

CHEMISTRY

BOOKS - CENGAGE CHEMISTRY (ENGLISH)

SOME BASIC CONCEPTS AND MOLE CONCEPT

Solved Examples

a.
$$(6.7 \times 10^5) \times (4.6 \times 10^4)$$

b. $(7.6 \times 10^7) \times (3.8 \times 10^{-4})$
c. $(6.8 \times 10^{-3}) \times (5.2 \times 10^{-4})$
d. $\frac{6.7 \times 10^5}{4.6 \times 10^4}$
e. $\frac{7.6 \times 10^7}{3.8 \times 10^{-4}}$
f. $\frac{6.8 \times 10^{-3}}{3.8 \times 10^{-4}}$

g. $7.65 imes10^2+2.72 imes10^3$

h. 7.87 imes 10 $^{-4}$ - 2.61 imes 10 $^{-5}$

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

a. π

b. The sum of 16.4 + 0.3254

c. The product of 12 imes 7.435

d. 0.0075

e. $5.033 imes 10^{22}$

f. 7.007

g. 6000

h. The subtractin of 19.3 - 0.4567



7. Express the following to four significant figure:

- i. $6.58768 imes 10^5$ ii. 8.35783`
- iii. 98.2350 iv. 0.003586

v. 90000

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8. Express the number 68000 in exponetial notation which shows

- i. Two significant figures
- ii. Three significant figures.

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9. An analytic balance has uncertainty in measurement equal to $\pm 1mg$. Then report the result in terms of percentage if the weight of a compound is

a. 1*g* b. 10*g* c. 100*g*

- **10.** Convert the following :
- a. 5L of a solution into m^3
- b. 4 days into seconds
- c. 200lb into kilogram
- d. 2.00 km into miles
- (1 mile = 1760yd, 1yd = 3ft1 in = 2.54cm)
- e. 0.800 carat intog grams and kilograms
- e. 8.0km into inches (1m = 1.094 yards(yd), 1yd = 36 in)
- f. 40 Em (exa metre) (thickness of Milky way galaxy) into metre
- g. 1.4Gm (gigmetre) diametre of sun) into metre
- h. 41Pm (petametre) (distance of nearest star) into metre
- i. 1 fg (femotgram) (mass of human DNA molecule) into kilogram
- j. 500Mg (megagram) (mass of a loaded jumbo jet) into kilogram



11. Express the following in SI unit:

a. 6'10 b. 200*lb'*

c. 60miles h^{-1} d. $-20^{\circ}C$

e. 2.53mm f. 7.85mL

g. 0.0528
in h. 52 μg

i. 5
days j. 5L

k. $14 lbin^{-2}$ (atmospheric pressure)

l. $6.86gcm^{-3}$ density of metal)

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12. Five grams of $KCIO_3$ yield 3.041g of KCI and 1.36L of oxygen at

standard temperature and pressure. Show that these figures support

the law of conservation of mass within limits of $\pm\,0.4~\%\,$ error.

13. 0.22g of a hydrogen (i.e., a compound conatining carbon and hydrogen only) on complete combustion with oxygen gave 0.9g water and 0.44g carbon dioxide. Show that these results are in accordance with the law of conservation of mass (atomic mass of C = 12, H = 1, O = 16).

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14. 0.7g of iron reacts directly with 0.4g of sulphur to form ferrous sulphide. If 2.8g of iron is dissolved in dilute HCl and excess of sodium sulphide solution is added, 4.4g of iron sulphide is precipitated. Prove the law of constant composition.

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15. 1.375g of cupric oxide was reduced by heating in a current of hydrogen and the weight of copper that remained was 1.098g In

another experiment, 1.179g of copper was dissolved in nitric acid and the resulting copper nitrate converted into cupric oxide by ignition. The weight of cupric oxide formed was 1.476g. Show that these result illustrate the law of constant composition.



16. 112mL of hydrogen combines with 56mL of oxygen of form water. When 224mL of hydrogen is passes over hand cupric oxide, the cupric oxide loses. 0.160g of weight. All volumes are measured at STP. Show that the result agrees with the law of constant composition (22.4L hydrogen and oxygen at STP weigh, respectively, 2g and 32g)



17. Element X and Y form two different compounds. In the first compound, 0.324gX is combined with 0.471gY. In the second



19. Carbon combines with hydrogen to forom three compounds A, B and C. The percentage of hydrogen in A, B and C is 25, 14.3, and 7.7,

respectively. (a) Find the empirical formula of the compounds.

20. Two oxides of a metal contain 27.6% and 30.0% of Oxygen, respecttively. If the formula of the first be M_3O_4 . Find that of the second.



21. If the masses of Mn of O are in the ratio of 55: 16 in MnO, what is the ratio of O that combines with the same mass of Mn in MnO_2 and Mn_2O_7 ?

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22. Ammonia contains 82.35% of nitrogen and 17.65% of hydrogen. Water contains 88.90% of oxygen . Nitrogen trioxide contains 63.15% of oxygen and 36.85% of nitrogen. Show by calculations from these data which law of chemicmal combination is verified.



23. Show that the results given below taken together illustrate a law of chemical action: (a) 0.46g og amgnesium produces 0.77g. Of magnesium oxide, (b) 0.82g of magnesium liberates 760mL of hydrogen at STP from an acid (weight of 1mL of hydrogen at STP = 0.00009g), and (c) 1.25g results from the union of 1.11g of oxygen and hydrogen.

24. Aluminium oxide contains 52.90% aluminium and carbon dioxide contains 27.27% carbon. Calculate the percentage of aluminium in aluminium carbide assuming that the law of reciprocal proportions is true.



