CHEMISTRY

BOOKS - S CHAND CHEMISTRY (HINGLISH)

STRUCTURE OF ATOM

Solved Examples

1. Calculate the atomic number of an element whose atomic nucleus has mass number 23

and neutron number 12. What is the symbol of the element ?

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

A. 1

B. 2

C. 4

D. 3

Answer: B

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4. Write the electronic configuration of an element X whose atomic number is 12.

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5. Write the distribution of electrons in a carbon atom. (Atomic number of carbon = 6)

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6. Write the electronic configuration of sodium atom (Atomic number of sodium = 11)

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7. What would be the electronic configuration of a positively charged sodium ion, Na^+ ? What would be its atomic number ?

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

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

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11. What valency will be shown by an element having atomic number 12 ?

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12. What valency will be shown by an element having atomic number 15 ?

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

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

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15. The number of protons, neutrons and electrons in species A to E are given in the following table :

Species	*Protons*	*Neutrons*	*Electrons*
A	6	6	4
B	18	22	18
C	17	20	17
D	9	10	11
E	17	18	17

Indicate from the above table the species that represent a pair of isotopes.

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16. Composition of the nuclei of two atomic species X and Y is given as under :

	X	Y
Protons :	6	6
Neutrons :	6	8

Give the mass number of X and Y. What is the relation between the two species and which element or elements they represent ?

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17. 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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18. A sample of an element X contains two isotopes $._{8}^{16}X$ and $._{8}^{18}X$. If the average

atomic mass of this sample of the element be 16.2 u, calculate the percentage of the two isotopes in this sample.

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19. Which two of the following atomic species are isotopes of each other and which two are isobars ?

$_{90}^{231}Z, _{91}^{230}Z, _{88}^{230}Z, _{90}^{233}Z.$

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

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Exercise

1. Which subatomic particle is not present in an ordinary hydrogen atom ?

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2. Name the scientists who described the arrangement of electrons in an atom.

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3. What is the maximum number of electrons which can be accomodated in the K shell of an atom ?

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4. What is the maximum number of electrons which can be accomodated in the L shell of an atom ?

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5. What is the maximum number of electrons an M shell of an atom can accommodate ?

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6. What is the maximum number of electrons that can go into the N shell of an atom ?

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7. What is the maximum number of electrons which can be accomodated in the :

(a) innermost shell of an atom ?

(b) outermost shell of an atom ?

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

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9. Name the negatively charged particles present in the atoms of all the elements.

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10. Who discovered electron?

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11. What is the usual symbol for (a) an electron (b) a proton, and (c) a neutron ?

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12. Name the central part of an atom where protons and neutrons are held together.

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13. What are the various letters used by Bohr to represent electron shells in an atom ?

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

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15. Name the positively charged particle present in the atoms of all the elements.

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16. What is the electronic configuration of a hydrogen atom ?

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17. How many times is a proton heavier than an electron ?

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18. Name the gas which produces anode rays consisting of protons in the discharge tube experiment.

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19. Which part of an atom was discovered by Rutherford's alpha particle scattering experiement ?

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20. What is the positive charge on the nucleus of an atom due to ?

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21. State the number of electrons present in the outermost shell of the atoms of the following elements :

(i) Neon (ii) Chlorine.

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22. Which shell of an atom can accommodate a maximum of :

(a) 8 electrons ? (b) 32 electrons ?

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23. Name the shell of an atom which can accommodate a maximum of :

(a) 2 electrons (b) 18 electrons

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24. Which subatomic particle was discovered by :

(i) Chadwick ? (ii) Thomson ? (iii) Goldstein ?

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25. Name the subatomic particle whose relative charge is :

(a) +1 (b) -1 (c) 0.

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26. Fill in the blanks in the following statements :

(a) The number of protons in the nucleus of an atom is called its .....

(b) The total number of protons and neutrons in the nucleus of an atoms is called its .....

(c) An atom has atomic mass number 23 and atomic number 11. The atom has ..... electrons.

(d) An atom of an element has 11 protons, 11 electrons and 12 neutrons. The atomic mass of the atom is .....

(e) If the nucleus of an atom has atomic number 17, mass number 37 and there are 17

electrons outside the nucleus, the number of neutrons in it is .....

(f) Almost all the mass of an atom is concentrated in a small region of space called the .....

(g) Cathode rays are a beam of fast moving .....

(h) The anode rays obtained from hydrogen gas consist of particles called .....

(i) The maximum number of electrons that can be accommodated in L shell are .....

(j) The maximum number of electrons that can go into the M shell is .....

(k) The subatomic particle not present in a hydrogen atom is .....

(l) The electron has ..... charge, the proton has ..... charge, and the neutron has ..... charge.

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27. What is an electron ? State its relative mass and charge.

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28. What is the absolute mass and charge of an electron ?

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29. What important information is furnished about the nucleus of an atom by the alpha particle scattering experiment of Rutherford ?

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30. How was it shown that an atom has a lot of empty space within it ?

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31. Why is an atom neutral inspite of the presence of charged particles in it ?

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32. (a) Which of the nuclear particles is present in the same fixed number of the atoms of any particular element ?

(b) What do we call this number which is characteristic of a particular element ?

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33. What is a proton ? State its relative mass and charge.

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34. What is a proton ? State its relative mass and charge.

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35. How does a proton differ from an electron ?

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36. State two observations which show that atom is not indivisible.

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37. All the gases form cathode rays and anode rays when electricity is passed through them :

(i) What does the formation of cathode rats tell us about the atoms ?

(ii) What des the formation of anode rays tell us about the atoms ?

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38. What do you understand by the term electronic configuration of an element ? Write down the electronic configuration of oxygen (At No. = 8).

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39. An element has an atomic number 12. How may electrons will be present in the K, L and M energy shells of its atom ?

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40. (a) What is the nucleus of an atom and what is the nature of charge on it ?

(b) Name the scientist who discovered the nucleus of atom.

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41. Name the particles used by Rutherford in his experiment on the discovery of nucleus.

Also state the charge on these particles.

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42. An element has atomic number 13 and an atomic mass of 27

(a) How many electrons are there in each atom of the element ?

(b) How are these electrons distributed in the various energy levels ?

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43. Write the distribution of electrons in an atom of element whose atomic number is 18. What is special about the outermost electron shell (or valence shell) of the atom of this element ?

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44. What is a neutron ? How does it differ from a neutron ?

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45. Compare an electron, a proton and a neutron in respect of their relative masses and charges.

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46. What is a proton ? How does it differ from a neutron ?

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47. Compare an electron and a proton in respect of mass and charge.

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48. Compare a proton and a neutron in respect of mass and charge.

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49. How does an electron differ from a neutron ?

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50. State the location of electrons, protons, protons and neutrons in an atom.

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51. Fill in the following blanks :

Atomic number	Mass number	Protons	Neutrons	Electrons	Symbol
10	22	.....	.....	.....	.....

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52. Fill in the following blanks in respect of an atom of an element :

No. of protons	No. of neutrons	Mass number	Atomic number	No. of electrons	Symbol
11	12	.....	.....	.....	.....

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53. (a) Describe Thomson's model of the atom. Which subatomic particle was not present in Thomson's model of the atom?

(b) The mass number of an element is 18. It contains 7 electrons. What is the number of protons and neutrons in it? What is the atomic number of the element?

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54. (a) Describe the Rutherford's model of an atom. State one drawback of Rutherford's

model of the atom

(b) The mass number of an element is 23 and it contains 11 electrons. What is the number of protons and neutrons in it ? What is the atomic number of the element ?

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55. (a) Describe Bohr's model of the atom. How did Neils Bohr explain the stability of atom ?

(b) An element has an atomic number of 11 its mass number is 23. What is the arrangement

of electrons in the shells ? State nuclear composition of an atom of the element.

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56. (a) What is mean by (i) atomic number, and (ii) mass number, of an element ? Explain with the help of an example

(b) What is the relation between the atomic number and mass number of an element ?

(c) If an element M has mass number 24 and

atomic number 12, how many neutrons does its atom contain ?

