22. The atom of an elelment 'A' has threee electons in the outermost shell. It loses one of these to the atom of another element 'B'.What will be the nature and value of charge on the ion which results from 'A'?

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23. The atom of an element has electronic configuration 2,8,6.Does it gain two electrons or lose six electrons have the configuration of the nearest noble gas element?

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24. Do the elelment ${}_{1}^{3}X$ and ${}_{2}^{3}Y$ represet pair of isotopes?

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

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26. Name the particles which actually determine the mass of an atom.

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27. J. chadwick discovered a sub atomic particle which has no charge but has mass nearly equal to that of a proton.Name the particle and give its location in an atom.

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28. The K and L shells of an atom are completely filled. Find the number of electrons present in it state the name of the element.

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29. Who discovered protons?

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30. What are valence shell and valence electrons?

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31. The total number of nucleons in the atoms of clacium and argon is 40 and the atomic numbers of calcium neutrons present in the nucleus of argon atom.

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32. Atom of an element has one proton one electron and no neutron .Name the element .How will you represent it?

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33. An element has 2 electrons in the M shell. What is the atomic number of the element ?

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34. Write the names of three elementary paritcles which constitute an atom.

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35. Identify the most stable atom from the following .Alson given the reason for your answer: ltbr. $Na_{11}^{23}, CI_{17}^{35}, AI_{13}^{27}, Ar_{18}^{40}$

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36. what are the constituents of cathode rays?

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37. What is the mass of an electron?

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38. Do protons and electrons have same mass?

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39. How are the radii of the nucleus and of an atom related to each other according to rutherford model of atom?

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40. What is the maximum number of electrons which can be present in M shell ?

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41. What is common in the different isotopes of an element?

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42. what is the e/m value of an electron?

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43. Give the electonic distribution in an elements with atomic number 15.

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44. Three species have the same atomic number .How are they related to each other?

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45. Do isobars have the same number of neutrons?

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46. Define the term isotope.

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47. What is the valency of the element neon?

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48. What is a nucleon?

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49. What is the expected valency of sulphur (Z=16)?

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50. Write the electronic distribution of the elements:

(i) ${}^{31}_{65}P$, (ii) ${}^{35}_{17}CI$

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51. In a species the number of elctrons ios more than the number of protons predict its nature.

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Short Answer Question

1. Which is the number of valence electrons in :

(a) sodium ion, Na^+

(b) oxide ion, O^{2-}

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2. Element 'A' and 'B' have atomic number 18 and 16 respectively.Which of these two would be more reactive any why?

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3. Two atoms A and B have the following composition:

AtomA, Atom B

17 protons,17 protons

18 neutrons,20 neutrons

What are their mass numbers? What is the relation between the species?

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4. The composition of two atomic particles is given below :

	X	Y
Protons :	8	8
Neutrons :	8	9
Electrons :	8	8

(i) What is the mass number of X ?

(ii) What is the mass number of Y ?

(iii) What is the relation between X and Y ?

(iv) Which element/elements do they represent ?

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5. State wheather the following statement are true or false.

(i)One mole of methane has four H atoms.

(ii) The isotopes of an element differ in the number of electrons.

(iii)The elelment are identified by their atomic numbers.

(iv) The mass number of an element has specific units.

(v) The K shell of an element cannot have more than eight electrons.

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6. Name the elements which have the following electronic configuration:

(i) 2,6 (ii) 2,7 (iii) 2,8,1 (iv)2,8,7 (v)2,8

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7. Give three points of distinaction between isotopes and isobars.

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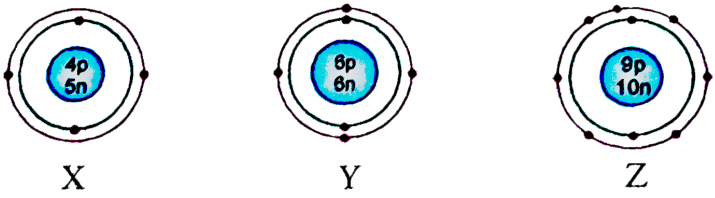
8. The details about three atoms X,Y and Z are given. Given information about their atomic number mass number and valency?



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

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10. Give the electronic distribution in magnesium atom and magnesium ion how do these electronic configruation differ?

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11. If 'K' and 'L' shells of an atom are completely filled then what would be (i) the total number of electrons in an atom and (ii) its valency?

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12. For chlorine Z=17,A =35.Give the number of protons ,electrons and neutrons in (i)chlorine atom ,(ii) chloride ion.

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13. List three observations of the experiment performed by Rutherford for his model of an atom.