25. Air contains 20% oxygen by volume. Calculation the theoretical volume of air which will be required for burning completely 200 cubic m of acetylene gas (C_2H_2) All volumes are measured under the same conditions of temperature and pressure.



26. One volume of a gaseous compound containing carbon, hydrogen, and oxygen was burnt in the presence of 2 volumes of oxygen. The resultant gases contained 2 volumes of carbon dixoide and 2 volumes of steam. Find the molecular formula of the compound, if all the volume were measured under the same conditions of temperature and pressure.



- 27. Calculate molecular mass of the following molecules:
- a. Sulphuric acid (H_2SO_4)
- b. Glucose $(C_6H_{12}O_6)$
- c. Methane (CH_4)



28. In 4g atoms of Ag. calculate

a. Amount of Ag.

b. Weight of one atom of Ag. (atoic weight of Ag = 108).

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29. How many <i>g</i> atoms are there in one atoms?
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30. How many years would it take to spend Avogadro Number of rupees at the rate of 10 lakh rupees per second ?
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31. From 200mg of CO_2 , 10^{21} molecules are removed. How many grams

and moles of CO_2 are left.



atoms of carbon needed to make such a de

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34. Calculate the residue obtained on strongly heating $2.76Ag_2CO_3$.





39. One litre of CO_2 is passed over hot coke. The volume becomes 1.4L

. Find the composition of products, assuming measurement at NTP.

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40. 5mL of a gaseous hydrocarbon was exposed to 30mL of O_2 . The resultant gas, on cooling, is formed to measure 25mL of which 10mL is absrobed by NaOH and the remainder by pyrogallol. Determine the molecular formula of hydrocation. All measurements are made at constant pressure and temperature.

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41. When a mixture of 10 moles of SO_2 and 15 moles of O_2 was passed over catalyst, 8 moles of SO_3 was formed. How many moles of SO_2 and



43. Calculate the number of moles in each of the following :

a. 11 g of CO_2



44. Calculate the mass of the following

a. One atom of calcium



46. How many moles of O are present in 4.9g of H_3PO_4 ? (Atomic

weight of P, O and H = 31, 16, 1)

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47. What is the molecular mass of a compound X, if its $3.0115 imes 10^9$ molucules weigh $1.0 imes 10^{-12} g$?

48. What is the volume occupied by one CCl_4 molecule at $20^{\circ}C$?

Density of CCl_4 is $1.6\,/\,$ at $20^{\,\circ}\,C$

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49. How many grams of $Cu(NO_3)_2$ would you need to take to get

1.00g of copper? Cu = 63.5, N = 14, O = 16.

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50. Calculate the number of atoms of each type that are present in

3.42g of sucrose $(C_{12}H_{22}O_{11})$.

51. How many molecules of benzene (C_6H_6) are there in 1L of benzene

? Specific gravity of benzene is 0.88.



c. 0.1 mole of SO_2 .

54. What is the volume of one molecules of water (density of $H_2O=1qcm^{-3}$)



55. Calculate the mass of the carbon present in 0.1 mole of sodium ferricyanide $Na_3[Fe(CN)_6]$.

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56. Calculate the total number of electrons present in 3.2g of oxygen

gas.



57. Calculate the number of molecules in one drop of H_2O whose mass

is 0.05g

58. Calculate the percentage compositon of various elements in the following compounds:

Blue vitriol $(CuSO_4. 5H_2O)$

- b. Green vitriol $(FeSO_4. 7H_2O)$
- c. White vitriol $(ZnSO_4. 5H_2O)$
- d. Ethanol (C_2H_5OH)
- e. Mohr's salt $[(NH_4)_2SO_4. FeSO_4. 6H_2O]$

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59. Calculate the percentage composition of:

Alumina $(Al_2O_3, \text{ potassium oxide } (K_2O), \text{ and silcia } (SiO_2)$ in the sample of clay $(Al_2O_3, K_2O, 6SiO_2)$.

b. Potassium sulphate (K_2SO_4) . Aluminium sulphate, and water of



62. Magnesium carbide reacts with water to give propyne gas and magnesium hydroxide. Write the balanced chamical reaction.



65. Calculate the molality (m) of 3M solution of NaCl whose density

is $1.25 gm L^{-1}$.

66. Calculate the molarity (M) of a solution of oxalic acid $[(COOH)_2, 2H_2O]$ containing 12.6g of the acid in 100mL of the solution.

- **67.** 100mL of 0.1MHCl + 100mL of $0.2MH_2SO_4 + 100mL$ of $0.1MHNO_3$ are mixed together.
- a. What is the final conecntration of the solution.
- b. What would be the final concentration of the solution. If the solution
- is made to 1L by adding H_2O ?
- c. What would be the final concentration of the solution if 700mL of
- H_2O is added to the solution?

68. 1L of 0.1MNaOH, 1L of 0.1MKOH, and 2L of $0.05MBa(OH)_2$

are mixed togther. What is the final concentration of the solution.



69. 50mL of 0.2MHCl, 50mL of $0.2NH_2SO_4$, and 200mL of $0.2MBa(OH)_2$ are mixed together and the volume was made to 1L by adding H_2O . What is the final concentration of the solution, and what is the nature of the final solution: acidic, basic or neutral?

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70. A solution contains 2.5mol of H_2O . Calculation the mole fraction of

each component of the solution.

71. The percentage composition by mass of a solution is 20% urea (NH_2CONH_2) , 40% glucose $(C_6H_{12}O_6)$, and 40% water (H_2O) . Calculate the mole fraction of each component of the solution.



72. A solution is prepared by mixing ethanol and water. The mole fraction of ethanol in the mixture is 0.9.

What is the molality (m) of the solution.

b. Water is added to the above solution such that the mole fraction of water in the solution becomes 0.9. What is the molality (m) of the solution?