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

A. Nucleus

B. Electrons

C. Protons

D. Neutrons

Answer: A

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

A. 2, 8, 1

B. 8, 2, 1

C. 2, 1, 8

D. 2, 8, 2

Answer: A

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59. Which subatomic particle is not present in an ordinary hydrogen atom ?

A. proton

B. neutron

C. nucleus

D. electron

Answer: B

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60. The subatomic particle called electron was discovered by :

A. J.J Thomson

B. Neils Bohr

C. James Chadwick

D. E. Goldstein

Answer: A

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

A. 2, 8

B. 2, 8, 1

C. 2, 8, 2

D. 2, 8, 3

Answer: A

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

A. 2, 8

B. 2, 8, 4

C. 2, 8, 8

D. 2, 8, 7

Answer: C

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63. Goldstein's experiments which involved passing high voltage electricity through gases at very low pressure resulted in the discovery of :

A. electron

B. proton

C. nucleus

D. neutron

Answer: B

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64. 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 ?

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

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

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

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

Answer: A

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65. The ion of an element has 3 positive charges. The mass number of atom of this element is 27 and the 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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66. The first model of an atom was given by

A. Neils Bohr

B. Ernest Rutherford

C. J.J. Thomson

D. Eugen Goldstein

Answer: C

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67. 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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68. From the symbol ${}_{15}^{31}P$, state :

(i) mass number of phosphorus,

(ii) atomic number of phosphorus and

(iii) electron configuration of phosphorus.

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69. The atom of an element X has 7 electrons in its M shell

(a) Write the electronic configuration of

element X.

(b) What is the atomic number of element X ?

(c) Is it a metal or a non-metal

(d) What type of ion will be formed by an atom of element X ? Write the symbol of the ion formed

(e) What could element X be ?

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70. An atom of element E contains 3 protons, 3 electrons and 4 neutrons :

(a) What is its atomic number ?

(b) What is its mass number ?

(c) Write the electronic configuration of the element E

(d) State whether element E is a metal or non-metal. Why ?

(e) What type of ion, cation of anion, will be formed by an atom of element E ? Why ?

(f) Write the symbol of the ion formed by an atom of element E

(g) What could element X be ?

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71. An atom of an element X may be written as

$${}^{9}_{4}X$$

What does the figure 9 indicate ?

(b) What does the figure 4 indicate ?

(c) What is the number of protons in atom X ?

(d) What is the number of neutrons in atom X ?

(e) What is the number electron in atom X ?

(f) How many electrons are there in the outermost shell of an atom of element X ?

(g) Write the symbol of ion formed by an atom of element X.

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72. The electronic configuration of an element Z is 2, 8, 8.

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

(b) State whether element Z is a metal or a non-metal

(c) What type of ion (if any) will be formed by an atom of element Z ? Why ?

(d) What is special about the outermost electron shell of the atom of this element ?

(e) Give the name and symbol of element Z

(f) Name the group of elements to which Z belongs.

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73. The total number of electrons in a nitrogen atom is 7. Find the number of valence electrons in it.

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74. What is the general name of the elements having 8 electrons in the valence shell of their atoms ?

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75. Which noble gas has less than 8 electrons in the valence shell of its atom ? What is this number ?

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76. State on use of radioactive isotopes in medicine.

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77. Give one example of a radioactive isotope which is used as a fuel in the reactors of nuclear power plants.

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78. Name the ratioactive isotopes which is used in the treatment of cancer.

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79. Which radioactive isotope is used to determine the activity of thyroid gland ?

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80. State one use of radioactive isotopes is industry.

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81. State whether the following statement is true is false :

Radioactive isotope of iodine is used for making the medicine called tincture iodine.

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82. What name is given to those atoms which contain the same numer of protons and electrons but different number of neutrons ?

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83. What is the relationship between an atom containing 11 protons, 11 electrons and 11 neutrons, and another atom containing 11 protons, 11 electrons and 12 neutrons ?

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84. What name is given to the pair of atoms such as ${}_{7}^{14}N$ and ${}_{7}^{15}N$?

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85. What name is given to those isotopes which have unstable nuclei and emit various types of radiations ?

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86. Fill in the following blanks in respect of an atom of an element :

Number of protons	Number of neutrons	Mass number	Atomic number	Number of electrons	Valency
11	12	.....	.....	.....	.....

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87. Complete the following statements :

(a) Magnesium has 2 valence electrons in the ..... shell

(b) The valency of nitrogen in N_2 molecule is .....

(c) Isotopes have different mass numbers because their nuclei contain different number of .....

(d) Some boron atoms have mass number 10 and some have mass number 11. These boron atoms with different mass numbers are called .....

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88. The nucleus of an atom has 5 protons and 6 neutrons. What would be the (a) atomic

number, (b) mass number, (c) the number of electrons, and (d) the number of valence electrons, per atom of this element ?

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89. Write the electronic configuration of the element with atomic number 17. Indicate the valency of the element.

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90. The atomic number of an element X is 16

(a) Write down the electric configuration of X.

(b) What will be the valency of X ?

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91. What valencies will be shown by the elements A, B, C, D and E having atomic numbers 2, 4, 8, 10 and 13 respectively.

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92. Give one use each of the follwing radioactive isotopes :

(a) Uranium-235 (b) Cobalt-60.

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93. Explain why $._1^3 H$ and $._2^3 He$ are not considered isotopes

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94. What is the reason for the different atomic masses of the isotopes of an element ?

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95. What is the reason for the identical chemical properties of all the isotopes of an element ? Explain with the help of an example.

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96. What is the reason for the slightly different physical properties of all the isotopes of an element ?

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97. Explain why, the atomic masses of many elements are in fractions and not whole numbers.

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

Argon, Deuterium, Calcium, Tritium, Protium.

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99. Hydrogen has three isotopes written as :

$._1^1 H, ._1^2 H, ._1^3 H$

Explain why :

(i) these isotopes have almost identical chemical properties

(ii) they are electricity neutral.

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100. Given that the percentage abundance of the isotope $._{10}^{20} N$ is 90 % and that of the isotope $._{10}^{22} Ne$ is 10 %, calculate the average atomic mass of neon.

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101. What are isobars ? Explain with an example.

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

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103. An element has $Z = 7$. What is the valency of the element ? Also name the element.

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104. (a) What are valence electrons ? Where are valence electrons situated in an atom ?

(b) What is the number of valence electrons in the atoms of an element having atomicm number 13 ? Name the valence shell of this atom.

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105. (a) What are isotopes ? Explain by giving an example

(b) Give one similarity and one difference between a pair of isotopes

(c) Give the number of protons, neutrons and electrons per atom in the two isotopes of chlorine $._{17}^{35}Cl$ and $._{17}^{37}Cl$.

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106. (a) What are radioactive isotopes ? Give two examples of radioactive isotopes

(b) Give any two uses of ratioactive isotopes

(c) An element Z contains two naturally

occuring isotopes ${}^{35}_{17}Z$ and ${}^{37}_{17}Z$. If the average atomic mass of this element be 35.5 u, calculate the percentage of two isotopes.

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107. (a) Define valency of an element. What valency will be shown by an element having atomic number 14 ?

(b) What is the relation between the valency of an element and the number of valence electrons in its atoms ? Explain with examples.

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

A. chemically similar atoms

B. isotopes

C. solid and liquid metals

D. isobars

Answer: D

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109. Which of the following statement is correct about the atom of an element ?

A. an atom can have only protons and neutrons but no electrons

B. an atom can have only electrons and neutrons but no protons

C. an atom can have only electron and proton but no neutron

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

Answer: C

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110. There are two species represented as ^{35}Cl and ^{37}Cl. Which of the following statement is correct regarding these species ?

