CHEMISTRY

BOOKS - MAXIMUM PUBLICATION

SOME BASIC CONCEPTS OF CHEMISTRY

Example

1. Which of the following is a mixture?

A. Graphite

B. Sodium chloride

C. Distilled water

D. Steel

Answer: d

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2. Fill in the blank

1μ g=___ g

A. 10^{-3}

B. 10^{-6}

C. 10^{-9}

D. 10^{-12}

Answer: B

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3. Fill in the blank

the number of significant in 0.00503060 is ___

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4. The balanceing of chemical eruation is based on which of the following law?

A. Law of multipul proportions

B. Law of conservation of mass

C. Law of definite proportions

D. Gay-Lussac law

Answer: B

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5. Which among the following is the heaviest?

A. 1 mole of oxygen

B. 1 molecule of sulphur trioxide

C. 100 u of uranium

D. 44 g carbon dioxide

Answer: D

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6. Calculate the number of atoms in 48 g of He?

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7. One mole of CO_2 contains how many gram atoms?

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8. Fill in the blank

The ratio of gram atoms of Au and Cu in 22ct

gold is____

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9. A compound contains 69.5% oxygen and 30.5% nitrogen and its molecular weight is 92.The compound will be

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10. The total number of electrons present in 1 mole of water is

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11. Fill in the blank

40g NaOH is present in 100 ml of a solution. Its molarity is____

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12. Classify the following substances into homogeneous and heterogeneous

mixtures.*Milk *Iron *Air *Gasoline *Kerosene *Muddy water

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13. Calculate the volume occupied by 4.4 g of CO_2at STP?

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14. During a group of discussion a student argued that "the water of sea and river should

have different chemical compositionh". What is our opinion

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15. During a group of discussion a student argued that "the water of sea and river should have different chemical compositionh". Which law would you suggest to support your answer?

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16. During a group of discussion a student argued that "the water of sea and river should have different chemical compositionh".State the law.

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17. "When science developed some theories are also modified". Write the modified atomic theory.

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18. Carbon combines with oxygen to form CO and CO_2. What is the law behind this?

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19. Carbon combines with oxygen to form CO and CO_2. State the law.

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20. Calculate the volume occupied by $6.02 \cdot 10^{25}$ molecules of oxygen at STP.

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21. Calculate the molality of a solution of NaOH containing 20g of NaOH in 400 g solvent.

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22. Calculate the mole fraction of NaOH in a solution containing 20 g of NaOH per 360 g of water.

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23. 12 g of carbon reacts with 32 g of oxygen to form 44 g of carbon dioxide.

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24. When hydrogen and oxygen combine to from water, the ratio between volume of reactants and products is 2:1:2. Which law of chemical combination is applicable here?

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25. When hydrogen and oxygen combine to from water, the ratio between volume of reactants and products is 2:1:2. State the law.

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26. Carbon form two oxides, the first contains 42.9% C and the second contains 27.3% carbon. Show that these are in agreement with the law of multiple proportions.

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27. calculate the molality of a solution containing 10 g of NaOH in $200cm^3$ of solution. Density of solution is 1.4g/mL.(Molar mass of NaOH=40).

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28. Calculate the mass percentage of oxygen in $CaCO_3$.

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29. $KCIO_3$ on heating decomposes to KCl and O_2. Calculate the mass and volume of O_2 produced by heating 50 g of $KCIO_3$.

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30. Calculate the number of molecules present in 11 g of CO_2.

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31. Calculate the number of molecules present in 56mL of CO_2 at STP.

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32. calculate the number of moles of O_2 required to produce 240 g of MgO by burning Mg metal.(Atomic mass, Mg=24, O=16).

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33. Arrange the following in the increasing order of their mass. 1 g of Ca, 12 amu of C, $6.022 \cdot 10^{23}$ molecules of CO_2, 11.2 L of N_2 at STP.