73. Calculate the molarity (M) and molality (m) of 16% aqueous methanol (CH_3OH) solution by volume. Density of solution

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= 0.9 gm L^{-1}.
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74. 20mg of K^{\oplus} ions are present in 1L of aqueous solution. Density of the solution is $0.8mL^{-1}$. What is the concentration of K^{\oplus} ions in ppm?

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75. 10L of hard water requires 0.28g of line (CaO) for removing hardness. Calculate the temporary hardness in ppm of $CaCO_3$.



76. Calculate the percent free SO_3 in an oleum which is labelled '118 % H_2SO_4 '.

77. If the percent free SO_3 in an oleum is 20% then label the sample of oleum in terms of percent H_2SO_4 ,

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78. 50.0 kg of N_2 (g) and 10.0 kg of H_2 (g) are mixed to produce NH_3 (g). Calculate the amount of NH_3 (g) formed. Identify the limiting reagent in the production of NH3 in this situation

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79. If 0.5 mol of $CaBr_2$ is mixed with 0.2 mol of K_3PO_4 , the maximum

nubmer of moles of $Ca_3(PO_4)_2$ that can be formed is:

a. 0.1 b. 0.2 c. 0.5 d.0.7

80. Upon mixming 100.0mL to 0.1M potassium solphate solution and 100.0mL of 0.05M barium chloride solution, precipitation of barium sulphate takes place. How many moles of barium sulphate are formed? Also, calculate the molar concentration of species left behind in the solution. Which is the limiting reagent?



81. In one process of waterproofing, a fabric is expsoed to $(CH_3)_2SiCl$ vapour. The vapour reacts with (OH) groups on the surface of the fabric or with traces of H_2O to form waterproofing film of by the reaction

Where *n* is large integer. The waterproofing film is deposited on the fabric layer upon layer. Each layer is 10Å thich [the thickness of the $(CH_3)_2SiO$ group]. How much $(CH_3)_2SiCl_2$ is required to waterproof one side of a piece of a fabric, 1.0m by 3.0m, with a film 1000 layers thick? The density of the film is $1.0gcm^{-3}$. (Atomic weight

of Si = 28 and Cl = 35.5)

$$n(CH_3)_2SiCl_2 + 2n \overset{\circ}{O}H \longrightarrow 2nCl^{\otimes} + nH_2O + +(CH_3)_2SiO_{\frac{1}{n}}$$



82. 1.62*g* of green algae absorbs 6×10^{-3} mol CO_2 per hour by photosynthesis. If the fixed *C* atoms are all stroed after photosynthesis as starch $(C_6H_{10}O_5)_n$, how long will it take for the alge to double their own weigth?

 $ig[Mwof(C_6H_{10}O_5)_n=162nig]$

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83. The molecular formula of a commercial resin used for exchanging ions in water softening is $C_8H_7SO_3Na(mol. wt. 206)$. What would be the maximum uptake of Ca^{2+} ions by the resin when expressed in mole per gram resin?

84. The chemical formula of the chelating agent Versence is $C_2H_4N_2(C_2H_2O_2Na)$ If each mol of this compound could bind 1 mol of Ca^{2+} , what would be the rating of pure Versene, expressed as $mgCaCO_3$ bound per g. Of chealting agent? Ca^{2+} is expressed in terms in terms of amount of $CaCO_3$ it could form.

 $[Mwofvesene = 380, MwofCaCO_3 = 100gmol^{-1}]$

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85. The plastic industry uses large amounts of phthalic anhydride $C_8H_4O_3$, made by the controlled

$$C_{10}H_8 + rac{9}{2}O_2 o C_8H_4O_3 + 2CO_2 + rac{5}{2}H_2O_2$$

Since some of the naphthalene is oxidised to other products, 80% yield is obtained. What weight of phthalic anhydrid would be produced by





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86. Calculate the mass of CaO required to remove the hardness of 1000,000 litres of water containing 1.62 g of calcium bicarbonate per litre.

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87. A mixture of NaCl and Na_2CO_3 is given On heating 12g of the mixture with dilute HCl, 2.24g of CO_2 is removed. Calculate the amounts of each in the mixture.

88. A mixture of FeO and Fe_3O_4 when heated in air to a constant weight, gains 5% of its weight. Find the composition of the intial mixutre.



89. Igniting MnO_2 in air converts it quantitatively to Mn_3O_4 . A sample of pyrolusite is of the following composition: $MnO_2 = 80 \%$, SiO_2 and other inert constituents = 15%, and rest bearing H_2O . The sample is ignited to constant weight. What is the percent of Mn in the ingnited sample?

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90. A flash bulb used for taking photograph in poor light contains 30mL of O_2 at 780mm pressure at $27^{\circ}C$. Suppose that metal wire flashed in the bulb is pure aluminium (Al) and it is oxidised to Al_2O_3

in the process of flashing, calculate the minimun weight of Al wire that

is to be used for maximum efficiency.



91. 1g of impure Na_2CO_3 is dissolved in water and the solution is made upto 250mL. To 50mL of this solution, 50mL of 0.1NHCl is added and the mixture after shaking well required 10mL of 0.16NNaOH solution for complete neutralization. Calculation percent purity of the sample of Na_2CO_3 .



92. 5mL of $8NHNO_3$, 4.8mL of 5NHCl, and a certain volume of $17mH_2SO_4$ are mixed together and made upto 2L. 30mL of the acid mixture exactly neutralises 42.9mL of Na_{2CO_3} solution containing 0.1g of Na_2CO_3 . $10H_2O$ in 10mL of water. Calculate:

The amount (in g) of the sulphate ions in the solution.
93. 10.0L of air of STP was slowly bubbled through 50mL of $N/25Ba(OH)_2$ solution and the final solution rendered red with phenoophthalein. After filtering the solution from the precipitated $BaCO_3$, the filtrate required 22.5mL of N/12.5HCl to becomes just colourless. Calculate the % age by volume of CO_2 in the air.

