



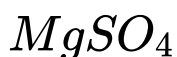
CHEMISTRY

BOOKS - A N EXCEL PUBLICATION

SOME BASIC CONCEPTS OF CHEMISTRY

Question Bank

1. Calculate the percentage of magnesium in





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2. How much copper can be obtained from 100 g of $CuSO_4$ (Atomic mass of Cu = 63.5, S = 32)



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3. An oxide of nitrogen contains 25.9% of nitrogen. What is its empirical formula



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4. Calculate the mass of chlorine required to react with 0.20 g of hydrogen to yield hydrogen chloride. Also calculate the amount of HCl formed.



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5. Calculate the volume of oxygen at STP that can be produced by heating 12.25g of potassium chlorate.



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6. Calculate the number of moles and mass of methane required to produce 11 g of CO_2 by combustion.



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7. 1.5 g of H_2 react with 14.5 g of O_2 to form water Which is the limiting reagent?



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8. 1.5 g of H_2 react with 14.5 g of O_2 to form water. Calculate the amount of water that is formed in the reaction.



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9. 1.5 g of H_2 react with 14.5 g of O_2 to form water. Calculate the amount of the reactant which remains unreacted.



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10. 4g of NaOH are dissolved in 100 mL of solution. Find its molality if the density of solution is $1.038 \frac{g}{cm^3}$



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11. Calculate the mass of zinc required to produce 448 mL of H_2 at STP by reacting with dilute sulphuric acid (Atomic mass of Zn = 65).



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12. How much iron can be theoretically obtained by the reduction of 1 kg of Fe_2O_3

Atomic mass of Fe = 55.8.



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13. 7g of N_2 is allowed to react with 2g H_2 in presence of catalyst to form NH_3 Which is the limiting reagent?



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14. 7g of N_2 is allowed to react with 2g H_2 in presence of catalyst to form NH_3 . Calculate the maximum amount of NH_3 that can be formed in the reaction.



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15. Calculate molecular mass of glucose ($C_6H_{12}O_6$) molecule.



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16. A compound contains 4.07 % hydrogen, 24.27 % carbon and 71.65 % chlorine. Its molar mass is 98.96 g. What are its empirical and molecular formulas?



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17. Calculate the amount of water (g) produced by the combustion of 16 g of methane.



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18. How many moles of methane are required to produce 22 g $CO_2(g)$ after combustion ?



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19. 50.0 kg of $N_2(g)$ and 10.0 kg of Hydrogen (g) are mixed to produce $NH_3(g)$. Calculate the amount of NH_3 (g) formed. Identify the limiting reagent in the production of NH_3 in this situation. —



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20. A solution is prepared by adding 2 g of a substance A to 18 g of water. Calculate the mass per cent of the solute



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21. Calculate the molarity of NaOH in the solution prepared by dissolving its 4 g in enough water to form 250 mL of the solution.



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22. The density of 3 Absolution of NaCl is 1.25gmL^{-1} Calculate molality of the solution



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23. Calculate the mass percentage of elements present in NaSO_4 sodium sulphate



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24. Determine the empirical formula of an oxide of iron which contains 69.9% iron and

30.1 % oxygen by mass.



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25. Calculate the amount of CO_2 produced when 1 mole of carbon is burned in air



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26. Calculate the amount of CO_2 produced when 1 mole of carbon is burned in 16 g of O_2



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27. Calculate the amount of CO_2 produced when 2 moles of carbon are burned in 16 g of O_2



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28. Calculate the mass of sodium acetate (CH_3COONa) required to make 500 mL of 0.375 M aqueous solution, (Molar mass of $CH_3COONa = 82,0245 \text{ g mol}^{-1}$)



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29. Calculate the concentration of nitric acid in moles per litre in a sample which has a density of 1.41gmL^{-1} and the mass percent of nitric acid in it being 69% .



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30. How much copper can be obtained from 100 g of CuSO_4



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31. Calculate the following In three moles of ethane (C_2H_6) Number of moles of carbon atoms



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32. Calculate the following in three moles of ethane (C_2H_6) Number of moles of hydrogen atoms



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33. Calculate the following in three moles of ethane (C_2H_6) Number of molecules of ethane



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34. Calculate the concentration of sugar ($C_{12}H_{22}O_{11}$) in $\text{mol } L^{-1}$ if its 20g are dissolved in water to make a final volume of 2L.



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35. Match the following prefixes with their multiples

- | | |
|------------|------------|
| (i) micro | 10^6 |
| (ii) deca | 10^9 |
| (iii) mega | 10^{-6} |
| (iv) giga | 10^{-15} |
| (v) femto | 10 |



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36. If the speed of light is $3.0 \times 10^8 \text{ m s}^{-1}$ calculate the distance covered by light in 2.00 nanosecond.



