CHEMISTRY

BOOKS - OMEGA PUBLICATION

SOME BASIC CONCEPTS OF CHEMISTRY

Questions

1. Explain the following terms

Element

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2. Explain the following terms

Compound

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3. Explain the following terms

Mixture

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4. What is the SI unit of mass? How is it defined?

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5. Match the following prefixes with their multiple

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

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6. Fill in the blanks in the following conversions

1km= ___mm= __pm

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7. Fill in the blanks in the following conversions

1mg =___kg= ___ ng

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8. Fill in the blanks in the following conversions

1mL = ____ L= ____ dm^3

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9. Explain precision and accuracy

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10. State the number of significant figures in the following numbers

43.8

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11. State the number of significant figures in the following numbers

0.0048

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12. State the number of significant figures in the following numbers

6.6437

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13. State the number of significant figures in the following numbers

800.0

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14. How many significant figure should be present in the answer of the following calculations

$$\frac{0.02856 \times 298.15 \times 0.112}{0.5785}$$

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15. How many significant figure should be present in the answer of the following calculations

5×5.364

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16. How many significant figure should be present in the answer of the following calculations

$0.0125 + 0.7864 + 0.0215$

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17. How many significant figures are there in each of the following?

6.022×10^{23}

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18. How many significant figures are there in each of the following?

12.0000

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19. How many significant figures are there in each of the following?

$6.62 \times 10^{-34} Js$

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20. Round up the following figures upto 3 significant figures.

34.216

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21. Round up the following figures upto 3 significant figures.

10.4107

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22. Round up the following figures upto 3 significant figures.

0.04597

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23. What is the sum of 3.468 and 2.02?

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24. What is the sum of 31.141, 2.01 and 4.124?

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25. The density of sodium is $5.96 gcm^{-3}$. What is the density in kg m^{-3}?

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26. What is law of conservation of mass?

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27. What is law of conservation of mass?

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28. Who is the father of chemistry?

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29. State and explain law of definite proportions

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30. State and explain the law of multiple proportions.

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31. State and explain the law of reciprocal proportions or law of equivalent proportions.

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32. State and explain Gay Lussac's law with an example

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33. If ten volume of dihydrogen gas react with five volume of dioxygen gas how many volume of water vapour would be produced?

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34. State Avogadro's law

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35. Who gave Atomic theory ?

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36. Define the terms : Atom

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37. Define

Molecule

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38. Define amu.

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39. Define atomic mass of an element.

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40. Define average atomic mass

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41. Define gram atomic mass.

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42. What will be the mass of one C^{12} atom in grams?

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43. Define molecular mass of a subtance?

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44. Define gram molecular mass.

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45. Calculate the molecular mass of the following

CO_2

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46. Calculate the molecular mass of the following

CH_4

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47. Calculate the relative molecular masses of : Water

(H_2O)

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48. Calculate the molecular mass of the followings:

H_2SO_4

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49. Calculate the molecular mass of the followings:

Na_2CO_3

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50. What is formula mass? Where it is used?

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51. Define mole. Calculate the mass of one molecule of

H_2O

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52. Calculate the number of molecules in a drop of water weighing 0.05g (H=1, O= 16)

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53. Calculate the mass of 2.5 gram atoms of magnesium.

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54. Calculate the mass of 3 gram molecules of sulphuric acid.

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55. How will you express gram atomic mass in terms of moles?

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56. How will you express gram molecular mass in terms of moles?

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57. Define gram molecular volume.

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58. Calculate the mass of 0.5 mole of glucose (Given molecular mass of glucose = 180g).

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59. Also calculate molecules of glucose in 22.5g of glucose.

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

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

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

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63. What volume is occupied by 0.5 mole of nitrogen gas at N.T.P?

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64. Chlorophyll, the green colouring matter of plant contains 2.68% of magnesium by weight. Calculate the number of magnesium atom in 2.0g chlorophyll.

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65. How much copper can be obtained from 100g of copper sulphate ?

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66. Calculate the number of moles in the following 7.85g of iron

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67. Calculate the number of moles in the following

4.68 mg of silicon

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68. Calculate the number of moles in the following

$65.6\mu g$ of carbon

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69. Calculate the number of atoms in each of the following

52 moles of Ar

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70. Calculate the number of atoms in each of the following

52u of He

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71. Calculate the number of atoms in each of the following

52g of He

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72. In three moles of ethane. calculate the number of moles of carbon atoms.

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73. In three moles of ethane. calculate the number of moles of hydrogen atoms.

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74. In the three moles of ethane. Calculate the number of molecules of ethane.

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75. Calculate the number of moles in the following : (1) 1.46g metric tones of Al.

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76. Calculate the number of moles in the following : (2) 7.9 mg of Ca

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77. Calculate the number of atoms in 0.25 mole atoms of carbon

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78. Calculate the number of atoms in

0.20 mole molecules of oxygen

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79. Calculate the percentage composition of $Ca(NO_3)_2$

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80. Calculate the mass % of different elements present in

sodium sulphate (Na2SO4).