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94. A mixture of $CaCO_3$ and $MgCO_3$ weighing 1.84g on heating left a residue weighing 0.96g. Calculate the percentage of each in the mixture.



95. A mixture contains equi-molar quantities of carbonates of two bivalent metals. One metal is present the extent of 13.5 % by weight in the mixture and 2.50g of the mixture on heating leaves a residue of 1.18g. Calculate the percentage by weight of the other metal.

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96. 25mL of solution containing HCl and H_2SO_4 is required for neutralisation of 25mLN/2 caustic soda solution. 50mL of the same solution on precipitation with $BaCl_2$ yielded 2.33g of $BaSO_4$. What weight of each acid contained in 1L the solution? (Molecular mass of $BaSO_4 = 233$)

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97. A mixture containing only Na_2CO_3 and K_2CO_3 and weighing 1.22g was dissolved in water to form 100mL of solution: 20mL of this

solution required 40mL of 0.1NHCl for neutralisation.

a. Calculate the weight of K_2CO_3 in the mixture.

b. If another 20mL of the same solution is treated with excess of $BaCl_2$, what will be the weight of precipitate thus obtained? (Molarcular of $Na_2CO_3 = 106$, $K_2CO_3 = 138$, $BaCO_3 = 197.4$)

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98. 2.36g of sample of dolomite containing only $CaCO_3$ and $MgCO_3$ were dissolved in 700mL of 0.1NHCl. The solution was dilutied to 2.05L. 25mL of this solution required 20mL of 0.01NNaOH solution for complete neutralisation. Find the percent composition of ore.

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99. 4.08g of a mixture of BaO and an unknown carbonate MCO_3 was heated strongly. The residue weighed 3.64g. This was dissolved in

100mL of 1NHCl. The excess of acid required of 16mL of 2.5NNaOH for complete neutralisation. Identify the matal M.

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100. H_2O_2 solution (20mL) reacts quantitatively with a solution of $KMnO_4(20mL)$ acidified with dilute H_2SO_4 . The same volume of the $KMnO_4$ solution is just decolourised by 10mL of $MnSO_4$ in neutral medium. simulataneously forming a dark brown precipitate of hydrated MnO_2 . The brown precipitate is dissolved in 10mL of 0.2M sodium oxalate under boiling condition in the presence of dilute H_2SO_4 . Write the balanced equations involved in the reactions and calculate the molarity of H_2O_2 solution.



101. 3g of ethane C_2H_6 on complete combustion gave 8.8g of CO_2 and 5.4g of water. Show that the results are in accordance with the law of

conservation of mass.

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102. Weight of copper oxide obtained by heating 2.16g of metallic copper with HNO_3 and subsequent ingnition was 2.70g In another experient, 1.15g of copper oxide on reduction yielded 0.92g of copper. Show that the results illustrance the law of definite proportions.

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103. In experiment on the effect of heating on oxides of lead in a current of hydrogen the following results were obtained. Show that they are in agreement with the law of multiple proportions.

- a. 1.393g of litharge (PbO) gave 1.293g of lead
- b. 2.173g of lead peroxide (PbO_2) gave 1.882g of lead
- c. 1.712g of red lead $\left(Pb_{3}O_{4}
 ight)$ gave 1.552g of lead

104. Two oxides of metal were found to contain 31.6% and 48% of oxygen, respectively. If the formula of first is represented by M_2O_3 , find that of the other

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105. The three elements A, B and C form three compounds AB, AC and BC. AB contains 75% of A, AC contains 57.14% of C while BC contains 11.11% of B. Prove that these results are in accordance to law of reciprocal proportions.

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106. A metal forms two oxides. The higher oxide contains 80% metal. 0.72g of the lower oxide gave 0.8g of higher oxide when oxidised. Calculate the weight of oxygen the combines with the fixed weight of metal in the two oxides, and show that the data supports the law of multiple proportines

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107. 500mL of 0.2MNaCl sol. Is added to 100mL of $0.5MAgNO_3$ solution resulting in the formation white precipitate of AgCl. How many moles and how many grams of AgCl are formed? Which is the limiting reagent?



108. Upon mixing 50.0mL of 0.1M lead nitrate solution with 50.0mL of 0.05M chromic sulphate solution, precipitation of lead sulphate takes place. How many moles of lead sulphate are formed? Also, calculate the molar concentration of the species left behind in the final solution. Which is the limiting reagent?

109. What is the percentage of aluminium in Al_2O_3 ? (Al=27, O=16)

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110. What is the percentage composition of each element is zincphosphate $Zn_3(PO_4)_2$? (Zn = 65.5, P = 31, O = 16)

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111. An organic compound consists of 6.023×10^{23} carbon atoms, 1.8069×10^{24} hydrogen atoms, and 3.0115×10^{23} oxygen atoms. What is its simplest formula?



112. What is the simplest formula of acompound that contains 0.25g atom of sillicon per 0.50g atom of oxygen.

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113. 0.1653g aluminium reacts completely with 0.652g chlorine to form chloride of aluminium.

a. What is the empirical formula of the compound?

b. If molecular mass of the compound is 267 amu, calculate the molecular formula of the compound.

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114. A 0.2075g sample of an oxide of cobalt on analysis was found to contain 0.1475g cobalt. Calculate the empirical formula of the oxide. (Co = 59amu) **115.** The molecular mass of iodide of tin (Sn) is 626.5 amu. What is the

empirical formula of the substance?