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14. Hydrogne has three isotopes which are wirtenas:

$${}_{1}^{1}H, {}_{1}^{2}H, {}_{1}^{3}H$$

Explain why:

(a) These isotopes have identical chemical properties. ,(b) These isotopes are electrically neutral

(c) The isotopes differ fin theeir masses because they differ in their of certain elements are given:

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15. In the following table the mass number and the atomic number of certain elemnts are given:

Elements	A	B	C	D	E
Mass no.	1	7	14	40	40
Atomic no.	1	3	7	18	20

(a)Select the pair of isobars from the above table.

(b) What would be the valency of the element C listed in a neutrl atom?

(c) Which two sub atomic particles are equal in number in a neutral atom?

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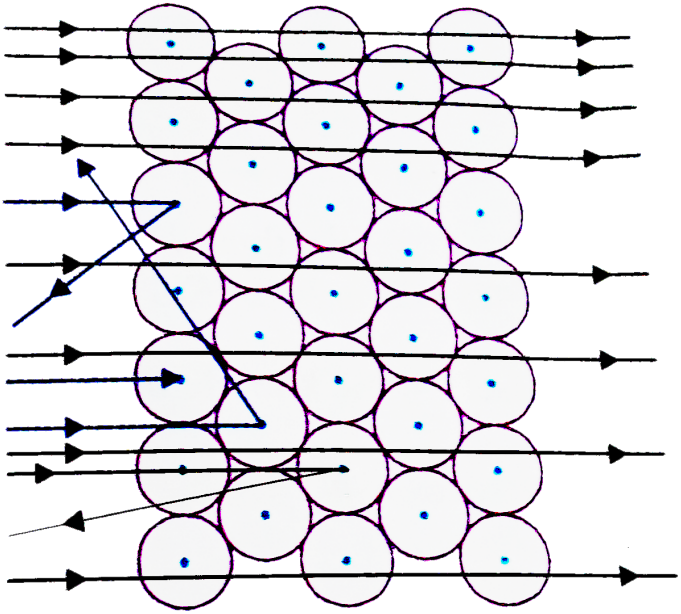

16.

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17. There are two elemetns $\overset{26}{\underset{13}{A}}$ and $\overset{26}{\underset{14}{B}}$ .Find the number of sub atomic particles in each of

these.What is the relations between these atoms?

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

Argon, Deuterium, Calcium, Tritium, Protium.

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19. (a) Explain Bohr and Bury rules for distrubution of electrons into different shells.

(b) Draw the electronic structure of element X with atomic number 17 and element y with atomic number 16?

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20. The atomic number and mass number of an element are 16 and 32 respectively.Find the number of proton electrons and neutrons in

it. State its valency .Is this element a metal or a non-metal .Justify your answer.

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21. You are given a n element ${}_{8}^{16}X$. Find out

(a) Number of protons electrons and neutrons in X.

(b) Valency of 'X'.

Write the chemical formula of the compound formed when 'X' reacts with(i) hydrogen,(ii) carbon.

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22. Define the terms (a) isotope,(b) isobar giving one example in each case. Name the element whose isotope is used in (i) nuclear reactor,(ii) treatment of cancer.

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23. (a) What are canal rays? Who discovered them? What is the charge and mass of canal rays?

(b) How are canal rays different from electons in terms of charge and mass?

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24. certain particle x has 17 protons 17 electrons and 18 neutrons

(i) What is the mass number of X?

(ii) What is atomic number of X?

(iii) What is valency of X?

(iv) identify the elemnet.

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25. (a) The element helium has 2 electrons in its valence shell but its valency is not 2. Explain

(b) Choose the isotopes from the following nuclie:

(i)8p+8n,(ii) 8p+9n,(iii) 18p +22n ,(iv)20p+20n

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26. complete the following table:

Atom	Mass no.	Atomic no.	No. of neutrons
$^{60}_{27}Co$			
$^{23}_{11}Na$	23	11	
$^{37}_{17}Cl$			20

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27. An element is represented as ${}^{16}_{8}X$.Find:

(a) The numbr of electons in elemnet X.

(b) Mass number of an element X.

(c) The number of neutrons in element X.

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28. The electronic configuration of potassium (K) is 2,8,8,1 instedad of 2,8,9 through the M

shell can accommodate up to 18 electron Explain.

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29. Show the electron distribution in magnesium atom and magnesium ion diagrammatically and also give their atomic numbers.

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30. The composition of two atoms A and B is given:

Atom A	Atom B
17 protons	17 protons
18 neutrons	20 neutrons
17 electrons	17 electrons

(a) What are the mass numbers and atomic numbers of A and B?