A. they have different chemical properties

B. their physical properties are the same

C. they have the same number of protons

D. they are isobars of the same element

Answer: C

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

A. plutonium-239

B. arsenic-74

C. cobalt-60

D. iodine-131

Answer: C

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112. Elements with valency 1 are

A. always metals

B. always non-metals

C. always metalloids

D. either metals or non-metals

Answer: D

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113. 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 electrons

B. one of the oxygen atoms has gained protons

C. the two oxygen atoms are isotopes

D. the two oxygen atoms are isobars

Answer: C

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

A. calcium

B. chromium

C. carbon

D. cadmium

Answer: C

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

A. 2

B. 4

C. 3

D. 5

Answer: B

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116. The atomic numbers of four elements A, B, C and D are $12, 13, 15$ and 3 respectively. The element which cannot form a cation is :

A. A

B. B

C. C

D. D

Answer: C

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

A. 16

B. 10

C. 9

D. 8

Answer: D

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118. For an element, Z = 9. The valency of this element will be :

A. 4

B. 2

C. 1

D. 3

Answer: C

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

A. W

B. X

C. Y

D. Z

Answer: B

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120. The four atomic species can be represented as follows. Out of these, the two species which can be termed isobars are :

(i) $^{201}_{60}X$

(ii) $^{200}_{61}X$

(iii) $^{200}_{58}X$

(iv) $^{203}_{60}X$

A. (i) and (ii)

B. (ii) and (iii)

C. (i) and (iii)

D. (i) and (iv)

Answer: B

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

A. P

B. Q

C. R

D. S

Answer: D

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

A. 1

B. 2

C. 3

D. 4

Answer: B

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123. The isotopes of an element contain :

A. same number of neutrons but different number of protons

B. same number of neutrons but different number of electrons

C. different number of protons as well as different number of neutrons

D. different number of neutrons but same number of protons

Answer: D

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124. Which is the number of valence electrons in :

(a) sodium ion, Na^+

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

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125. Atom A has a mass number 209 and atomic number 82

Atomic B has a mass number 209 and atomic

number 83

(i) How many protons atom A has ?

(ii) How many protons atom B has ?

(iii) Are atoms A and B isotope of the same element ?

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126. Which of the following pairs are isotopes ? Give reasons for your choice :

(i) ${}_{26}^{58}A$, ${}_{28}^{58}B$ or (ii) ${}_{35}^{79}X$, ${}_{35}^{80}Y$.

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127. Three different atoms of oxygen are represented as :

$._{8}^{16}O$, $._{8}^{17}O$ and $._{8}^{18}O$

(i) What do the subscripts (lower figures) and supercripts (upper figures) represented ?

(ii) What factor is responsible for the change in the supercripts 16, 17 and 18, though the element is the same ?

(iii) What is the usual name for such atoms of an element ?

(iv) Give the nuclear composition of $._{8}^{18}O$.

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128. The atomic species A and B have different number of protons but the same number of nucleons. One the other hand, and atomic species X and Y have the same number of protons but different number of nucleons. Which pair is an example of isobars ? Why ?

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129. Composition of the nuclei of two atomic species A and B is given as under :

	A	B
Protons :	18	20
Neutrons :	22	20

Give the mass numbers of A and B. What is the relation between the two species and which element or elements they represent ?

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130. Which of the following pairs are isobars ?

(i) ${}^{58}_{26}A$, ${}^{58}_{28}B$

(ii) ${}^{79}_{35}X$, ${}^{80}_{35}Y$

Give reasons for your choice.

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131. The number of protons, neutrons and electrons in particles 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

Giving reasons, find a pair of isotopes from the above particles.

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132. 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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133. Four students (A),(B),(C) and (D) observed the colour and solubility of iron, sulphur and iron, sulphur and iron sulphide in carbon disulphide. The tick mark represents soluble and cross mark represents insoluble, in carbon disulphide. Their observation are tabulated below

Student	Colour			Solubility in carbon disulphide		
	Fe	S	FeS	Fe	S	FeS
(A)	Yellow	Silvery	Greyish silver	(✓)	(×)	(✓)
(B)	Silvery	Orange	Reddish brown	(×)	(✓)	(✓)
(C)	Grey	Yellow	Greyish black	(×)	(✓)	(×)
(D)	Silvery	White	Silvery white	(✓)	(×)	(×)

The student who correctly reported the observations, is student :

A. A

B. B

C. C

D. D

Answer: C

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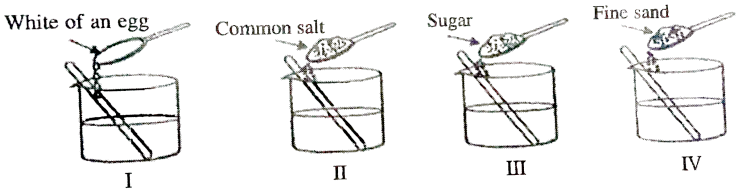
134. The white of an egg, common salt, sugar and fine sand are added to water separately in beakers as shown below. The mixture is stirred well. A suspension will be formed in the beaker



A. I

B. II

C. III

D. IV

Answer: D

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135. The correct procedure of heating iron-sulphur mixture to prepare iron sulphide is :

A. heat the powder mixture at the base of the test tube using a blue flame throughout

B. heat the iron filings and sulphur mixture in the middle of the test tube using yellow flame throughout

C. heat the powder mixture at the top of the test tube using an orange flame throughout

D. heat the iron filings-sulphur mixture at 3/4 quarters of the test tube using a red flame throughout.

Answer: A

Watch Video Solution

136. A student while heating solid lead nitrate taken in a test tube would observe :

A. white residue of PbO_2

B. green residue of NO_2

C. yellow residue of PbO

D. brown residue of NO

Answer: C

Watch Video Solution

137. The following precautions were listed for the experiment on determination of melting point of ice. The incorrect precaution is :

A. The bulb of the thermometer should be kept surrounded with crushed ice

B. Ice should be stirred regularly to keep a uniform temperature throughout

C. The final temperature should be noted by keeping the eyes in line with the level of mercury

D. Only the tip of the bulb of the thermometer should just touch the crushed ice

Answer: D

Watch Video Solution

138. The correct procedure for preparing a colloidal solution of egg albumin in water is :

A. to break the egg shell, take only the white portion and to add it to water with constant stirring

B. to break the egg shell, take only the yellow portion and to add it to boiling water with constant stirring

C. to boil the egg first, to be break the egg shell, to add the white portion to ice cold water and to mix

D. to boil the egg first, to break the egg shell, to add the yellow portion to water and to mix.

Answer: A

Watch Video Solution

139. Four students (A), (B), (C) and (D) independently observed the evaporation of water under different conditions, and recorded the temperature of water at regular interval as shown below

Student	Placing of experimental set up in/under	Temperature recording for 15 minutes
(A)	sun	increased gradually
(B)	open air	decreased gradually
(C)	a fan	initially increased, then became constant
(D)	a corner of the room	initially increased, then gradually decreased

The correct recording of observations is that of the student :

A. A

B. B

C. C

D. D

Answer: B

 Watch Video Solution

140. A student takes a mixture of sand and ammonium chloride in a china dish and heats it under a funnel fitted with a plug over a flame. He would observe that :

A. solid sand gets deposited on the lower cooler parts of the funnel while solid ammonium chloride remains in the china dish

B. sand and ammonium chloride get deposited on hotter parts of the funnel

C. ammonium chloride gets deposited on the cooler parts of the funnel and sand remains in the china dish.

D. sand collects on cooler parts of the funnel while ammonium chloride melts in the china dish

Answer: C

Watch Video Solution

141. A student takes some water in a beaker and heats it over a flame for determining its boiling point. He keeps on taking its

temperature reading. He would observe that the temperature of water :

A. keeps on increasing regularly

B. keeps on increasing ireegularly

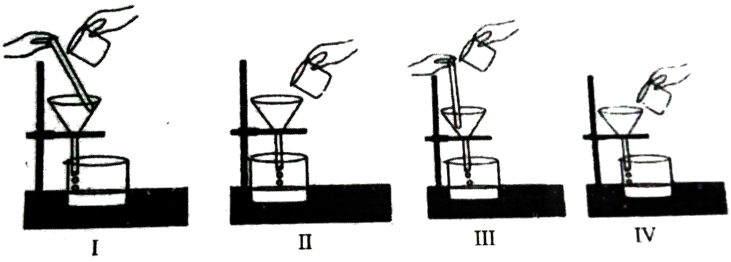
C. first increases slowly, then decreases rapidly and eventually becomes constant

