CHEMISTRY

BOOKS - NCERT CHEMISTRY (HINGLISH)

ATOMS AND MOLECULES

Atoms And Molecules

1. Which of the following correctly represents 360 g of water?

(i) 2 moles of H_2O

ii) 20 moles of water.

iii) 6.022×10^{23} molecules of water.

iv) 1.2044×10^{25} molecules of water.

A. only (i)

B. (i) and (iv)

C. (ii) and (iii)

D. (ii) and (iv)

Answer: D

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2. Which of the following statements is not true about an atom?

A. Atoms are not able to exist independently

B. Atoms are the basic units from which molecules and ions are formed.

C. Atoms are always neutral in nature.

D. Atoms aggregate in large numbers to formthe matter that we can see, feel or

touch

Answer: D

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3. The chemical symbol for nitrogen gas is:

A. Ni

B. N_2

C. N^+

D. N

Answer: B

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4. The chemical symbol for sodium is

A. So

B. Sd

C. NA

D. Na

Answer: D

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5. Which of the following would wight the highest?

A. 0.2 moles of sucrose $(C_{12}H_{22}O_{11})$

B. 2 moles of CO_2

C. 0.2 moles of $CaCO_3$

D. 10 moles of H_2O

Thinking Process

1 mole = gram molecular mass of the compound.

Answer: C

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6. Which of the following has maximum number of atoms?

A. 18 g of H_2O

B. 18 g of O_2

C. 18 g of CO_2

D. 18 g of CH_4

Answer: D

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7. Which of the following contains maximum number of molecules?

A. 1 g of CO_2

B. 1g N_2

C. 1 g H_2

D. 1g CH_4

Answer:

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8. Mass of one atom of oxygen is

A. $\frac{16}{6.023 \times 10^{23}}$ g

B. $\frac{32}{6.023 \times 10^{23}} g$

C. $\frac{1}{6.023 \times 10^{23}}$ g

D. 8 u

Answer: A

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9. 3.42 g of sucrose are dissolved in 18g of water in a beaker. The number of oxygen atoms in the solution are

A. 6.68×10^{23}

B. 6.09×10^{22}

C. 6.022×10^{23}

D. 6.022×10^{21}

Answer: A

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10. A change in the physical state can be brought about

A. only when energy is given to the system.

B. only when energy is taken out from the system.

C. When energy is either given to, or taken out from the system.

D. Without any energy change.

Answer: C

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11. Which of the following represents a correct chemical formula? Name it.

A. CaCl

B. $BiPO_4$

C. $NaSO_4$

D. NaS

Answer: N//A

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12. Write the molecular formulae for the following compounds.

a) Copper (II) bromide

b) Aluminium (III) nitrate

c) Calcium (II) phosphate

d) Iron (III) sulphide

e) Mercury (II) chloride.

f) Magnesium (II) Acetate.

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13. Write the molecular formulae of all the compounds that can be formed by the combinations of following ions.

$Cu^{2+}, Na^{+}, Fe^{3+}, Cl^{-}, SO_4^{2-}, PO_4^{3-}$

A. CH_3COONa

B. $NaCl$

C. H_2

D. NH_4NO_3

Answer: B

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14. Write the cations and anions present (if any) in the following compounds?

a) CH_3COONa

b) NaCl

c) H_2

d) NH_4NO_3

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15. Give the formulae of the compounds formed from the following sets of elements.

a) Calcium and fluorine

b) Hydrogen and sulphur

c) Nitrogen and hydrogen

d) Carbon and chlorine

e) Sodium and oxygen

f) Carbon and oxygen

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16. Which of the following symbols of elements are incorrect? Give their correct symbols.

Cobalt CO

Carbon c

c) Aluminium AL

d) Helium He

e) Sodium So

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17. Give the chemical formulae for the following compounds and compute the ratio by mass of the combining elements in each one of them.

a) Ammonia

b) Carbon monoxide

c) Hydrogen chloride.

d) Aluminium fluoride.

e) Magnesium sulphide.

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18. State the number of atoms present in each of the following chemical species.

a) CO_3^{2-}

PO_4^{3-}

c) P_2O_5

d) CO

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

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20. Does the solubility of a substance change with temperature? Explain with the help of an example.

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21. Classify each of the following on the basis of their atomicity. A) F_2 , b) NO_2, c) N_2O , d) C_2H_6, e) P_4, f) H_2O_2, g) P_4O_{10}, h) O_3, i) HCl, j) CH_4, k) He, l) Ag

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22. You are provided with a fine white coloured powder which is either sugar or salt. How would you identify it without testing?