(b) What is the relation between the two chemical species?

(c) Which element or elements do they represent?

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31. (a) what is the relationship between two elements x and y whose atomic numbers are 18 and 20 repectively but their mass umbers remain the same as 40 ?

(b) are their chemical properties same or different? Explain and support your answer.

(c) Which has more numbr of electrons Na or Na^+ ? why?

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32. write the elctron distrubution of oxygen atom .How many valence electrons does it have?

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33. (a) Why does helium have zero valecy?

(b) Name the secientist and his experiment to prove that nucleus of an atom is positively charged.

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34. Which observations in scatteing experiment led Rutherford to make the following conclusions:

(i) Most of the space in an atom is empty , (ii) Whole mass of an atom is present in its center.

(iii) Nucleus is postively charged.

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35. Write the two postulates of Thomson's model o fan atom .What were the drawbacks

in this model?

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36. (a) how many neutrons are present in c-14 isotope of carbon?

(b) how many protons does He^{2+} ion posses?

(c) How many electons can be filled in the third orbit of an atom at the maximum ?

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37. 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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38. 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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39. Calculate the number of neutrons present in the nucleus of an element X which is represented as $^{31}_{15}X$.

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

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

(a) $^{35}_{17}Cl$ (b) $^{12}_{6}C$ (c) $^{81}_{35}Br$

Element	n_p	n_n

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

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44. Fill in the blanks in the following statements:

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

(b) Isotopes have same.....but different ..... .

(c) Neon and chlorine have atomic numbers 10 and 17 respectively. Their velencies will be ..... and .....respectively

(d) The electronic configuration of silicon is.....and that of sulphur is..... .

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

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Long Answer Question

1. (a) Give the schematic atomic structures of chlorine atom and chloride ion .

(b) mention two uses of isotopes in the filed of medicine

How are the following pair of elements known as?

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2. Answer the following in one line or two:

(a) what is the maximum number of electrons

that can be accomodated in the outermost energy shell in an atom?

(b) on the basis of thomoson's model of an atom explain how an atom is neutral as a whole

(c) how many neutons are present in hydorgen atom?

(d) do isobars belongs to the same elements?

e) An element has five electons in the M shell which is the outermost shell. write its electronic configureation.

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3. Which observations in scatteing experiment led Rutherford to make the following conclusions:

(i) Most of the space in an atom is empty , (ii) Whole mass of an atom is present in its center. (iii) Nucleus is postively charged.

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4. With the help of suitable acitivies shows that

(i) cathode rays travel in straight line

(ii) cathode rays consist of material particles.

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5. The average atomic mass of a sample of an element X is 16.2 μ. What is the percentage of each isotope ${}_{8}^{18}X$ and ${}_{8}^{18}X$ in the sample?

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6. Give reasons for the following:

(a) Isotopes of an element are chemically similar. , (b) An atom is electrically neutral

(c) Nobles gases show least reactivity , (d) Nucleus of an atom is heavy and positively charged

(e) Ions are more stable than atoms.

7. The following data repersents the distribution of electons protons and neutrons in atoms of four element AltBltCltD

Element	Protons	Neutrons	Electrons
A	19	21	19
B	17	18	17
C	17	20	17
D	18	22	18

Answer the following questions:

(a)Describe the electronic distrubution in atom of element B. , (b) Is elements B a metal or a non metal? why ?

(c) which two elements form a pair of isotopes? ,(d) which two element form in pair of iosbars?

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8. An atom of an elements has two electrons in outermost M shell state its

(a) Electronic configuration (b) number of protons (c) atomic number

(d) nature whether metal or non metal

(e) valency

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9. (a) why are the chemical properties of the isotopes same?

(b) Draw bohr model helium atom.

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10. (a) In the gold foil experiment , what observations led Rutherford to conclude that

(i) Most of the space inside the atom is hollow

(ii) The central protion of the atom is positively charged.

(iii) volume occupied by the nucleus is very small as compared to the total volume of the atom

(iv) almost the entire mass of the atom concentrated at its centre.

(b) If bromine atom is available in the form of two isotopes ${}^{79}_{35}Br(49.7\%)$ and ${}^{81}_{35}Br$ (50.3%) calculate the average atomic mass of bromine atom.

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11. (a) state the postulates stated by neils bohr in order to overcome the objection as raised against Ruthford's model of atom.

(b) summarise the rules for the distrubution of elctrons in the first eighteen elements

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12. Define isotopes why do isotopes have same atomic number but differente mass numbers? Explain with the help an example.