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34. Irrespective of the source, pure sample of H_2O always contains 88.89% by mass of oxygen and 11.11% by mass of hydrogen. Which law is illustrated here?

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35. Irrespective of the source, pure sample of H_2O always contains 88.89% by mass of oxygen and 11.11% by mass of hydrogen. State the law.

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36. Calcium carbonate reacts with aqueous HCl to give CaCl_2 and CO_2 according to the reaction:

$$CaCO_3 + 2HCl \rightarrow CaCl_2 + CO_2 + H_2O.$$

What mass of $CaCO - 3$ is required to react completely with 25mL of 0.75MHCl?

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37. During a seminar, a students remarked that "Dalton's atomic theory has some faulty assumptions". Do you agree with him?

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38. During a seminar, a students remarked that "Dalton's atomic theory has some faulty assumptions". What is the present status of Dalton's atomic theory?

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39. During a seminar ,a students remarked that "Daltons atomic theory has some faulty assumptions". Write ay two wrong postulates of daltons atomic theory.

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40. One gram atom of an element contains 6.023×10^{23} atoms. Find the number of atoms in 8 g oxygen.

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41. One gram atom of an element contains 6.023×10^{23} atoms. Which is heavier , 1 ovygen atom or 10 hydrogen atoms?

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42. One gram atom of an element contains 6.023×10^{23} atoms.Define mole and Avogadro number.

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43. Classify the following as homogeneous and heterogeneous mixtures. Air,Smoke,Gunpower,NaCl solution, Petrol,Bronge, Mixture of Suger and sand.

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44. State and explain law of multiple proportions with example.

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45. One mole of an ideal gas occupies 22.4L at STP. Calculate the mass of 11.2L of oxygen gas at STP.

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46. One mole of an ideal gas occupies 22.4L at STP. Calculate the number of atoms present in the above sample.

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47. 21 g of nitrogen gas is mixed with 5g of hydrogen gas to yield ammonia to the equation. $N_2 + 3H_2 \rightarrow 2NH_3$. Calculate the maximum amount of ammonia that can be formed.

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48. When two elements combine to form more than one compound the different masses of the elements combining with fixed mass of the other bear a simple ratio. Name the above law.

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49. When two elements combine to form more than one compound the different masses of the elements combining with fixed mass of the other bear a simple ratio. Explain the above law by taking oxides of carbon.

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50. A compound contains 80% of carbon and 20% hydrogen. If the molecular mass is 30 calculate empirical formula and molecular formula.

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51. A compound contains 4.07% of hydrogen, 24.27% of carbon and 71.65% of chlorine. The molar mass is 98.96. What is the empirical and molecular formula?

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52. Nitrogen forms various oxides. Identify the law of chemical combination illustrated here. Also state the law.

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53. Which of the following weighs more? 1 mole of glucose, 4 moles of oxygen, 6 moles of N, 5 moles of sodium.

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54. 3 g of H_2 is mixed with 29 g of O_2 to yield water. Which is the limited reagent?

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55. 3 g of H_2 is mixed with 29 g of O_2 to yield water. Calculate the maximum amount of water that can be formed.

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56. 3 g of H_2 is mixed with 29 g of O_2 to yield water. Calculate the amount of the reactants which remains unreacted.

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57. Calculate the mass of oxygen required for the complete burning of 2 g of carbon.

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58. Calculate the molar mass of CO_2.

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59. Calculate the molar mass of CH_4.

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60. One gram mole of a substance contains 6.022×10^{23} molecules. 24 g of carbon is

treated with 72 g of oxygen to form CO_2. Identify the limiting reagent.

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61. One gram mole of a substance contains 6.022×10^{23} molecules. 24 g of carbon is treated with 72 g of oxygen to form CO_2. Find the number of molecules of CO_2 formed in this situation.

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62. One gram mole of a substance contains 6.022×10^{23} molecules. Find out the number of molecules in 2.8 g of nitrogen.