D. first increases gradually and then becomes constant

Answer: D

 Watch Video Solution

142. Which of the following is the correct set of apparatus to separate common salt and sand by filtration process :



A. I

B. II

C. III

D. IV

Answer: A

Watch Video Solution

143. A student added the following substances to water kept in four separate beakers. He stirred the mixture well and filtered each one of them through a filter paper. He would obtain a solid residue on the filter paper in the case of :

A. egg albumin

B. common salt

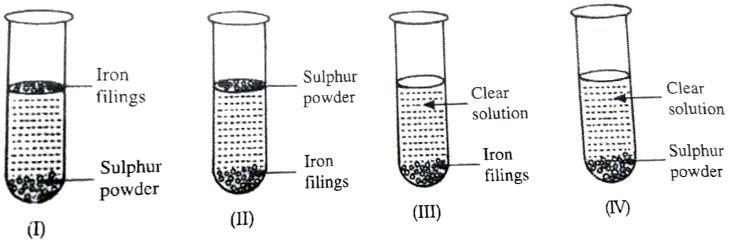
C. chalk powder

D. alum

Answer: C

Watch Video Solution

144. In an experiment, carbon disulphide was added to a test-tube containing a mixture of iron filings and sulphur powder as shown in the given diagrams :



The correct observation is represented in diagram :

A. I

B. II

C. III

D. IV

Answer: C

Watch Video Solution

145. The colour of insoluble product formed sodium sulphate and barium chloride solution are mixed together is :

A. blue

B. yellow

C. white

D. red-brown

Answer: C

Watch Video Solution

146. A student, by mistake, mixed sulphur powder with iron filings. The following techniques were suggested to separate the sulphur from the mixture out of which he has to choose one :

A. dissolving in carbon disulphide filtration, evaporation

B. dissolving in water at room temperature and filtration

C. dissolving in hot waterm filtration and

evaporation

D. dissolving in ice cold water and filtration

The correct technique is :

A. A

B. B

C. C

D. D

Answer: A

Watch Video Solution

147. A student has done the labelling for the experimental set-up for separating a mixture of sodium chloride and camphor as indicated in the diagram given here. The parts/substances that have been incorrectly labelled are :

A. I,III,VIII

B. II,III,VII

C. I,II,VIII

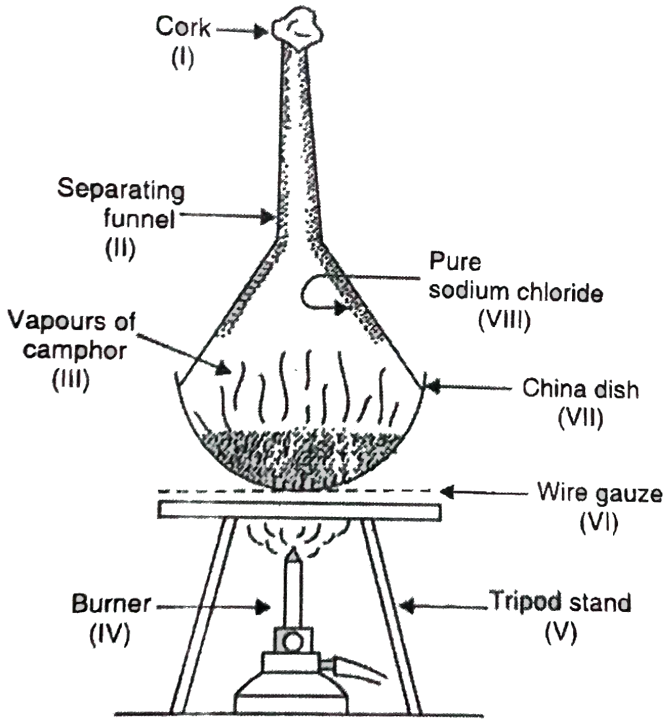
D. III,V,VII

Answer: C

Watch Video Solution

148. A teacher gave an impure sample of alum containing fine sand as impurity to a student. He asked him to recover pure alum from this sample. The correct procedure to be followed

would be to :



A. dissolve the impure sample of alum in water, filter and evaporate the filtrate

B. dissolve the impure sample of alum in alcohol and filter

C. move a magnet over the impure sample of alum

D. dissolve the impure sample of alum in carbon disulphide, filter and evaporate the filtrate

Answer: A

 Watch Video Solution

149. The colour of residue left behind on heating lead nitrate when it is still hot is :

A. green

B. yellow

C. black

D. reddish-brown

Answer: D

 Watch Video Solution

150. A student took some lead nitrate compound in a boiling tube and heated it strongly. The gas/gases evolved on heating this compound is/are :

A. NO_2

B. $NO_2 + CO_2$

C. $NO_2 + O_2$

D. $N_2 + O_2$

Answer: C

Watch Video Solution

151. When a student heated a colourless solid compound, then brown fumes of a gas are evolved. The colourless solid is most likely to be :

A. ferrous sulphate

B. lead carbonate

C. lead nitrate

D. lead sulphate

Answer: C

Watch Video Solution

152. When dilute sulphuric acid is added to granulated zinc placed in a test-tube, the observation made is :

A. the surface of the metal turns shiny

B. the reaction mixture turns milky

C. odour of sulphur dioxide is observed

D. a colourless and odourless gas evolves with bubbles

Answer: D

 Watch Video Solution

153. What is the correct order of the methods you would apply to separate the components of a mixture of ammonium chloride, common salt and sand ?

A. dissolving in water, filtration, evaporation and sublimation

B. dissolving the water, evaporation and sublimation

C. sublimation, dissolving in water, filtration and evaporation

D. moving a magnet, dissolving in water and sublimation

Answer: C

Watch Video Solution

154. Four students took separately the mixture of sand, common salt and ammonium cloride in beakers, added water, stirred the mixture well and then filtered. They reported their observations as shown below

Student	*As residue*	*In the filtrate*
I	Ammonium chloride	Sand, Common salt
II	Common salt, Sand	Ammonium chloride
III	Sand, Ammonium chloride	Common salt
IV	Sand	Ammonium chloride, Common salt

Who reported the observations in the correct order of the components as residue and in the filtrate ?

A. I

B. IV

C. III

D. II

Answer: B

 Watch Video Solution

155. When zinc metal reacts with dilute sulphuric acid, a gas is evolved. Which one is a correct statement about the nature of this gas ?

A. colourless with suffocating odour

B. reddish brown and odourless

C. colourless and sweet smelling

D. colourless and odourless

Answer: D

Watch Video Solution

156. The reaction between iron and copper sulphate solution represents which type of reaction ?

A. decomposition

B. combination

C. single displacement

D. double decomposition

Answer: C

Watch Video Solution

157. When a burning magnesium ribbon is introduced in a gas jar containing oxygen, it will burn with :

A. a reddish flame

B. a pale blue flame

C. a golden yellow flame

D. a dazzling white flame

Answer: D

Watch Video Solution

158. A student heats calculated amounts of iron filings and sulphur powder together in a boiling tube. He will obtain :

A. a homogeneous mixture of Fe and S

B. a heterogeneous compound of Fe and S

C. a homogeneous compound of FeS

D. a heterogeneous mixture of FeS, Fe and S

Answer: C

 Watch Video Solution

159. Which of the following mixture can be separated completely by the process of sublimation ?

A. fine sand and cane sugar

B. sodium chloride and potassium permanganate

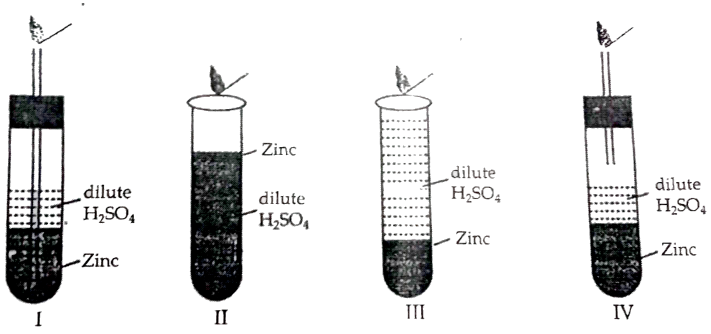
C. potassium chloride and ammonium chloride

D. barium chloride and sodium sulphate

Answer: C

Watch Video Solution

160. Four set ups as given here were arranged to identify the gas evolved when dilute sulphuric acid was added to zinc granules. The most appropriate set up is :



A. I

B. II

C. III

D. IV

Answer: D

Watch Video Solution

161. An iron nail was dropped into copper sulphate solution. After some time, the colour of the solution changed from :

A. light green to blue

B. blue to light green

C. light green to colourless

D. blue to yellow

Answer: B

Watch Video Solution

162. A student was asked by her science teacher to prepare a true solution. She dissolved the solute in water but forget to

record its name. What may be the correct name of the solute ?

