CHEMISTRY

BOOKS - KUMAR PRAKASHAN KENDRA

CHEMISTRY (GUJRATI ENGLISH)

STRUCTURE OF THE ATOM

Intext Questions And Answers

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 subatomic particles 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 thee observation if the a-particle scattering experiment is carried out using a foil of a metal other than gold?

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7. Name the three subatomic particles of ab atom.

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8. Helium atom has an atomic mass of 4 u 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. How will you find the valency of chlorine, sulphur and magensium ?

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

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13. With the help of Table given on page 277 find out the mass number of oxygen and sulphur atom.

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14. For the symbol H, D and T tabulate three subatomic particles found in each of them.

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

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Questions And Answers

1. What is an α-particle ?

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2. What is the mass of α-particle ?

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3. Which fundamental particle was discovered by J. J. Thomson ?

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4. Why did Rutherford select a gold foil in his α-particle scattering experiment ?

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5. Who discovered neutron ?

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6. Why is an atom electrlcally neutral ?

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7. What is nucleus in an atom ?

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8. What is the radius of an atom as compared to the nucleus ?

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9. What is the mass of proton with respect to an electron ?

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10. What is an orbit ?

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11. What is a neutron ?

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12. What is the difference between a proton and a neutron ?

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13. What is the maximum number of electrons that can be accommodated in L shell? (L shell or 2nd orbit)

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14. What is the mass of an atom ?

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15. Where is the mass of an atom concentrated ?

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16. What is atomic number?

View Text Solution

17. What is mass number ?

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18. Draw a sketch of aluminium and chlorine atoms showing distribution of electrons in various shells.

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19. Calculate the average atomic mass of chlorine on the basis of this data : Atomic number 17, mass number 35, 37 and their ratio 3: 1.

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20. What do you understand by valence electrons ?

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21. From the symbol $^{40}_{20}Ca$, write electronic configuration and valence electrons.

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22. Draw the atomic structure of sodium atom on the basis of Bohr's model.

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23. What is meant by electronie configuration of an element?

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24. 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 proton.

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

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25. Name the isotopes of hydrogen.

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26. What are isobars ?

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27. The atomic number of an element is 12. What is its valency ?

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28. Atomic number

View Text Solution

29. Atomic mass number

View Text Solution

30. Isotopes

View Text Solution

31. Stationary orbit

View Text Solution

32. Valency

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33. What are α-particles made-up of ?

A. 2 electrons and 2 protons

B. 2 protons and 2 neutrons

C. 2 electrons and 2 neutrons

D. Helium atom

Answer: A::B::D

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34. Which of the following elements possesses 16 electrons and 16 neutrons?

A. ${}^{16}_{16}X$

B. ${}^{16}_{32}X$

C. ${}^{16}_{0}X$

D. ${}^{0}_{16}X$

Answer: A::B::C

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35. The atomic numbers of Ne, Mg. Al and P are 10, 12, 13 and 15. Out of Ne, Mg^{2+}, Al^{3+} and P^{3-}, electronic structure of which element /ion differs?

A. Ne

B. Mg^{2+}

C. Al^{3+}

D. p^{3-}

Answer: C

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36. How many electrons can be accommodated in the outermost orbit of an element ?

A. 2

B. 8

C. 18

D. 16

Answer:

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37. In isobars, the number of .... is samne.

A. proton and electron

B. proton and neutron

C. electron and neutron

D. neutrons

Answer: A::D

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38. For ${}_{15}^{31}P$ is one of the isotopes of phosphorus. State the number of protons, neutrons and electrons in it respectively.

A. 15, 31, 15

B. 15, 15, 16

C. 15, 31, 16

D. 15, 16, 15

Answer: A

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39. The atomic number of calcium is 20. It possesses K, L, M and N shells. Which shel(s) would be Alled incompletely ?

A. L, M, N

B. M, N

C. N

D. K, L , M, N

Answer:

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40. In chlorine. argon, potassium and calcium, the number of electrons are 17, 18. 19, 20 and number of neutrons are 18, 22. 20, 20 respectively. Whlch pair of elements is isobars?

A. Chlorine and calcium

B. Potassium and chlorine

C. Argon and calcium

D. Potassium and argon

Answer: A::C::D

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41. When Ion is formed from the atom, number of which subatomic particle(s) changes ?

A. Proton

B. Neutron

C. Electron

D. Proton and neutron

Answer: C

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42. The electrons present in the outermost shell of an atom are known as ..... .

A. Valence electrons

B. Octet

C. Diatomic

D. Nucleon

Answer: A::C

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43. State the electronic configuration of $^{35}_{17}Cl$.

A. 2,7

B. 2,8,8,7

C. 2,8,7

D. 2,7,8

Answer: B

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44. ..... Is used in the treatment of cancer.

A. ^{235}U

B. ^{25}Na

C. ^{127}I

D. ^{60}Co

Answer: C

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45. State the pair of isobar elements.