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81. A substance has empirical formula CH_2O. Its molecular mass is 180. What is its molecular formula?

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82. Two elements A (Atomic mass = 75) and B(Atomic mass =16) combine to give a compound having 75.8% A. Calculate the relative number of atoms present in B.

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83. A compound containing carbon, hydrogen and oxygen gave the following analytical data C= 40.0%, H= 6.67%. Calculate the molecular formula of the compound, If its molecular mass is 180.

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84. An organic compound on analysis gave the following percentage composition of C= 57.8, H= 3.6 and the rest is oxygen. Vapour density of the compound is 83. Find out the molecular formula of the compound.

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85. An organic substance containing carbon, hydrogen and oxygen gave following percentages, C= 40.68%, H_2= 5.085% and O_2= 54.22%. The vapour density of the compound is 59. Calculate the molecular formula of the compound.

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86. Determine the empirical formula of a compound with following percentage composition Cu= 47.3, Cl= 52.7.

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87. An organic compound has the following percentage composition : C= 48%, H= 8% N= 28% and rest of oxygen. Calculate the empirical formula of the compound.

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88. An inorganic salt gave the following percentage composition : Na= 29.11%, S= 40.51% and O= 30.38%. Calculate the empirical formula of the salt. (At. Mass Na= 23, S=32)

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89. Determine the empirical formula of an oxide in which mass percent of iron and oxygen are 69.9 and 30.1 respectively.

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90. Define limiting reactant or limiting reagent

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91. What is the concentration of a solution ?

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92. Define solute.

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93. Define solvent.

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94. A solution is prepared by dissolving 2g of substance A in 18g of water. calculate the mass percentage of solute?

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95. A solution is prepared by adding 60g of methyl alcohol to 120g of water. calculate the mole fraction of methanol and water?

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96. Define molarity. Give its mathematical representation

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97. What is the unit of molarity?

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98. What is molarity equation? What is its utility?

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99. How are 0.50mol Na_2CO_3 and 0.50M Na_2CO_3 different?

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100. A sample of NaOH weighing 0.38 g is dissolved in water and solution is made to 50.0 mL in a volumetric flask. What is the molarity of the solution?

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101. Calculate the mass of sodium acetate (CH3COONa) required to make 500 mL of 0.375 molar aqueous solution. Molar mass of sodium acetate is 82.0245 g mol–1

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102. If the density of methanol is 0.793 kg L^{-1}. What is its volume needed for making 2.5L of its 0.25M solution?

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103. Define molarity. Give its mathematical representation

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104. What is the unit of molarity?

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105. Which of the two, molarity and molality, is better to express concentration and why?

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106. What is the unit of formality?

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107. Define ppm

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108. What will be the normality of solution obtained by mixining $0.45N$ and $0.60NNaOH$ in the ratio $2:1$ by volume ?

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109. What is normality equation? What is its utility?

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110. Define the following

Acidity of base

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111. Define the following

Basicity of acid

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112. How will you calculate equivalent mass from molecular mass?

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113. In a reaction $A + B_2 \rightarrow AB_2$. Identify the limiting reactant, if any, in the following reaction mixtures.

300 atoms of A+200 molecules of B

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114. In a reaction $A + B_2 \rightarrow AB_2$. Identify the limiting reactant, if any, in the following reaction mixtures.

2 mole A +3 mole B

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115. In a reaction $A + B_2 \rightarrow AB_2$. Identify the limiting reactant, if any, in the following reaction mixtures.

100atoms of A +100 molecules of B

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116. In a reaction $A + B_2 \rightarrow AB_2$. Identify the limiting reactant, if any, in the following reaction mixtures.

5 mol A+ 2.5 mol B

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117. In a reaction $A + B_2 \rightarrow AB_2$. Identify the limiting reactant, if any, in the following reaction mixtures.

2.5 mol A +5 mol B

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118. Calcium carbonate reacts with aqueous HCl to give $CaCl_2$ and CO_2 according to the reaction,

$CaCO_3(s) + 2HCl(aq) \rightarrow CaCl_2(aq) + CO_2(g) + H_2O(l)$

What mass of $CaCO_3$ is required to react completely wth 25mL of 0.75 M HCl?

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

$4HCl(aq) + MnO_2(s) \rightarrow 2H_2O(l) + MnCl_2(aq) + Cl_2(g)$

. How many grams of HCl react with 5.0g of manganese dioxide?

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Multiple Choice Questions Mcqs

1. How many significant figures are there in each of the following?

6.022×10^{23}

A. three

B. four

C. five

D. can be any of these

Answer: B

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2. The prefix 10^{18} is

A. giga

B. exa

C. kilo

D. nano

Answer: B

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3. Fill in the blanks:

One fermi = _____

A. $10^{-13}cm$

B. $10^{-15}cm$

C. $10^{-10}cm$

D. $10^{-12}cm$

Answer: A

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4. Which one of the following is not an element?