A. barium sulphate

B. sulphur powder

C. alum

D. egg albumin

Answer: C

Watch Video Solution

163. A student placed a clean iron nail in blue coloured copper sulphate solution for a considerable time. He observes that :

A. iron nail gets green coating

B. iron nail gets brown coating

C. iron nail gets no coating

D. iron nail gets blue coating

Answer: B

Watch Video Solution

164. When a student added a few drops of barium chloride solution to sodium sulphate solution, he obtained a white precipitate instantly. Which of the following type of chemical reaction has been carried out by the student ?

A. combination

B. double displacement

C. displacement

D. decomposition

Answer: B

Watch Video Solution

165. A student was asked to carry out a chemical reaction by placing four different metal strips in $CuSO_4$ solution for a considerable time, one by one. Which of the following metal strip will turn the blue $CuSO_4$ solution to a light green solution in due course of time ?

A. Fe

B. Au

C. Mg

D. Ag

Answer: A

 Watch Video Solution

166. We can show that is more reactive than copper :

A. by preparing copper sulphate solution and dipping iron strip in it

B. by dipping both the strips in water for some time

C. by preparing iron sulphate solution and dipping copper strip in it

D. by heating both iron and copper strips

Answer: A

 Watch Video Solution

167. A student sets up an apparatus to determine to melting point of ice. He takes a beaker half filled with crushed ice and dips a mercury thermometer with an initial reading of room temperature $(25^{\circ}C)$ in such a way that the bulb of thermometer is surrounded by ice. The correct observation obtained by the student is that :

A. mercury in the thermometer keeps on falling till it reads, $-1^{\circ}C$ and becomes constant thereafter

B. temperature falls, reaches $0^\circ C$, then it remains constant even after the whole of the ice has melted

C. the temperature falls in the beginning but starts rising as soon as the ice starts melting

D. temperature falls, reaches $0^\circ C$ and remains constant only as long as both ice and water are present in it.

Answer: D

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168. What are canal rays?

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

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

173. 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 ?

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

177. How will you find the valency of chlorine, sulphur and magnesium ?

Watch Video Solution

178. 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 ?

Watch Video Solution

179. With the help of Table given below, find out the mass numbers of oxygen and sulphur atoms :

Name of element	Symbol	Atomic number	Number of protons	Number of neutrons	Number of electrons
Oxygen	O	8	8	8	8
Sulphur	S	16	16	16	16

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

185. Describe Bohr's model of the atom.

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

192. A sample of an element X contains two isotopes $._{8}^{16}X$ and $._{8}^{18}X$. If the average atomic mass of this sample of the element be

16.2 u, calculate the percentage of the two isotopes in this sample.

Watch Video Solution

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

Watch Video Solution

194. Composition of the nuclei of two atomic species X and Y is given as under :

	X	Y
Protons :	6	6
Neutrons :	6	8

Give the mass number of X and Y. What is the relation between the two species and which element or elements they represent ?

Watch Video Solution

195. 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.

Watch Video Solution

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

Watch Video Solution

197. Isotopes of an element have :

(a) the same physical properties

(b) different chemical properties

(c) different number of neutrons

(d) different atomic numbers

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

200. 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	—

Watch Video Solution

201. Imran and Rohan are best friends. They study in different schools in Srianagar in Kashmir. Imran has just entered class IX whereas Rohan is a student of class X. This year, winter is very severe in Kashmir, So, imran Rohan were discussing the central heating systens, which could be used to heat their homes during severe cold in this winter season. Imran said that they can use boiling hot water in hot water radiators for the central heating of their homes in water.

Rohan, however, did not agree with Imran. Rohan said that he, however, does not know the practical implications of his recommendation.

(a) What is the temperature of boiling water under normal conditions ?

(b) What is the temperature of steam formed from boiling water under normal conditions ?

(c) Out of boiling water and steam, which causes more severe burns on the skin and why ?

(d) State whether boiling water or steam is better for central heating in homes during

extreme water. Give your choice.

(f) What values are displayed by Rohan in this episode ?

Watch Video Solution

202. Ravi was performing some experiements related to the laws of chemical combination in the science laboratory under the guidance of his chemistry teacher Mr. John. Ravi found that when he burned 1 gram of hydrogen gas in 8 grams of oxygen gas in a closed vessel, he

obtained 9 grams of water. He repeated this experiment many times but obtained the same results every time

(a) Write a balanced chemical equation for the reaction between hydrogen and oxygen to form water. Also write the names of all the substances involved below their formulae in the equation

(b) What are the reactants and products in the above reaction ?

(c) Which law of chemical combination is illustrated by the fact that when Ravi burned 1g of hydrogen in 8g of oxygen, he obtained

9g of water ?

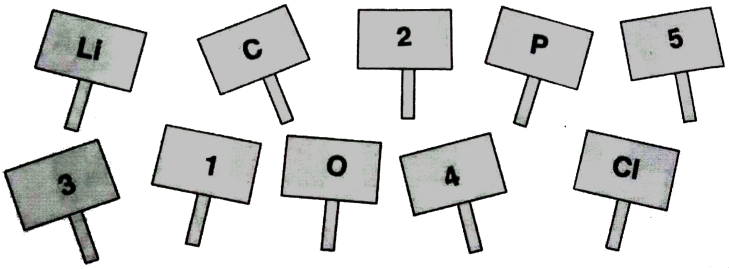
(d) What mass of water will be obtained if 1g of hydrogen is burned in 10g of oxygen ? Which law of chemical combination will govern your answer ?

(e) What values are displayed by Ravi in this episode ?

Watch Video Solution

203. The students of class IX have made placards showing the symbols of some

elements and valencies of these elements. These placards somehow got mixed up as shown below :



On this basis of these placards the chemistry teacher, Mrs. Shanti, asked a student Vikas to answer the following questions :

(a) Choose the symbol of an element from among the placards which exhibits valencies of 3 and 5. What is the name of is the name of this element ? Is it a metal or a non-metal ?

(b) Choose the symbol of an element from the given placards which shows a valency of 2. What is the name of this element ? Is it a metal or a non-metal ?

(c) Work out the formula of the compound formed between the element of valency 3 and element of valency 2. Also name this compound

(d) What values are displayed by Vikas in this episode ?

Watch Video Solution

Very Short Answer

1. State whether the following statements are true or false :

(a) Thomson proposed that the nucleus of an atom contains protons and neutrons

(b) he cathode rays obtained from all the gases consists of negatively charged particles called electrons

(c) The anode rays obtained from all the gases consist of positively charged particles called protons.

View Text Solution

Ncert Book Page 50

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

View Text Solution

Value Based Questions

1. Ajay and Rakesh live in Rajgarh town of Churu districk of Rajasthan. As usual, the summer in this area of Rajasthan in extremely hot. Ajay's sister is getting engaged in the month of May, Ajay's family and relatives were waiting for the guests to arrive for the engagement ceremony. They had brought a slab of ice and put it in a tub of water for cooling the warm bottles of soft drinks. Just when they had finished drinking all the cold soft drink bottles, the gruests (including would-be bridegroom) arrive. Ajay and Rakesh

were in a fix because they had only warm bottles of soft drinks left with them. Ajay suggested that they should put the warm soft drink bottles in the ice cold water which they already had in the tub but Rakesh did not agree with him Rakesh quickly brought a big slab of ice from the nearby shop crushed it well. He then put the warm soft drink bottles in an empty tub and surrounded them well with crushed ice. These warm soft drink bottles got colled in a short time and were served to the guests. All the guests enjoyed cold soft drinks on a very hot day and felt

refreshed.