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63. One gram mole of substance contains 6.022×10^{23} molecules. Which is the heavier-one SO_2 molecule or one CO_2 molecule.

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64. How can you illustrate the law of multiple proportions by using oxides of metals containing 78.7% and 64.5% of the metal?

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65. Calculate the number of molecules present in 1 g of water.

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66. Calculate the volume of 0.2 mole of sulphur dioxide at STP.

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67. "One mole of all substances contain the same number of specified particles." Justify the statement.

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68. "One mole of all substances contain the same number of specified particles." How to connect mole, gram mole and gram atom?

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69. "One mole of all substances contain the same number of specified particles." What is the relation between number of moles and volume?

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70. "One mole of all substances contain the same number of specified particles." Calculate the number of moles of a gas in 11.2L at STP

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71. Calculate the molecular mass of the following: H_2O, CO_2, CH_4

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72. calculate the mass percent of different elements present in sodiun sulphate(Na_2SO_4).

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73. Calculate the amount of carbon dioxide that could be produced when 1 mole of carbon is burnt in air.

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74. Calculate the amount of carbon dioxide that could be produced when 1 mole of carbon is burnt in 16 g of dioxygen

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75. Calculate the amount of carbon dioxide that could be produced when 2 moles of carbon are burnt in 16 g of dioxygen.

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76. Chlorine is prepared in the laboratory by treating manganase dioxide(MnO_2) with aqueous hydrochloric acid according to the reaction,

`4HCl(aq)+MnO_2(s) to 2H_2O(l)+MnCl_2(aq)+Cl_2(g). How many grams of HCl react with 5.0 g of manganese dioxide?

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77. calculate the molarity of a Solution of ethanol in water in which the mole fraction of

ethanol is 0.40.

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78. calculate the number of moles of O_2 required to produce 240 g of MgO by burning Mg metal.(Atomic mass, Mg=24, O=16).

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79. If the mass percent of the various elements of a compound is known, its empirical formula

can be calculate. What is mass percent?Give its mathematical expression.

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80. If the mass percent of the various elements of a compound is known, its empirical formula can be calculate. A compound contains 4.07% hydrogen, 24.27% carbon and 71.65% chlorine. Its molecular mass is 98.96. What are the empirical and molecular formulae?

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81. One mole is the amount of substance that contains as many elementary particles as 12g of C^{12} isotope of carbon. What do you meaqn by molar mass of a compound?

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82. One mole is the amount of substance that contains as many elementary particles as 12g of C^{12} isotope of carbon. Calculate the number of moles in 1 litre of water(Density of

water is 1g/mL). Also calculate the number of water molecules in 1 litre of water.

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83. The laws of chemical combination are the basis of the atomic theory. Name the law of chemical combination illustrated by the pair of compounds, CO and CO_2.

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84. The laws of chemical combination are the basis of the atomic theory. State amd explain the law of conservation of mass.

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85. The laws of chemical combination are the basis of the atomic theory. Calculate the molarity of a solution containing 8 g of NaOH in 500mL of water

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86. the laws of chemical combination governs the formation of compounds from elements. State the law of conservation of mass. Who put forward this law?

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87. The combination of elements of form compounds is govemed by the laws of chemical combination. Hydrogen combines with oxygen to form compounds, namely

water and hydrogen peroxide. State and illustrate the related law of chemical combination.

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88. The combination of elements of form compounds is govemed by the laws of chemical combination. What is meant by 'limiting reagent' in a chemical reaction?

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89. The combination of elements of form compounds is govemed by the laws of chemical combination. 28 g of nitrogen is mixed with 12g of hydrogen to form ammonia as per the reaction, `N_2+ 3H_2 to 2NH_3. Which is the ' limiting reagent' in this reaction. [Atomic masses : N=14, H=1]

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90. Mole is a very large number to indicate the number of atoms, molecules, etc. Write

another name for one mole.

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91. How the molecular formula is different from that of the Empirical formula?