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23. Calcualte the number of moles of magnesium present in a magnesium ribbon weighting 12g. Molar atomic mass of magnesium is 24 g mol^{-1}.

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24. Veriy by calculating that

a) 5 moles of CO_2 and 5 moles of H_2O do not have the same mass.

b) 240 g of calcium and 240 g magnesium elements have a mole ratio of $3:5$

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25. Find the ratio by mass of the combining elements in the following compounds.

a) $CaCO_3$

b) $MgCl_2$

c) H_2SO_4, d) C_2H_5OH

e) NH_3, f) $Ca(OH)_2$

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26. Calcium chlroide when dissolved in water dissociates into its ions according to the

following equations.

$CaCl_2(aq) \rightarrow Ca^{2+}(aq) + 2Cl^{-1}(aq)$

Calculate the number of ions obtained from $CaCl_2$ when 222g of it is dissolved in water.

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27. The difference in the mass of 100 moles of each of sodium atoms and sodium ions is 5.48002 g. Compute the mass of an electron.

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28. Cinnabar (HgS) is a prominent ore of mercury. How many grams of mercury are present in 225g of pure HgS? Molar mass of Hg and S are 200.6 g mol^{-1} and $32gmol^{-1}$ respectively.

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29. The mass of one steel screw is 4.11 g. Find the mass of the of one mole of these steel screws. Compare this value with the mass of

the earth $\left(5.98 \times 10^{24} kg\right)$. Which one of the two is heavier and by how many times?

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30. A sample of vitamin C is known to contain 2.58×10^{24} oxygen atoms. How many molesof oxygen atoms are present in the sample?

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31. Raunak took 5 moles of carbon atoms in a container and Krish also took 5 moles of sodium atoms in another container of same weight.

a) Whose container is heavier?

b) Whose container has more number of atoms?

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32. Fill in the missing data in the following table.

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33. The visible universe is estimated to contain 10^{22} stars. How many moles of stars are present in the visible universe?

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34. What is the SI prefix for each of the following multiples and submultiples of a unit?

a) 10^3

b) 10^{-1}

c) 10^{-2}

d) 10^{-6}

e) 10^{-9}

f) 10^{-12}

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35. Express each of the following in kilograms

a) 5.84×10^{-3}mg

b) 58.34g

c) 0.584g

d) 5.873×10^{-21}g

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36. Compute the difference in masses of 10^3 moles of each of magnesium atoms and

magnesium ions. (Mass of an electron $= 9.1 \times 10^{-31}$kg)

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37. Which has more number of atoms?

100g of N_2 or 100g of NH_3

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38. Compute the number of ions present in 5.85g of sodium chloride.

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39. A gold sample contains 90%` of gold and the rest copper. How many atoms of gold are present in one gram of this sample of gold?

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40. What are ionic and molecular compounds? Give exmples.

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41. Compute the difference in masses of one mole each of aluminium atoms and one mole of its ions? (Mass of electron is 9.1×10^{-28} g). Which of one is heavier?

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42. A silver ornament of mass 'm' gram is polished with gold equivalent to 1% of the mass of silver. Compute the ratio of the

number of atoms of gold and silver in the ornament.

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43. A sample of ethane (C_2H_6) gas has the same mass a 1.5×10^{20} moleucles of methane (CH_4). How many C_2H_6 molecules does the sample of gas contain?

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44. Fill in the blanks.

a) In a chemical reaction, the sum of the masses of the reactants and products remains unchanged. This is called law of conservation of mass.

b) A groupof atoms carrying a fixed charge on them is called polyatomic ion.

The formula unit masss of $Ca_3(PO_4)_2$ is 310g.

d) Formula of sodium carbonate is ..... and that of ammonium sulphate is.....

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45. Complete the following crossword puzzle (Figure) by using the name of the chemical elements. Use the data given in the table following.

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46. a) In this crossword puzzle (Figure), names of 11 elements are hidden. Symbols of these are given below. Complete the puzzle.

1. Cl,

2) H

3) Ar,

4) O,

5) Xe, 6) N, 7) He, 8) F, 9) Kr, 10) Rn, 11) Ne

b) Identify the total number of inert gases, their names and symbols from this crossword puzzle.

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47. Write the formulae for the following and calculate the molecular mass for each one of them.

a) Caustic potash

b) Baking powder

c) lime stone

d) caustic soda

e) Ethanol

f) Common salt

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48. In photosyntheses, 6 molecules of carbon combine with an equal number of water molecules through a complex series of reactions to give a molecule of glucose having a molecular formula $C_6H_{12}O_6$. How many grams of water would be requried to produce 18g of glucose? Compute the volume of water so consumed assuming the density of water to be $1gcm^{-3}$.

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