(I = 127, Sn = 118.5)



116. What is the empirical formula for a compound that contains 22~%~S and 78~%~F? ($S=32,\,F=19$)

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117. A substance used as a water softener has the following mass percentage composition : 42.07 % Na, 18.9 % P, and 39.04 % of oxygen. Determine the empirical formula of the compound. (Na = 23, P = 31, 0 = 16) **118.** An orgainc compound contains 43.98 % C, 2.09 % H, and 37.2 % Cl. Calculate its empirical formula.



119. A 0.534g of a sample of haemoglobin on analysis was found to contain 0.34 % Fe. If each haemoglobin molecule has four Fe^{2+} ions, what is the molecular mass of haemoglobin ? (Fe = 56amu)

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120. How many g atoms and number of atoms are there in (a) 60g carbon, (b) 22.4gCu, an (c) 72.52g lead. Given atomic masses of C, Cu and Pb are 12,63.6, and 207.2, respectively. (Avogadro's number $= 6.02 \times 10^{23}$).



121. Find the number of g atoms and weight of an element having

 $2 imes 10^{23}$ atoms. Atomic mass of element is 32.

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122. Calculate the number of atoms and volume of 1g helium gas at STP

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123. If 10^{21} molecules are removed from 200 mg of CO_2 , the number

of moles of CO_2 left is



124. Weight of one atom an element is $6.44 imes 10^{23} g$. Calculate g atom

of elements in 40kg.



126. Calculate the number of oxialic acid molecules in 100mL of 0.02N

oxialic acid

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127. Hameoglobin contains 0.25% iron by weight. The molecular weight of hameglobin is 896000. Calculate the number of iron atom per molecules of haemoglobin.

128. P and Q are two element that form P_2Q_3 and PQ_2 . If 0.15 mole of P_2Q_3 weighs 15.9 g and 0.15 mole of PQ_2 weighs 9.3g, what are the atomic weights of P and Q?



129. A polystryrene, having formula $Br_3C_6H_2(C_8H_8)_n$, was perpared heating styrene with tribromobenzoyl peroxide in the absence of air. If it was found to contain 10.46% bromine by weight, find the value of n.



130. One litre of mixture of CO and CO_2 is passed through red hot charcoal in tube. The new volume becomes 1.4 litre. Find out % composition of mixture by volume. All measurements are made at same P and T

131. 1.0 g of metal nitrate gave 0.86 g of metal sulphate. Calculate the equivalent weight of metal.



132. 2g of a metal in H_2SO_4 gives 4.51g of the metal sulphate. The specific heat of metal is $0.057calg^{-1}$. Calculate the valency and atomic weight of metal.



133. 1.878g of MBr_X when heated in a stream of HCl gas was comletely converted to chloride MCl_X which weighted 1.0g The specific heat of metal is $0.14calg^{-1}$. Calculate the molemular weight of the metal bromide.

134. Find the milli equivalent of

a. $Ca(OH)_2$ in74g

b. NaOHin20g

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135. Calculate the concentration of NaOH solution in g/ml which has the same normality as that of a solution of HCl of concentration 0.0365g/ml.

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136. Calculate normality of the following:

a. 0.74g of $Ca(OH)_2$ in 5mL of solution.



137. Calculate the normality of the result in solution made by adding 2 drops (0.1mL) of $0.1NH_2SO_4$ in 1 litre of distilled water.

C) Watch	Video	Solution

138. What volume at STP at ammonia gas will be required to be passed into 30mL of NH_2SO_4 solution to bring down the acid normality to 0.2N?



139. Calculate the normality of mixture obtained by mixing

a. 100mLof 0.1 NHCl + 50mLof 0.25 NNaOH

140. In what ratio should you mix $0.2MNaNO_3$ and $0.1MCa(NO_3)_2$ solution so that in resulting solution the concentration of -ve ion is 50 % greater than the concentration of + ve ions?



141. What volume at water is requried to make 0.20N solution from 1600mL of 0.2050N solution?

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142. $20mLof 0.2MAl_2(SO_4)_3$ mixed with 20mL of $6.6MBaCl_2$.

Calculate the concentration of Cl- ion in solution.

143. How much $BaCl_2$ would be needed to make 250mL of a solution having same eoncentration of Cl^{\oplus} as the one containing 3.78g of NaCl per 100mL.



144. What is the normarlity and nature of a mixutre obtained by mixing 0.62q of Na_2CO_3 . H_2O to 100mL of $0.1NH_2SO_4$?

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145. A sample of H_2SO_4 (density $1.787gmL^{-1}$) si labelled as 86% by weight. What is the molarity of acid? What volume of acid has to be used to make 1L of $0.2MH_2SO_4$?

146. Mole fraction of I_2 in C_6H_6 is 0.2. Calculate molality of I_2 in C_6H_6 .

 $ig(MwofC_6H_6=78gmol^{-1}ig)$



147. Calculate molality of 1 litre solution of 95% H_2SO_4 by volume. The density of solution is $1.84gmL^{-1}$.

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148. What is would be the molality of a solution obtained by mixing equal volumes of 30% by weight $H_2SO_4(d = 1.218gmL^{-1})$ and 70% by weight $H_2SO_4(d = 1.610gmL^{-1})$? If the resulting solution has density $1.425gmL^{-1}$, calculate its molality.

149. To 50L of 0.2NNaOH, 5L of 1NHCl and 15L of $0.1NFeCl_3$ solution are added. What weight of Fe_2O_3 can be obtained from the precipitate? Also report the nomality of NaOH left in the resultant solution.

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150. The molecular mass of an organic acid was determind by the study of its barium salt. 4.290g of salt was converted to free acid by the reaction with 21.64mL of 0.477M H_2SO_4 . The baurim salt was found to have two moles of water of hydration per Ba^{2+} ion and the acid is monobasic. What is molecular weight of anhydrous acid ?