(a) What is the temperature of water formed from freshly melted ice ?

(b) What is the temperature of melting ice ?

(c) A person holds some ice-old water in his left hand palm and a piece of ice in his right hand palm. Which of the two will appear to be more cold and why ?

(d) Explain why, the warm drink bottles could be cooled more quickly by placing them in a tub of crushed ice than in a tub of ice cold water.

(e) Can you suggest another way in which the

warm soft drinks can be cooled even more quickly by using ice (than by keeping the bottles in crushed ice) ?

(f) What type of change of state takes place when ice is used for cooling purposes ? What is the special name of this change of state ?

(g) What values are displayed by Rakesh in the episode ?

View Text Solution

2. Roshni is a student of class IX in a school in Delhi. One day Roshni's mother, Mrs. Deepa, was complaining that the woollen and silk clothes which she had stored steel trunks had been partially eaten up and damaged by some tiny insects. Mrs. Deepa had to spend a lot of money to get these damaged clothes repaired. When Roshni heard her mother complaining, she asked her to place some small, white balls of a particular material inside the folds of the woollen and silk clothes before storing them again in trunks, and closing the lids of trunks

properly. Mrs. Deepa did the same. When Mrs. Deepa opened the trunks again after about six months to take out a silk saree for a marriage function, she found that the stored clothes had remained safe, they had not been damaged this time. At the same time, she noticed that the small white balls placed inside the folds of clothes had become much smaller in size. Mrs. Deepa asked Roshni why the white balls had become much smaller in size on keeping. Roshni explained everything to her mother. Roshni also told her mother that one day a„ the white balls placed for

protecting stored woolen and silk clothes would disappear completely without leaving behind any residue and then new balls will have to be placed for further protection of stored clothes.

(a) What is the usual name of the tiny insects which eat up and damage stored woolen and silk clothes in Roshni's home ?

(b) What is the material of small white balls placed in stored woolen and silk clothes by Mrs. Deepa ?

(c) How do the small white balls placed inside the folds of stored clothes work to prevent

damage to stored clothes ?

(d) Why do small white balls kept within the folds of stored woolen and silk clothes become smaller and smaller with time and ultimately disappear completely one day ? What is the special name of the process which makes the white balls become smaller or disappear completely without leaving behind any residue ?

(e) Name one other material whose balls can also be used for the protection of stored woolwn and silk clothes ?

(f) What values are displayed by Roshni in this episode ?

View Text Solution

3. Vibha is a student of 9th standard. Vibha's family has an LPG connection in the kitchen. When Vibha's mother, Mrs. Chopra, was preparing breakfast for the family, the cooking gas cylinder got empty. Mrs. Chopra keeps a spare gas cylinder. So, she removed the empty gas cylinder and connected the filled gas

cylinder tp the cooking gas stove. Mrs. Chopra then lighted the gas stove adn started preparing breakfast again. Just then Vibha came running into the kitchen and told her mother that she could smell the leaking cooking gas from the new LPG cylinder even from a distance. Vibha closed the gas supply from the leaking cylinder by turning off the regulator knob quickly. She also asked her mother not to use this leaking gas cylinder till the leakage is set right. She also opened the window of kitchen to let the leaked gas cylinder. The gas mechanic of the distributor

on telephone and complained about the leaking gas cylinder, The gas mechanic of the distributor came to Vibha's house within half an hour. When he checked the gas cylinder, he found that the rubber washer of the cylinder had a cut in it through which the gas was leaking. The gas mechanic changed the defective rubber washer and then checked for the leakage again. There was no gas leakage rectification service is provided freeof charge by the LPG distributor. Mrs. Chopra was happy that Vibha had saved their lives as well as money.

(a) (i) What substance is added to the LPG cylinder by the filling company to help in detecting gas leakage from the cylinder ?

(ii) Which property of the above substance is made use of in detecting the leaking gas from LPG cylinder ?

(b) Name the physical process which helps in bringing leaking LPG containing the above substance to us even from a distance

(c) Define the above physical process

(d) How is the leaking cooking gas from LPG cylinder detected ?

(e) What would have happened if Mrs. Chopra

had continued to use the leaking gas cylinder ?

(f) What values are displayed by Vibha in this episode ?

View Text Solution

4. (a) (i) Ethyl mercaptan

(ii) Strong smell of ethyl mercaptan

(b) Diffusion (in gases)

(c) The spreading out and mixing of a gas with another gas due to the motion of their

particles is called diffusion in gases

(d) The leaking cooking gas containing the strong smelling substance ethyl mercaptan spreads and mixes with the surrounding air by the process of diffusion. When the air containing ethyl mercaptan reaches our nose, we can smell it and come to know of the gas leakage.

(e) LPG is a highly inflammable gas (which catches fire very easily). If Mrs. Chopra had continued to use the leaking LPG cylinder, then a lot of LPG would have collected in the kitchen after some time. This collected LPG

could ignite on coming in contact with gas stove flame causing a big fire in the kitchen. Even the LPG cylinder could catch fire and burst causing a big explosion. This could lead to the loss of life and property.

(f) The various values displayed by Vibha in this episode are (i) Good smelling power (so as to smell leaking cooking gas even from a distance) (ii) Knowlege of tshe risks of using a leaking LPG cylinder (iii) Responsible citizen (in calling LPG distributor to rectify gas leakage), and (iv) Desire to protect her family and property (from any related accident).

View Text Solution

5. Abhinav is a student of class IX. One day all the students were performing experiments in the science laboratory. Just then, the chemistry teacher, Mrs. Prasad, came to the laboratory. She had three beaker in her hands labelled A, B and C. All the beakers contained colourless liquids which looked exactly the same. Mrs. Prasad turned to the students and said that one of the beakers contained a pure substance whereas the other two beakers

contained solutions of the same solute in the same solvent but different concentrations. She also told the students that the weight one of the three beakers A, B and C were 110g, 120g and 100g respectively. Mrs. Prasad wanted one of the students to find out experiementally which beaker contained a pure substance and which two beakers contained solutions. She also wanted them to show experimentally two properties which could tell why the solutions are considered mixtures, even though they are homogeneous substances. Mrs. Prasad wanted one of the the students to find out

experimentally which beaker contained a pure substance and which two beakers contained solutions. She also wanted them to show experimentally two properties which could tell why the solutions are considered mixtures, even though they are homogeneous substances. Mrs. Prasad allowed them to use any required apparatus from the laboratory for the purpose. Abhinav offered to perform the experiements to distinguish between the pure substance and solutions and also to show experimentally why solutions are considered mixtures.

(a) What did Abhinav do to find out which of the given liquids is a pure substances and which liquids are solutions ? What were the observations made by Abhinav ?

(b) Whay did Abhinav conclude form the above observations ?

(c) Which property of the pure substance is exhibited by this experiment ?

(d) Which properties of a solution are exhibited in this experiement ?

(e) What values are displayed by Abhinav in this episode ?

View Text Solution

6. All the students of class 9 were performing experiments to study the types of solutions in the science laboratory. Vikalp took some water in a beaker and heated it slowly with the help of a burner.He starded adding postassium nitrate to the hot water with a spoon and stirred it with a glass rod continuously, so that potassium nitrate goes on dissolving in water. Vikalp took the temperature of water up to $40^\circ C$, and then keeping the temperature constant, went on adding more and more of

potassium nitrate to water, till no more potassium nitrate dissolved in it and some potassium nitrate is also left undissolved at the bottom of beaker. The contents of the beaker are now filtered through a filter paper arranged in a funnel. A clear solution is obtained in the form of a filtrate

(a) Depending upon the amount of solute present, the solution can be classified into two groups. Name these two groups of solution

(b) What type of potassium nitrate solution prepared by Vikalp at $40^{\circ} C$? Define the type of solution prepared by Vikalp

(c) What will happen if the potassium nitrate solution prepaerd by Vikalp at $40^\circ C$? is heated further (say to $60^\circ C$) ? Give reason for your answer

(d) What will happen if the potassium nitrate solution prepared by Vikalp at $40^\circ C$ is allowed to cool (say to $20^\circ C$) ? Give reason for your answer

(e) Which term/phrase can be used to convey that a maximum of 106 grams of potassium nitrate can be dissolved in 100 grams of water at a temperature of $60^\circ C$?