A. ${}^{40}_{20}Ca$, ${}^{35}_{17}Cl$

B. ${}^{20}_{18}Ca$, ${}^{20}_{19}Cl$

C. ${}^{16}_{8}Ca$, ${}^{18}_{8}Cl$

D. ${}^{19}_{7}Ca$, ${}^{13}_{7}Cl$

Answer: A::B::C

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46. In $^{108}_{47}Ag$, state the number of protons, neutrons and electrons respectively.

A. 47, 47, 61

B. 47, 61 , 47

C. 61,47,47

D. 61,61,47

Answer: A::D

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47. Which subatomic partlcle is not present in hydrogen atom ?

A. Proton

B. Ncutron

C. Proton and neutron

D. Electron

Answer:

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48. State the valence electrons in graphite.

A. 2

B. 3

C. 5

D. 4

Answer: D

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49. The atomic number of element X is 8, while the atomic number of element Y is 4 . Hence. The valency of these elements is ..... .

A. 1

B. 2

C. 3

D. 4

Answer: B

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50. State the correct electronlc strueture of Mg^{2+} from the following :

A. 

B. 

C. 

D. 

Answer:

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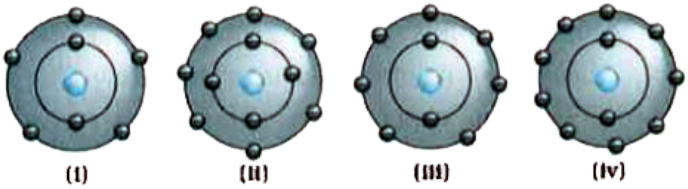
51. Which of the following figures do not denote the atom truely as per Bohr's model of

atom?



A. (i) and (ii)

B. (ii) and (iii)

C. (ii) and (iv)

D. (i) and (iv)

Answer: A::D

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52. The number of electrons present in the outermost shell of an atom is known as ... .

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53. $^{22}_{11}Na$ and $^{22}_{10}Ne$ are ..... of each other.

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54. $^{234}_{92}U$, $^{239}_{92}U$ and $^{238}_{92}$U are .... Of uranium .

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55. The valency of oxygen is .... .

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56. An isotope of ..... Is used as a fuel in nuclear reactors.

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57. An isotope of ..... is used in the treatment of goitre.

View Text Solution

58. An isotope of cobalt is used in the treatment of ..... .

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59. In isotopes of an element, the number of ..... Differes.

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60. Proton and neutron are also called as ..... .

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61. The maximum number of electrons in M-shell is ..... .

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62. Rutherford selected foll of . metal in scattering of α-particles experiment.

View Text Solution

63. ..... present in the nucleus of an atom possess positlve electric charge.

View Text Solution

64. The mass of neutron is ..... Times more than that of electron.

View Text Solution

65. The electronic configuration of sodium atom is ..... .

View Text Solution

66. The electronic configuration of sodium atom is ..... .

View Text Solution

67. There are ..... electrons in the outermost orbit of chlorine atom.

View Text Solution

68. There are ..... electrons in the outermost orbit of chlorine atom.

View Text Solution

69. One of the indications that atoms are not indivisible comes from the study of ..... .

(static electrictty, scattering of α-particles, seeds in the watermelon)

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70. The negatively charged particle discovered by . J. Thomson is called ..... .

(proton, neutron. electron)

View Text Solution

71. Canal rays possess ..... electrical charge.

(postve, negative, neutral)

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72. The mass of proton is approximately ..... times as that of the electron.

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73. In Rutherford's α- particle scatteringexperiment, one out of every.. particles appeared to rebound.

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74. The radius of the atom is about ..... Times more than the radius of nucleus.

$(10^2, 10^4, 10^5)$

View Text Solution

75. In an orbit 32 electrons can be accomodated, then it will be ..... Orbit. (L, M, N)

View Text Solution

76. Scientist ..... discovered subatomic particle which had no charge.

(J. J. Thomson, J. Chadwick, E. Goldstein)

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77. The maximum number of electorns present in the orbit is respresented by ..... Formula.

$(3n^2, 2n^2, 2n)$

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78. The valencies of magnesium and aluminium are ..... Respectively.

(2 and 3, 1 and 3,3 and 2)

View Text Solution

79. Hydrogen has ..... Isotopes.

Two, three, four)

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80. Protons are in the interior part of the atom.

View Text Solution

81. α-particles are doubly-charged moving helium ion.

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82. There is very negliglble contribution of electrons in deciding the atomic mass.

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83. The valenctes of hydrogen. sodtum and lithium are same.

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84. The chemical properties of isotopes are similar.

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85. Total number of nucleons is the same in the atoms of isobar.

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86. The average atomic mass of chlorine is 35.5 u.

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

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88. What are the features of Rutherford's model of an atom ?