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151. 4.0g of NaOH is contained in one decilitre of aqueous solution. Calculate the following in the solution (d of NaOH solution $= 1.038 gm L^{-1}$)

a. Mole fraction of NaOH

b. Molartiy of NaOH

c. Molality of NaOH

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152. Calculate the mass fraction and mole fraction of ethyl alcohol and

 H_2O in a solution containing 9.2g of alcohol in 18.0g of H_2O .

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153. A solution contains 410.3 g of H_2SO_4 per litre of the solution at 20°C. If its density is $1.243gcm^{-3}$, what will be its molality and molarity

?



154. Concentrated nitric acid used as a laboratory reagent is usually 69% by mass of nitric acid. Calculate the volume of the solution which contained 23 g of HNO_3 .Density of cone. HNO_3 solution is $1.41gcm^{-3}$?

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155. Calculate the molality of a solution obtained by dissolving 15.87gehtyl alcohol (C_2H_5OH) in 168g of H_2O .

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156. What volume of 95% sulphuric acid (density = $1.85gcm^{-3}$) and what mass of water must be taken to prepare $100cm^3$ of 15% solution of sulphuric acid (density = $1.10gcm^{-3}$)?

157. Calculated the molality of a sulphuric acid solution in which the mole fraction of water is 0.85.

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158. A sample of H_2SO_4 (density $1.787gmL^{-1}$) si labelled as 86% by weight. What is the molarity of acid? What volume of acid has to be used to make 1L of $0.2MH_2SO_4$?

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159. A 6.90M solution of KOH contains 30% by weight of KOH. Calculate the density of the solution.



160. 3.5 litre of 0.01MNaCl is mixed with 1.5 litre of 0.05MNaCl.

What is the concentration of the final solution?

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161. The density of 5% aqueous $MgCl_2$ solution is $1.043gmL^{-1}$. What is the molarity and molaltiy of the solution? What is the molality of Cl^{Θ} ions? (Mg = 24amu)

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162. The density of a $3MNa_2S_2O_3$ (sodium thiosulphate) solution is

 $1.25 gm L^{-1}$. Calculate:

a. % by weight of $Na_2S_2O_3$

b. Mole fraction of $Na_2S_2O_3$

163. The density of 0.06M solution of Kl in water is $1.006gmL^{-1}$. Determine the molality of this solution (K = 39, I = 127amu)

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164. 11.2g of carbon reacts with 21.1 litres of oxygen at $18^{\circ}C$ and 750mm of Hg. The cooled gases are passed through 2 litre of 2.5NNaOH. Determine the concetration of NaOH remaining in solution which is not converted to Na_2CO_3 . Assume that CO does not react with NaOH:

a. What is the mole fraction of CO in the gases?

b. What is the concetration of NaOH which is not converted to Na_2CO_3 in the remaining solution?



165. $15mLof 1MH_2SO_4$, 25mL of $4MHNO_3$, and 20mL of XMHCl were mixed and made up to 1000mL. Prepared by dissolving 4.725g of pure $Ba(OH)_2$. $8H_2O$ in water made up to 0.25 litre. What is the molarity of HCl solution (i.e. find X)

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166. The acid solution has a specific gravity of 1.8, when it contains 62% by weight of the acid. The solution is diluted to such an extant this its specific gravity is lowered to 1.2. what is the % by weight of the acid new solution.



167. A solution of KCl has a density of $1.69gmL^{-1}$ and is 67% by weight. Find the denisty of the solution if it is diluted so that the percentage by weight of KCl in the diluted solution is 30%

168. A gaseous hydrocarbon X, was burnt in excess of oygen. A $0.112dm^2$ sample of X, at STP gave 0.88g of CO_2 . How many C-atoms are there in one molecule of X?

a. 1 b. 2 c. 3 d. 4

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169. A mmonia is highly soluble gas in water and gives a alkaline solution of NH_4OH . What volume of NH_3 gas at STP will be required to the passed in 100mL of $0.5MH_2SO_4$ to bring down its strength to 0.25M?

(For titrations with aqueous NH_3 , it is assumed that NH_4OH dissociates to 100% extent)

a. 2.24 L b. 1.68 L c. 1.12 L d. 0.56 L`

170. The equivalent weight of Na_2HPO_4 can be

a. M/2 as base b. M/1 as acid

c. Both (a) and (b) d. Neither (a) and (b)

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171. Arrange the following in order of increasing masses.

i. 1 molecules of oxygen ii. 1 atom of nitrogen

iii. 1 mol of water iv. 1×10^{-10} of iron

a. ii lt I lt iii lt iv b. ilt iilt ivlt iii

c. ii lt ilt ivlt iii d. iltiiltiiiltiv



172. 10.1g of KNO_3 is dissolved in 500mL of H_2O . Mass of $Ba(NO_3)_2$ that should be added to this solution of get a molality (m) of 0.3 with

respect to $NO_3^{\, \Theta}$ ion is

 $(MwofKNO_3=101gmol^{-1}, MwofBa(No_3)_2=261gmol^{-1})$

a.
$$pprox 1.3g$$
 b. $pprox 13g$ c. $pprox 6.5g$ d. $pprox 65g$



173. One litre of N/2HCl solution was heated in a beaker. When the volume was reduced to 600mL, 9.125g of HCl was lost out the new normality of solution is

- a. pprox 0.4
- b. pprox 0.8
- c. pprox 0.4 d. pprox 0.2

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174. Three metals of alkaline earth metal group (A, B and C) When reacted with a fixed volume of liquid Br_2 separately gave a product (metal bromides) whose mass is plotted against the mass of metals

taken as shown in the figure. From the plot, predict what relation can be concluded between the atomic weight of A, B and C