(f) What values are displayed by Vikalp in this episode ?

View Text Solution

7. Raghvan is a student of class 9 in a Chennai school. His teacher, Mr. Murthy, had just finished a lecture on various types of changes which take place even in the same substance under different experimental conditions. Mr. Murthy gave a beaker full of a common liquid to Raghav. A drop of this liquid can turn

anhydrous copper sulphate blue. Mr, Murthy than asked Raghav to perform two different experiements starting with the given liquid which lead to the formation of gas/gases under different experimental conditions. He also asked Raghavan to classify these changes under different types of changes. Raghvan first arranged a distillation apparatus. He took some of the given liquid in the distillation flask and started heating it with a burner. After some time, a gas started forming and going into the condenser. The condenser cooled the gas and re-converted it into the original liquid.

Raghvan then arranged an apparatus to pass electric current into the given liquid. He took the given liquid in the appropriate apparatus, acidified it by adding a little of sulphuric acid, and then passed electric current from a battery for a considerable time. He collected two gases in the two water-filled test-tubes inverted over the two electrodes of the apparatus. When the mixed these two gases and ignited this mixture very,very carefully (with the help of his teacher), he heard a little explosion and saw the drops of original liquid being formed. Raghvan both the experiments

and the conclusions obtained to his teacher. Mr. Murthy was very happly

(a) What do you think was the liquid give to Raghvan by Mr. Murthy ?

(b) Which gas is formed when heat energy is applied to the liquid in the distillation flask ? What type of change occurs in this case ?

(c) Which two gases are formed when electric energy is applied to the acidified liquid in the appropriate appartus ? What type of change occurs in this case ?

(d) How does the above change (which occurs on passing electric current through acidified

liquid) differ from the change which takes place when a piece of paper is burnt ?

(e) What values are displayed by Raghvan in this episode ?

View Text Solution

8. Rohit and Arun are two friends both of whom study in class IX in different schools. Earlier Rohit's mother used to purchase ordinary common salt for cooking food. But since the time Rohit had studied the benefits

of using iodised common salt, the had made his mother purchase and use only iodised salt for cooking food. One day, while working in the kitchen, Rohit's mother mixed some ammonium chloride in iodised salt container by mistake. Rohit and Arun had recently studied the various method of separation of mixtures in the class. They started discussing the components and the method of separation of the mixture made by Rohit's mother unknowingly. Arun said that the mixture obtained by mixing ammonium chloride with iodised salt actually contains

ammonium chloride, iodine and salt in it, so they had to use more than one method to separate this mixture into its components. Rohit, however, did not agree with Arun. He explained his point of view to Arun

(a) What are the benefits of using iodised salt ?

(b) What can you say about Arun's statement that the mixture obtained by mixing ammonium chloride and iodised salt contains ammonium chloride, iodine and salt ?

(c) Name and define the process which can be used for the separation of mixture containing

ammonium chloride and iodised salt

(d) Describe briefly, how a mixture of ammonium chloride and iodised salt can be separated.

(e) What values are displyed by Rohit in this episode ?

View Text Solution

9. Bhavna is a student of class IX in a city school. She has a five year old younger brother Bunty who is very naughty. Bhavna's mother,

Mrs. Malikm had purchased a big bottle of nail poslish remover from the market about six months back. She had used less than half of this bottle so far. One day Mrs. Malik left this bottle on the dining table by mistake and went out of the house for some work. In her absence, Bunty opened the half empty bottle of nail polish remover and filled it by adding water in it. When Mrs. Malik came back, she was very angry with Bunty and scolded him for spoiling her expensive bottle of nail polish remover. Mrs. Malik was about to throw away his bottle containing nail polish remover

mixed with water when her daughter Bhavna came back from school. She told her problem to Bhavna. Bhavna throught over this problem for a while and said that there was no need to throw away the mixture of nail polish remover and water She told her mother that she could recover pure nail polish remover from this mixture. Next day, Bhavna took the bottle containing this mixture to her school laboratory. With the permission of her teacher, Bhavna set up an apparatus which included a particular type of flask fitted will a tall column. She put the mixture of nail polish remover and

water in the flask and heated it gradually. On heating nail polish remover was turned into vapour, which were cooled by a water condenser to obtain pure nail polish remover. Water was left behind in the flask. Mrs. Malik was very happy to get back her nail polish remover.

(a) What is nail polish remover ?

(b) State whether nail polish remover and water are miscible liquids or immiscible liquids

(c) Name the process used by Bhavna for the complete separation of mixture of nail polish remover and water. Also define this process.

(d) On what factors does the separation of nail polish remover and water mixture of nail polish remover and water. Also define this process

(d) On water factors does the separation of nail polish remover and water mixture by the above process depend ?

(e) Name the tall column used in the flask during the separation of a mixture of nail polish remover and water

(f) What values are displayed by Bhavna in this episode ?

View Text Solution

10. Bunny is a ten year old boy. His motherm Mrs. Bhatia, is having high fever today. Bunny is to go for playing a cricket match with his friends in the afternoon but his white cricket dress is very dirty. He does not know how to operate the washing machine. So, Bunny decided to wash his dirty clothes himself with hands without disturbing his mother. After washing his clothes with detergent powder, he squeezed them well to remove the maximum water out of these clothes. Bunny then kept

the washed and squeezed clothers as such in the bathroom ifself for drying. He checked the wet clothes periodically. Bunny found that the wet washed clothes had not dried even after keeping for four hours in the bathroom. Just then Bunny's elder sister Anushka, who is a student of class IX, returned from school. Bunny shared his problem with her. Anushka found that Bunny had kept the washed clothes after squeezing out water as such without even spreading them. Anushka took these wet, washed clothes to the roof of their house where there was still bright sunshine. Even

wind was blowing faster on the roof top. Anushka spread the wet clothes properly on the clothes line fixed on the roof of their house. Bunny was glad to find that the wet clothes had now dried in less than two hours.

(a) Which process is involved in the drying of wet clothes ? Define this process

(b) Apart from drying clothes, state another important use of the above process

(c) Why did Anushka spread the wet clothes properly on the clothes line ?

(d) Why did Anushka put the wet clothes in sunshine ?

(e) How did blowing of wind help in the quick drying of wet clothes ?

(f) What values are displyed by Anushka in this episode ?

View Text Solution

11. Pawan is a student of class IX. The students of his class have recently studied the topic on the separation of various types of mixtures. One day, when the students were performing experiements in the science laboratory, their

chemistry teacher Mr. Jain came to the laboratory with a packet in this hand. Mr. Jain told Pawan that the packet contained a mixture of aluminium powder, sulphur powder and nuckel powder. He asked Pawan to separate all the three constituents of this mixtures. Mr. Jain allowed the use of any other equipment/device/chemical, etc., required for this purpose from the laboratory. Pawan thought over the methods to be used for separating the given mixture for a while and then started working on the separation of mixture. He succeeded all the constituents of

the mixture, one by one. Mr. Jain appreciated his effort.

(a) Which property of sulphur powder could be used by Pawan to separate it from aluminium powder and nickel powder ?

(b) Describe briefly, how Pawan separated sulphur powder from the mixture of aluminium powder, sulphur powder and nickel powder

(c) Which property of nickel powder could be used by Pawan to separate it from aluminium powder ?

(d) Describe briefly, how Pawan separated

nickel powder from aluminium powder.

(e) What values are displayed by Pawan in this episode ?

View Text Solution

12. One day Vabhav was performing experiments in the science laboratory based on the of chemical combination. Just then his chemistry teacher, Mr. Rajeev, came into the laboratory. Mr. Rajeev told Vaibhav that in an experiment conducted byby a class IX student

when 10.6 g of sodium carbonate was reacted with 12.0g of ethanoic acid in a closed flask, then 16.4 g of sodium ethanoate, 4.4 g of carbon dioxide and an unknown mass of substances Y were produced. Mr. Rajeev asked Vaibhav to make use of this information and answer the following questions :

(a) Write a word equation for the reaction which takes place on reacting sodium carbonate and ethanoic acid

(b) Which is the substance Y which is produced in this reaction ?