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

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90. Write the main postulates of Bohr's model of an atom.

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91. Mention two features of Bohr's model which helped compensate drawbacks in Rutherford's model of an atom.

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92. If bromine atom is available in the form of, say two isotopes $^{79}_{35}Br$ (49.7%) and $^{85}_{35}Br$ (50.3%). Calculate the average atomic mass of bromine atom.

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

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94. 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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95. Give information about isotopes.

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96. State one similarity and one dissimilarity between protons and neutrons.

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97. Which constituent particles of the atom determine (i) the mass of the atom (ti) the size of the atom ?

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98. What is an octet? Why do atoms complete their octet ?

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99. Complete the table on the basis of the following information : ${}^{12}_{6}C$, ${}^{81}_{35}Br$

Element	Number of protons	Number of neutrons

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100. Match the following properiy :

Column I	Column II
1. Electron	a. Inert element
2. Neutron	b. Metallic element
3. Helium	c. Positively changed particle
4. Magnesium	d. Negatively charged particle
	e. Chargeless particle

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101. Match the following properiy :

Column I	Column II (Number of neutrons)
1. Protium	a. 1
2. Deutarium	b. 0
3. Tritium	c. 2
	d. 3

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102. Match the following properiy :

Column I	Column II
1. K	a. 12
2. L	b. 18
3. M	c. 8
4. N	d. 32
	e. 2

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103. Match the following properiy :

Column I	Column II (Isotopes)
1. Useful in nuclear reactor	a. I
2. Useful in treatment of cancer	b. U
3. Useful in treatment of goitre	c. Co
	d. CO

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104. Match the following properiy :

Column I	Column II
1. J. J. Thomson	a. Neutron
2. E. Goldstein	b. Distribution of electrons
3. J. Chadwick	c. Proton
4. Bohr and Bury	d. Electron

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105. Match the following properiy :

Column I	Column II
1. Ernest Rutherford	a. Invisibility of atoms
2. J. J. Thomson	b. Stationary orbits
3. Neils Bohr	c. Concept of nucleus
4. E. Goldstein	d. Discovery of electrons
	e. Atomic number
	f. Canal rays

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106. Electrons and Protons

View Text Solution

107. Protons and Neutrons

View Text Solution

108. Atomic number and Atomic mass number

View Text Solution

109. Isotopes and Isobars

View Text Solution

110. Draw a diagram of Thomson's model of an atom. Why was it discarded ?

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

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112. Summarise the rules for writing of distribution of electrons in various shells for the first eighteen elements.

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113. Define valency by taking examples of silicon and oxygen.

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114. Why do helium, neon and organ have a zero valency ?

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115. (a) The elements are identified by their atomic numbers and not by their mass number. Justify the statement. (b) State the rules followed for writing the number of electrons in different energy levels.

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116. (a) Define atomic number and mass number. (b) Which one of them is a more fundamental attribute of element ? State the reason.

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117. The number of protons and electrons are the same in an atom. Then why is it wrong to say that atomic number of an atom is equal to the number of electrons?

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118. (a) Which of the following species has 18 electrons ?

Ca^{2+}, K^{+}, Cl^{-}. Ar

(b) Chemial properties of all isotopes of an element are similar. State reason.

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119. The average atomic mass of a sample of an element X is 16.2 u. What are the percentages of isotopes ${}^{16}_{8}X$ and ${}^{18}_{8}$ X in the sample?

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120. State the uses of isotopes.

View Text Solution

121. Describe the main features of Bohr's model of an atom. Draw a neat and labelled diagram of energy levels.

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122. (a) You are given an elemetn $^{14}_{7}X$. Find out (i) number of protons, elecirons and neutrons in X. (ii) valency of X (iii) electronic configuration of X.

(b)If bromine atom in the form of, say 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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123. 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	-	-
-	2	-	1	-	-
-	1	0	1	0	-

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

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125. If iron atom is available in the form of , say three isotopes ${}_{25}^{54}\mathrm{Fe}$, ${}_{26}^{56}Fe$ and ${}_{26}^{57}\mathrm{Fe}$ and their proportion is 5% , 90% and 5% respectively.

Calculate the average mass of iron atom.

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126. The average atomic mass of an element Y is 35.54. Find the percentages of isotopes ${}^{37}_{17}Y$ and ${}^{35}_{17}$Y.

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127. Give the arrangement of electrons of the following elements in their orbit :

${}_{11}Na,$ ${}_{13}Al,$ ${}_{19}K,$ ${}_{16}S,$ ${}_{8}O$

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128. Write electron structure of following atoms on the basis of Bohr's model :

$_{10}Ne,$ $_{12}Mg,$ $_{15}P,$ $_{17}Cl,$ $_{20}Ca$

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Activity

1. comb dry hair . Does the comb then attract small pieces of paper ?

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2. Rub a glass rod with a silk cloth and bring the rod near an inflated balloon . What happens ?

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