- $\mathsf{a.}\, C > B$
- $\mathsf{b}.\,B>A\text{,}$
- C < A < B

Data is insufficient to predict



175. The following chemical reactions used to be untilized to rapidly produce large amounts of N_2 gas inside an automobile air bag:

 $2NaN_3
ightarrow 2Na + 3N_2(g)$

 $10Na+2KNO_3
ightarrow K_2+5Na_2O+N_2(g)$

 $K_2O + Na_2O + SiO_2
ightarrow
m Alkaline silicate (glass)$

How many grams of KNO_3 are needed to produce enough N_2 to fill a

12.3L air baG AT $27^{\,\circ}\,C$ and 4 atm.

a. 202g b. 81.25g

c. 404g d. 25.25g

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Ex 1.1 Objective Questions

1. Objective question (only one correct).

i. The simplest formula of a compound containing 50% of element A

(atomic mass 10) and 50% of element B (atomic mass 20) is:

a. AB b. A_2B c. A_2B_3 d. AB_3



2. A metal M of atomic weight 54.9 has a density of $7.42gcm^{-3}$. Calculate the volume occupied and the radius of the atom of this metal assuming it to be sphere.

Watch Video Solutio	n
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- 3. Fil in the blanks
- a. The mass of 1 molecule of water (H_2O) is
- b. The number of molecules in 16g of sulphur dioxide (SO_2) are
- c. The weight of one mole of sodium carbonate (Na_2CO_3) is.....

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4. Objective question .

i. A certains compound has the molecular formula X_4O_6 . If $10gof X_4O_6$

has 5.72gX, then atomic mass of X is:

a. 32 amu b. 42 amu c. 98 amu d. 37 amu

ii. For 109% labelled oleum, if the number of moles of H_2SO_4 and free SO_3 be p and q, respectively, then what will be the value of $rac{p-q}{p+q}$ a. 1/9 b. 9 c. 18 d. 1/3

iii. Hydrogen peroxide in aqueous solution decomposes on warming to give oxygen according to the equation,

 $2H_2O_2(aq)
ightarrow 2H_2O(l) + O_2(g)$

Under conditions where 1 mol gas occupies $24dm^3$, $100cm^3$ of XM solution of H_2O_2 produces $3dm^3$ of O_2 . Thus, X is

a. 2.5 b. 0.5 c. 0.25 d. 1

iv. 4g of sulphur is burnt to form SO_2 which is oxidised by Cl_2 water. The solution is then treated with $BaCl_2$ solution. The amount of $BaSO_4$ precipitated is:

a. 0.24 mol b. 0.5 mol

c. 1 mol d. 0.125 mol

v. A reaction occurs between 3 moles of H_2 and 1.5 moles of O_2 to give some amount of H_2O . The limiting reagent in this reaction is a. H_2 and O_2 both b. O_2

c. H_2 d. Neither of them

vi. $4I^{\, \Theta} \, + \, Hg^{2\, +} \, o \, HgO_4^{\, -}$, 1 mole each of $Hg^{2\, +}$ and $I^{\, \Theta}$ will form:



5. A 2.0 g sample containing Na_2CO_3 and $NaHCO_3$ loses 0.248 g when heated at 300° C, the temperature at which NaHC03 decomposes to Na_2CO_3 , CO_2 and H_2O . What is the percentage of Na_2CO_3 in the mixture ?

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6. Fill in the blanks.

a. The equivalent weight of $NaHCO_3$ isand of SO_2 is

b. 2 mol of 50% pure $Ca(HCO_3)_2$ on heating forms 1 mol of CO_2 . The

% yield of CO_2 is

c. 5g of K_2SO_4 was dissolved in 250mL of solution. The volume of this solution that should be used so that 1.2g of $BaSO_4$ be precipitated fromk $BaCl_2$ is (molecular mass of $K_2SO_4 = 174$ and $BaSO_4 = 233$)

d. The residue obtained on strongly heating $2.76gAg_2CO_3$ is

$$\left[Ag_2CO_3 \stackrel{\Delta}{\longrightarrow} Ag + CO_2 + O_2
ight]$$

Atomic mass of Ag=108

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Ex 1.1 Objective Questions (Single Correct)

1. Objective question (single correct answer).

i. The molarity of a aqueous solution of glucose $\left(C_{6}H_{12}O_{6}
ight)$ is 0.01 To

200mL of the solution, which of the following should be carried out to

make it 0.02M?

- I. Evaporate 50mL of solution
- III. Add 0.180g of glucose and then evaporate 50mL of solution
III. Add 50mL of water

The correct option is:

a. I b. III c. II d. I, II, III

ii. The atomic mass of Cu is 63.546. There are only two naturally occuring isotopes of copper Cu^{63} and Cu^{65} . The percentage of natural abundance of Cu^{63} in nearly

a. 30 b. 10 c. 50 d. 73

iii. An aqueous solution of urea (NH_2COHN_2) is 3.0 molal. The mole fraction of urea is

a. 0.33 b. 0.25 c. 0.66 d. 0.05

iv $0.2MH_2SO_4~(1mL)$ is diluted to 1000 times of its initial volume. the final normality of H_2SO_4 is:

a. 2×10^{-3} b. 2×10^{-4} c. 4×10^{-4} d. 2×10^{-2}

v. Which of the following question are dependant on temperature?