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37. Dinitrogen and dihydrogen react as $N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$ Calculate the mass of produced if $2.00 \times 10^3 \text{ g}$ dinitrogen reacts with $1.00 \times 10^3 \text{ g}$ of dihydrogen



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38. Dinitrogen and dihydrogen react as



Will any of the reactant remain unreacted?



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39. Dinitrogen and dihydrogen react as



If yes, calculate the mass of the reactant.



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40. How are 0.50 mol Na_2CO_3 and 0.50 M of Na_2CO_3 different.



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41. If 10 volumes of dihydrogen reacts with 5 volumes of dioxygen gas, how many volumes of water vapour would be produced (volumes are measured under the same conditions)



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42. Which one of the following will have largest number of atoms?

1g Au (s)

1g Na(s)

1g Li (s)

1g Cl_2 (g)



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43. Calculate the mass of one ^{12}C atom in gram.



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44. Calcium carbonate reacts with HCl as

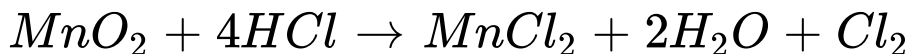


Calculate the mass of CaCO_3 required to react completely with 25 ml of 0.75 M HCl?



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45. Manganese dioxide reacts with hydrochloric acid as



Calculate the mass of HCl that reacts with 5.0g manganese dioxide (Atomic mass of Mn = 55)



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46. Chlorine is prepared in the laboratory by treating manganese dioxide (MnO_2) with aqueous hydrochloric acid according to the reaction?



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47. Calculate the number of moles of O_2 required to produce 240 g of MgO by burning magnesium metal

A. 1

B.

C.

D.

Answer:



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48. How many moles of oxygen are given by the complete decomposition of 1.225gKClO_3 ?



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49. If the mass percent of various elements of a compound is known, its empirical formula can be calculated. What is mass percent? Give its mathematical expression.



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



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51. One mole is the amount of substance that contains as many elementary particles as 12 g of ${}_{6}^{12}\text{C}$ isotope of carbon. What do you mean by molar mass of a compound?



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52. One mole is the amount of substance that contains as many elementary particles as 12 g of ${}_{6}^{12}\text{C}$ isotope of carbon. Calculate the number of moles in 1 litre of water

(Density of water is $1\text{g}/\text{mL}$). Also calculate the number of water molecules in 1 litre of water



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53. 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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54. The laws of chemical combination are the basis of the atomic theory. State and explain the law of conservation of mass



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



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56. 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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57. The combination of elements from compounds is governed by the laws of chemical combination. Hydrogen combines with oxygen to form two compounds, namely

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



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



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59. The combination of elements form compounds is governed by the laws of chemical combination 28 g of N_2 is mixed with 12g of H_2 to form ammonia as per the reaction, $N_2 + 3H_2 \rightarrow 2NH_3$. Which is the limiting reagent in this reaction?



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60. Mole is a very large number to indicate the number of atoms, molecules, etc. Write another name for one mole.



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61. How is molecular formula different from the empirical formula?



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62. 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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63. Define 1 mole



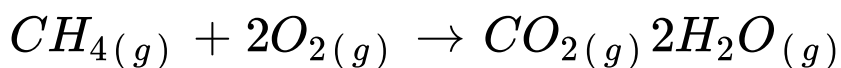
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64. What is the number of hydrogen atoms in one mole of methane (CH_4)?



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65. The mole concept helps in handling a large number of atoms and molecules in stoichiometric calculations. Calculate the amount of CO_2 formed by the complete combustion of 80 g of methane as per the reaction



(Atomic masses: C = 12.01u, H = 1.008u, O=16u)..



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66. What is atomic mass unit (amu)?



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67. In a reaction $A + B_2 \rightarrow AB_2$. identify the limiting reagent in the reaction mixture containing 5 mole of A and 2.5 mole of B.



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68. Calculate the mass of NaOH required to make 500 mL of 0.5 molar aqueous solution

(Molecular mass of NaOH=40)



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



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70. The following data were obtained when dinitrogen (N_2) and dioxygen (O_2) react

together to form different compounds.

 Name the law of chemical combination obeyed by the above experimental data.

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71. What is atomic mass unit (amu) ?

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72. Hydrogen combines with oxygen to form two different compounds, namely, water

(H_2O) and hydrogen peroxide (H_2O_2) Which law is obeyed by this combination?



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



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74. How many significant figures are present in the followings? 0.0025



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75. How many significant figures are present in the followings? 285



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76. A given compound always contains exactly the same proportion of elements by weight'.

Name the law



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77. A given compound always contains exactly the same proportion of elements by weight'.

Write the name of the scientist who proposed it



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78. A given compound always contains exactly the same proportion of elements by weight'. Calculate the number of molecules in each of the following: $1gN_2$ (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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79. A given compound always contains exactly the same proportion of elements by weight'.

Calculate the number of molecules in each of the following: $1gCO_2$ (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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80. When nitrogen and hydrogen combine to form 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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81. 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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