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

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

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

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

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

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

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20. In the gold foil experiment of Geiger and Marsden, that paved the way for Rutherford's model of an atom, ~$1.00\,\%$ 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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Higher Order Thinking Skilll Based Questions

1. Both helium (He) and beryllium (Be) have two valence electrons.Whereas he represent a noble gas element,Be does no. Assign reason.

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2. Study the data given below answer the qusestion which follow:

Particle	Electrons	Protons	Neutrons
A	2	3	4
B	10	9	8
C	8	8	8
D	8	8	10

(i) write the mass number and atomic number of the particles A,B,C and D.

(ii) Which repersent a pair of isotopes?

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3. Which of the two will be chemically more reactive , element x with atomic number 17 or element y with atomic number 16?

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4. The number of protons neuitrons and electrons in particles from A to E are given below:

Particle	Protons	Neutrons	Electrons
A	17	18	17
B	3	4	2
C	18	22	18
D	17	20	17
E	9	10	10

(i) Which one is a cation? , (ii) which one is an anion?

Which represent pair of isoptopes?

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5. An atom of an elemets has three elctons in the third shell which is the outermost sell .Write

(a) the electronic configureation , (b) the

atomic number

(c) Eclectronic configuration : 2,8,3 , (d) Valency

(e) the name o f the element , (f) its nature whether metal or non metal

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Multiple Choice Question

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 ?

A. ${}^{31}_{15}X$

B. ${}^{31}_{16}X$

C. ${}^{16}_{15}X$

D. ${}^{15}_{16}X$

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 , ii and iv

C. ii , iii and iv

D. I, ii and iv

Answer: d

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5. Which of the following statements about Rutherford 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. iand 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 statement 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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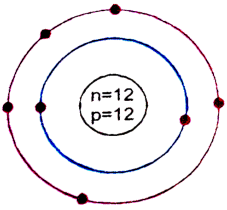
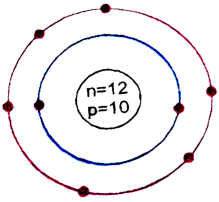
10. Identify the Mg^{2+} ion from the figure where, n and p represent the number of neutrons and protons respectively.

A.



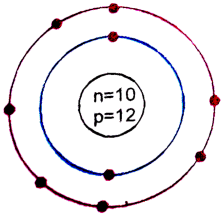
(a)

B.



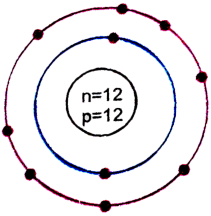
(b)

C.



(c)

D.



(d)

Answer: d

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11. In a sample of ethyl ethanote $(CH_3COOC_2H_5)$ 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 one electron

B. one of the oxygen atoms has gained two neutrons

C. The two oxyen atomis 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. J.J Thomson

Answer: D

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14. An atom with 3 protons and 4 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 elctrons and neutrons

C. An atom has equal number of proton and neutrons

D. An atom has equal number of electrons protons and neurtons.

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. Atom of an element has one proton one electron and no neutron .Name the element .How will you represent it?

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20. Write any two observation 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 acuires noble gas configuration by accepting requisite

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

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Praticle Based Question

1. Mention the temperature of the following in degree celsius and kelvin scales:

(i) Ice and ice cold water

(ii) Boling water and steam.

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2. Rima took fine chalk powder egg albumin starch powder and alum powder in four test tubes A,B,C, and D respectively .After adding water to all the four test tubes, identify the test tubes as true solution suspension and colloid.

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3. A student added water to sand and strach in different test tube .How will you differenitiate

between the two on the basis of transparency?

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4. List two precautions you must take while finding the melting point of ice .

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5. Dipti was asked to prepare four separate mixtures in four beakers A,B,C and D by mixing

sugar, fine aan thin paste of strarch and chalk powder respectively in water and then categorise each as stable or unstable what will be correct categorization?

6. Identify two clear and transparent solution form the following mixtures:

(a) Milk and water (b) sugar and water (c) strach powder and water (d) Glucose and water.

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7. In an experiment to determine the boiling point of water state the reason for the following recautions:

(i) The bulb of the thermometer should not touch the sides of the beaker.

(ii) while boiling water pumice stone should be added.

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8. Four students A,B,C and D were given funnels filter paper test tubes ,test tube stands common salt, chalk powder starch and glucose powder they prepared the true solution suspension and collloidal solution .Test tubes were arranged as shown in the figure. observe the filtrate obtained in the test tubes and residue on filter paper . conclude about filtrate residue and type of solution.

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9. If in the determinenation of melting point of ice the ice is contaiminated with some non volatile impurity like common slalt how is the melting point of ice affected?