A. Diamond

B. Graphite

C. Silica

D. Ozone

Answer: C

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5. Law of mulitple proportions is illustrated by one of the following pairs.

A. H_2S and SO_2

B. NH_3 and NO_2

C. Na_2S and Na_2O

D. N_2O and NO

Answer: D

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6. 1 amu is equal to

A. $\frac{1}{12}$ of the mass of $C-12$

B. $\frac{1}{14}$ of the mass of $O-16$

C. 1g of H_2

D. $1.66 \times 10^{-23} kg$

Answer: A

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7. Define atomic mass of an element.

A. the actual mass of one atom of the element

B. the relative mass of an atom of the element

C. the average relative mass of its atoms as compared with an atom of carbon taken as 12.

D. much different from the mass number of the element

Answer: C

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8. How is Avogadro's number denoted ?

A. number of atoms in gram of element

B. number of millilitres which one mole of a gaseous substance occupies at N.T.P

C. number of molecules present in one gram molecular mass of a substance

D. all are correct

Answer: D

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9. Calculate the equivalent weight of oxalic acid

A. 90

B. 63

C. 53

D. 45

Answer: B

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10. Avogadro's hypothesis is related with

A. volume of gas and number of atoms

B. volume of gas and number of ions

C. volume of gas and number of electrons

D. volume of gas and number of molecules

Answer: D

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11. Atomicity of oxygen is

A. 1

B. 2

C. 3

D. 4

Answer: B

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12. Gram molecular mass is expressed in

A. gram

B. kilogram

C. pound

D. a.m.u

Answer: A

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13. 1 mole represents particles.....

A. 6.023×10^{-23} particles

B. 6.023×10^{23} particles

C. 6.023×10^{-34} particles

D. 6.023×10^{34} particles

Answer: B

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14. Which of the following is incorrect?

A. Gram molecular mass= one mole molecules

B. Gram atomic mass= one gram atom

C. 1 a.m.u $= 1.66 \times 10^{-24} g$

D. Molecular mass of oxygen is 32 amu

Answer: A

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15. In case of molecular substances, one mole represents

A. gram molecular mass

B. 6.023×10^{23} molecules of the substance

C. 22.4 litres at STP (in gaseous substance)

D. all the above

Answer: D

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16. Gram molecular mass of H_2SO_4 is

A. 98 a.m.u

B. 98g

C. 49g

D. none of the above

Answer: B

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17. Calculate the mass of 2.5 gram atoms of magnesium.

A. 60g

B. 48g

C. 24g

D. 36g

Answer: A

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18. 1 mole of oxygen molecules is equal to

A. 6.023×10^{23} atoms of oxygen

B. 6.023×10^{-23} atoms of oxygen

C. 6.023×10^{23} molecules of oxygen

D. 6.023×10^{-23} molecules of oxygen

Answer: C

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19. Calculate the number of atoms in

0.25 mole atoms of carbon

A. 6.023×10^{23} atoms

B. 6.023×10^{-23} atoms

C. 1.506×10^{23} atoms

D. 6.023×10^{23} atoms

Answer: C

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20. Calculate the volume occupied at NTP by 14g of nitrogen gas .

A. 22.4L

B. 11.2L

C. 44.8L

D. 5.6L

Answer: B

21. Under similar conditins of T and P, equal volumes of all gases contain equal number of molecules'. This statement is given by

A. Dalton's law

B. Law of constant composition

C. Avodadro's hypothesis

D. Berzelius's hypothesis

Answer: C

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22. The number of significant figures in 0.0045 are

A. Two

B. three

C. four

D. five

Answer: A

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23. Which of the following is correct?

A. $1L = 1dm^3$

B. $1L = 10dm^3$

C. $10L = 1dm^3$

D. $1L = 1m^3$

Answer: A

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24. In which of the following numbers all zeroes are significant?

A. 0.00007

B. 0.0080

C. 60.000

D. 0.800

Answer: C

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25. A molal solution is one that contains 1 mole of a solute in

A. 1000g of the solvent

B. 1 litre of the solvent

C. 1 litre of the solution

D. 22.4 litre of the solution

Answer: A

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26. One mole of CH_4 contains

A. 6.02×10^{23} atoms of H

B. 4 atoms of H

C. 1 atom of C

D. 24.092×10^{23} atoms of H

Answer: D

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27. The number of significant figures in 4.023 is

A. 1

B. 2

C. 3

D. 4

Answer: D

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

A. 1g Au

B. 1g Na

C. 1g Li

D. $1gCl_2$

Answer: C

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29. Which of the following concentration terms is/are affected by a change in temperature ?

A. Molarity

B. Molality

C. Normality

D. Formality

Answer: C

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