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92. An organic compound on analysis gave the following composition. Carbon=40%, Hydrogen=6.66% and oxygen= 53.34%.

Calculate its molecular formula if its molecular mass is 90.

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93. The mole concept helps in handling a large number of atoms and molecules in stoichiometric calculations. Define 1 mol.

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94. The mole concept helps in handling a large number of atoms and molecules in stoichiometric calculations. What is the number of hydrogen atoms in 1 mole of methane(CH_4)?

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95. The mole concept helps in handling a large number of atoms and molecules in stoichiometric calculations. Calculate the

amount of carbon dioxide formed by the complete combustion of 80g of methane as per the reaction:

$CH_4g + 2O_2g \rightarrow CO_2g + 2H_2O_g$. (Atomic masses : C= 12.01u, H= 1.008u, O= 16u)

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96. Atoms have very very small mass and so usually the masses of atoms are given relative to a standard called atomic mass unit. What is Atomic Mass unit (AMU)?

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97. In a reaction `A + B_2 to AB_2 , identify the limiting reagent in the reaction mixture containing 5 mol A and 2,5 mol B.

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98. calculate the mass of NaOH required to make 500mL of 0.5 M aqueous solution. (molecular mass of NaOH = 40).

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99. How many moles of dioxygen are present in 64 g of dioxygen?(Molecular mass of dioxygen is 32).

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100. Define empirical formula. How is it related to the molecular formula of a compound?

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101. Hydrogen combines with oxygen to form two different compound, namely, water(H_2O) and hydrogen peroxide(H_2O_2). Which law is obeyed by this combination?

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102. Hydrogen combines with oxygen to form two different compound, namely, water(H_2O) and hydrogen peroxide(H_2O_2). State the law

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103. Hydrogen combines with oxygen to form two different compound, namely, water(H_2O) and hydrogen peroxide(H_2O_2). How may significant figures are present in the following? 0.0025, 285

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104. A given compound always contains exactly the same proportion of elements by weight'. Name the above law.

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105. A given compound always contains exactly the same proportion of elements by weight'. Write the name of the scientist who proposed this law..

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106. Calculate the number of molecules in each of the following : 1 g N_2, 1 g CO_2. (Given that

N_a is 6.02×10^{23}, molecular mass of N_2 is 28 and CO_2 is 44).

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107. 12g of C_{12} contains Avogadro's number of carbon atms. Give the Avagadro's number.

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108. Fill in the blank

The mass of 2 moles of ammonia gas is____

A. 2g

B. 1.2×10^{22} g

C. 17g

D. 34g

Answer: D

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109. Calculate the volume of ammonia gas produced at STP when 140g of nitrogen gas

reacts with 30g of hydrogen gas.(Atomic masses: N= 14u , H =1u)

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110. When nitrogen and hydrogen combines to from ammonia, the ratio between the volumes of gaseous reactants and products is 1:3:2. Name the law of chemical combination illustrated here.

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111. A compound is made up of two elements A and B, has A=70%, B=30%. The relative number of moles of A and B in the compound are 1.25 and 1.88 respectively. If the molecular mass of the compound is 160, find the molecular formula of the compound.

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112. Empirical formula represents the simple whole number ratio of various atoms present

in a compound. Give the relationship between empirical formula and molecular formula.

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113. An organic compound has the following percentage composition C = 12.36%, H = 2.13%, Br = 85% . Its vapour density is 94. Find its molecular formula.

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114. what is mole fraction?

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115. Determine the number of moles present in 0.55 mg of electrones.

A. 1 mole

B. 2 moles

C. 1.5 moles

D. 0.5 mole

Answer: A

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116. Give the empirical formula of the following

.$C_6H_{12}O_6, C_6H_6, CH_3COOH, C_6H_6Cl_6$.

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117. Two elements carbon and hydrogen combine to from C_2H_6, C_2H_4, and C_2H_2. Identify the law illustrated here.

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