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10. A mixture of san d powdered glass and common salt is dissoled in water and then filtered.Name the substanceleft on the filter paper .Name the substance in the filtrate.

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11. In an exp[eriment to determine the boiling point of water mention two important precautions.

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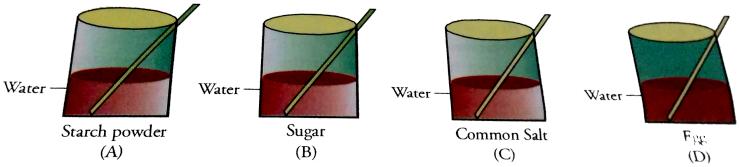
12. Four students A,B,C and D are asked to prepare colloidal solution .The following diagrams shown the preparation done by them .Name the student who will able to prepare colloidal solution.Write two

properties of colloidal solutions.



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13. Rima took fine chalk powder egg albumin starch powder and alum powder in four test tubes A,B,C, and D respectively .After adding water to all the four test tubes, identify the test tubes as true solution suspension and colloid.

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14. What is a suspecnsion? Give two characteristics of suspension?

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15. List two properties of a true solution .How would you prepare a true solution .List two different solutues which will form a true solution.

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16. While doing an experiment to determine the melting paint of ice state the role of glass stirrer and mention the correct position of bulb of the thermometer.

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17. Rima took fine chalk powder egg albumin starch powder and alum powder in four test tubes A,B,C, and D respectively .After adding

water to all the four test tubes, identify the test tubes as true solution suspension and colloid.

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18. While determininig the melting point of ice it was observed that even when ice cubes were being moderates heated using the gas burner the temperature did not rise for sometime till the whole ice melted. Give the possible reason.

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19. In an experiment to verifty the law of conservation of mass in a chemical reaction four studetns A,B,C and D noted down the following observation for the different in the mass of apparatus before and after the chemical reation,

A-4g,B-8g,C-zero g,D-10 g

Which student has made the correct observation and why?

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20. When 15g of copper sulphate react with 15 g of sodium hydroxide, 20g of sodium suphate along with copper hydroxide is formed .What is the mass of copper hydroxide formed?

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21. To verify the law of conservation of mass in a chemicl reaction four students A,B,C and D perfored the following chemicla reactions in the schoold laboratory.

Added zinc granules to dil hydorchlorica acid

(b) heated lead nitrate (solid) in a test tube

(c) dipped mg ribbon in copper suphate solution

(d) added barium chloride solution to sodium suphate solution .

Which student according to you is likely to obtain the best results and why?

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22. 16.8 g of sodium hydrogen carbonate are added to 12.0 g of acetic acid .The residue left

weighed 20.0 g what is the mass of CO_2 escaped in the reaction ?

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23. While studying the properties of cathode rays in a discharge tube a student placed mica wheel moundted on an axle in the path of the rays .What would happen to the wheel? What conclusions can be drawn from it?

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Short Answer Questions

1. why are anode rays called positive rays?

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2. Name the constituent of cathode rays. What is the magnitude of charge and mass present on it?

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3. How do neutrons and protons different characteristic?

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4. Name the three isotopes of hydrogen .How do they differ? Which out of them is radioactive?

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5. The elements which exitst as isotopes have generally fractional atomic masses.Justify.

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6. Nuclear compostion of atomic species A and B are given below.

A	B
$\text{Protons} 6$	$\text{Protons} 6$
$\text{Neutrons} 6$	$\text{Neutrons} 8$

Give the atomic numbers and mass numbers of A and B .How are they related to each other? Which element do they represent?

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7. Given the number of porotons, electrons and neutrons in the following :

$$\overset{23}{\underset{11}{Na}}\ \overset{31}{\underset{15}{P}}\ \overset{35}{\underset{17}{CI}}$$

Give the electonic distribution of these atoms and also predict the valency in each case.

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Long Answer Questions

1. Define the terms atomic number and mass number how are they related to each other? In which case the atom of the element has same number of protons and electrons?

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2. Describe Rutherford atom model. What are the drawbacks of this model?

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3. Complete the following table:

Mass number	Atomic number	No. of protons	No. of neutrons	Name of the element
31	15	—	—	—
—	—	12	12	—
—	17	—	18	—

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4. What are isotopes? What is common in the isotopes of an element . Give the representations of the three isotopes of carbon which are c-12,c-13 and c-14

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5. How will you account for the following ?

(i) an atom is electrically neutral

(ii) isotopes of an element are chemically similar

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6. An ion M^{3+} contains 10 electrons and 14 neutrons what are the aomic number and mass number of the element M? name the

elemetn .Give its electrons distribution and predict valency.

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