(c) What mass of substance Y is produced in

this reaction ?

(d) Which law of chemical combination has been made use of in calculating the mass of substance Y ? State this law

(e) What values are displayed by Vaibhav in this eposide ?

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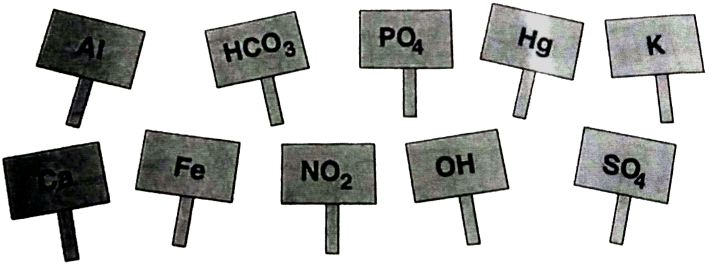
13. Pratap is a student of class IX in a city school. He has recently studied the writting of formulae of ionic compounds in the class.

Pratap has made some placards for a science quiz showing the symbols of some elements and some ions but forgot to write the electric charges on the ions. Moreover, the placards made by Pratap got mixed up as shown below :



Based on these placards, the chemistry teacher, Mr. Suri, asked Pratap to answer the following question :

(a) Choose the symbol of the element from

among the placards which can form divalent and trivalentcations. Name this element. Also write the symbols of these cations along with their charges

(b) Choose the symbol of a divalent anion from among the given placards. what is the name of this anion. Also write the symbol of this anion alongwith its charge

(c) Work out the formula of the ionic compound formed between the divalent cation and divalent anion described above. Also name the compound formed

(d) Work out the formula of the ionic

compound formed between the trivalent cation and divalent anion described above. Also name the compound formed

(e) What values are displayed by Pratap in this episode ?

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14. Vikram is a student of class IX in a village school. He lives on the outkirts of th village in a farmhouse. There is an undergound oil pipeline going to an Oil Refinery in the area

which passes near his farmhouse. One day Vikram found that a lot of workers had started digging the whole underground pipeline at some distance from his house. When he enquired about it, he was told that a leakage in oil pipeline (due to some crack, etc) is suspected in this area, so digging has to be done in a considerable area to find the place of leakage and set it right. Vikram asked the workers to stop digging all around. He said that he can pinpoint the place of leakage in the oil pipeline made of metal by using a certain procedure. Vikram then explained how

the solution of a particular substance can be introduced in the pipeline carrying oil and the place of leakage of this substance can be detected by using a special instrument. The place of leakage of this substance will tell the place of crack in the pipeline from where the oil leaks.

(a) What type of substance is used to dectect the leakage (or crack) in the underground oil pipeline ?

(b) Which special instrument is used to detect the leakage of the above substance from the oil pipeline ?

(c) Describe briefly, how the leakage in underground oil pipeline is detected by using the above particular substance and the special instrument

(d) Which property/properties of the above mentioned particular substance introduced in the oil pipeline helps its detection above the ground ?

(e) What is the advantage of using this substance in detecting the leakage in underground oil pipeline ?

(f) What values are displayed by Vikram in this episode ?

View Text Solution

15. Ramnik is a student of class 9. One day he was studying a chapter of chemistry in the class alongwith other students. The teacher, Mr. Bhagi, told the students that the scientists James Chadwick J.J. Thomson and E. Goldstein had discovered three subatomic particles P, Q and R, respectively. He gave the characteristics of all these particles, their locations and arrangements in the atom. Mr. Bhagi also described the contributions of scientists

Ernest Rutherford and Neils Bohr in this regard. After completing the discussion on this chapter, Mr. Bhagi asked Ramnik to answer the following question :

(a) What is the name of particle P ? What is the nature of charge on it ? State its location in tha atom

(b) What is the name of particle Q ? What is the nature of charge on it ? State its location in the atom

(c) What is the name of particle R ? What is the nature of charge on it ? State its location in the atom

(d) (i) Which of the particles P,Q and R is not present in an ordinary hydrogen atom

(ii) Which of the particles P,Q and R is not present in an alpha particle ?

(e) What is the total number of P and R particles present in one atom of an element known as ?

. (f) The number of particles Q in one neutral atom of an element is nineteen. How are these particles arranged in various energy levels in the atoms ?

(g) What values are displayed by Ramnik in this episode ?

View Text Solution

16. Naveen is a student of class IX in a city school. His uncle Ram Dev who lives in a village is not keeping good health. He has a tumour in his body. Ram Dev has come to city alongwith his son Ramesh for treatment. Naveen accompanied them to the most famous hospital for medical check-up and treatment. Whan Ram Dev told the person at the reception desk that he had a tumour, he was asked to go to the oncology department

of the hospital. The special doctor (called oncologist) examined the tumour of Ram Dev carefully. He then removed some tissue from the tumour and sent it for biopsy, so as to find whether the tumour was malignant or not. The result of biopsy showed that the tumour was malignant. The doctor told Ram Dev that he had come to the hospital at the right time due to which his disease had been detected at an early stage and can be cured successfully. The doctor then recommended radiotherapy for Ram Dev. Naveen had come to know of the term ratiotherapy, Naveen could make out

what disease isotopes in his class. So, as soon as doctor talked of radiotherapy, Naveen could make out what disease his uncle was suffering from. He also shared his knowledge of this disease with his uncle and his son.

(a) What do you think is the disease Ram Dev is suffering from ? Define this disease

(b) What are (i) tumour (ii) oncoloy (iii) oncologist, and (iv) biopsy ?

(c) What is meant by saying that the tumour is malignant ?

(d) What is ratiotherapy ? Explain it working briefly

(e) Which ratioactive isotope is usually used in the treatment of this disease by radiotherapy ? How does it work ?

(f) What values ae displayed by Naveen in this episode ?

View Text Solution

17. Akshay and Sauranh are the students of class IX. They have recently studied the chapter on structure of atom in the class. Both Akshy and Saurabh were performing some

activities in the science laboratory. Akshy took a plastic comb and rubbed it in his dry hair. When he brought this plastic comb (rubbed in dry hair) near tiny pieces of paper, the comb attracted the pieces of paper towards it. Mean while, Saurabh took a glass rod and rubbed it with a piece of silk cloth. When he brought this glass rod (rubbed with silk cloth) near the tiny pieces of paper, the glass rod also attracted the pieces of paper towards it (just like the plastic comb). Akshy and Saurabh had studied an instrument called electroscope in class VIII. So, they decided to make use of a

positively charged electroscope having diverged leaves (or opened up leaves) in their activity. Akshy took the plastic comb (rubbed in dry hair) and touched the metal top of positively charged electroscope with it. This made the diverged leaves of electroscope to fold up. Saurabh then tool the glass rod (rubbed with silk cloth) and touched the metal top of another positively charged electroscope with it. This made the diverged leaves of the electroscope to diverge (or open up) even more. Askshy did not understand the various conclusions which could be drawn from all

these observations. Saurabh explained him everthing very clearly.

(a) What conclusion can be drawn from the observation that a plastic comb rubbed in dry hair and a glass rod rubbed with silk cloth, both attract tiny pieces of paper ?

(b) What do the above observations tell us about the atoms present on plastic comb and glass rod ?

(c) (i) What conclusion do you get from the observation that when a plastic comb rubbed in dry hair is touched with the metal top of a positively charged electroscope, then its

diverged leaves fold up ?

(ii) What conclusion do you get form the observation that when a glass rod rubbed with silk cloth is touched with the metal top of a positvely charged electrosope, then its leaves diverage even more ?

(d) What are the two types of electric charges present in atoms as shown by the above observations ? Name the subatomic particles which carry these charges.

(e) (i) Which electric charges are agained by a plastic comb on rubbing in dry hair ?

(ii) Which electric charge are lost by a glass

rod on rubbing with silk cloth ?

(f) What values are displayed by Saurabh in this episode ?

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