a. Molarlity b. Normality c. Mole fraction d. Molality

vi. A sample of H_2SO_4 density $1.85mL^{-1}$ is 90% by weight. What is

the volume of the acid that has to be used to make $1L f 0.2MH_2SO_4$?

```
a. 16mL b. 18mL c. 12mL d. 10mL
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vii. The hydrated salt Na_2SO_4 . nH_2O undergoes 55.9% loss in weight

on heating and becomes anhydrous. The value of n will be

a. 5 b. 7 c. 3 d. 10

viii. 0.2 mol of HCl and 0.1 mol of barium chloride is dissolved in water to produce a 500mL solution. The molarity of Cl^{θ} is.

a. 0.06M b. 0.12M c. 0.09M d. 0.80M

ix. The density of 1M solution of NaCl is $1.055gmL^{-1}$. The molality of the solutions is.

a. 1.0585 b. 1.00 c. 0.0585 d. 0.10

x. Hydrochloric acid solution ${\cal A}$ and ${\cal B}$ have concentration of 0.5N , and

 $0.1N\!,$ respectively. The volume of solutions A and B required to make

 $2L ext{ of } 0.2N ext{ hydrochloric acid are}$

a. 0.5LofA + 1.5ofB

 ${\sf b.}\, 1.0 Lof A + 1.0 Lof B$

 $\mathsf{c.}\, 0.75 Lof A + 1.25 Lof B$

 $\mathsf{d.}\, 1.5 Lof A + 0.5 Lof B$

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2. The molality of 1M solution of sodium nitrate is $0.858molkg^{-1}$. Determine the density of the solution.



3. 49g of H_2SO_4 is disslved in enough water to make one litre of a soltuion of density $1.049gcc^{-1}$. Find the molarity, normality, moality, and mole fraction of H_2SO_4 in the solution.

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Ex 1.1 Fill In The Blanks

1. Fill in the blanks. ItbRgt a. The mass of $MgCL_2$ should be dissolved in 750g of water in order to prepare a 1.05m solution is.....

b. The percentage composition (by mass) and mole fraction of each component is sugar containing 1000g of sugar in 2000g of water is.....

Ex 1.2 Objective Question (Single Correct)

1. Objective question (single correct answer).

i. H_3PO_4 is a tribasic acid and one of its salt is NaH_2PO_4 . What volume of 1MNaOH solution should be added to 12g of NaH_2PO_4 to convert in into Na_3PO_4 ?

a. 100mL b. 2 mol of $Ca(OH)_2$ c. Both d. None

iii. The normality of a mixture obtained mixing 100mL of $0.2mH_2SO_4$ with 100mL of 0.2MNaOH is:

a. 0.05N b. 0.1N c. 0.15N d. 0.2N

iv 100mL solution of 0.1NHCl was titrated with 0.2N NaOH solutions. The titration was discontinued after adding 30mL of NaOH solution. The reamining titration was completed by adding 0.25NKOH solution. The volume of KOH required from completing the titration is:

a. 70mL b. 35mL c. 32mL d. 16mL

2. 4.0g of a mixture of Nacl and Na_2CO_3 was dissolved in water and volume made up to 250mL. 25mL of this solution required 50mL of N/10HCl for complete neutralisation. Calculate the percentage composition of the original mixture.

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3. 500mL fo 2MHCl, 100mL of $2MH_2SO_4$, and one gram equivalent of a monoacidic alkali are mixed together. 30mL of this solution requried 20mL of $143g Na_2CO_3$. xH_2O in one litre solution. Calculate the water of crystallisation of Na_2CO_3 . xH_2O

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Ex 1.2 Fill In The Blanks

1. Fill in the blanks.

a. 2.24L ammonia at STP neutralised 100mL of a solution of H_2SO_4 . The molarity of acid is......

b. The equivalent weight of a metal carbonate 0.84g of which reacts exactly with 40mL of $N/2H_2SO_4$ is

c. 1.575g, of hydrated oxalic acid $(COOH)_2$. nH_2O is dissolved in water and the solution is made to 250mL On titration, 16.68mL of this solution is required for neutralisation of 25mL of N/15NaOH. The value of water crystallisation, i.e., n, is.....

d. 1mL of H_3PO_4 was diluted to 250mL. 25mL this solution requried 40.0mL of 0.10NNaOH for neutralisation using phenolphthanlen as indicator. The specific gravity of acid is.....

The density of 1.48 mass percent calcium hydroxide solution is $1.25gmL^{-1}$. The volume of 0.1MHCl solution required to neutralise 25mL of this solution is......



1. 10mL of hydrogen combines with 5mL of oxygen to yield water. When 200mL of hydrogen at STP is passed over heated CuO, the CuO loses 0.144g of its wieght. Do these result correspond to the law of constant composition?



2. The common salt was obtained from two different sources. In one sample, the percentage of chlorine was found to be 60.75 %. In the second sample, 3.888 g of chlorine were present in 6.4 g of the salt. Show that these data are in accordance to the law of constant proportion.



3. 3.2g sulphur combines with 3.2g of oxygen, to from a compound in one set of conditions. In another set of conditions 0.8g of sulphur combines with 1.2g of oxygen to form another compound. State the law illustrated by these chemical combinations.

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4. 1g of oxygen combines with 0.1260g of hydrogen to form H_2O . 1g of nitrogen combines with 0.2160g of hydrogen to form NH_3 . Predict the weight of oxygen required to combine with 1g of nitrogen to form an oxide.



5. KCL contains 52 % of potassium, Kl contains 23.6% of potassium, and ICI contains 77.8% of iodine. Show that the above data is in agreement with the law of reciprocal proportions. **6.** What weight of sodium chloride would be decomposed by 4.9g of sulphric acid, if 6g of sodium bisulphate $(NaHSO_4)$ and 1.825g of hydrogen chloride were produced in the reaction

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7. If the law of constant compositon is true, what weights of calcium carbon, and oxygen are present in 1.5g of calcium carbonate, if a sample of calcium carbonate from another source contains the following percentage composition: Ca = 40.0%, C = 12.0%, and O = 48.0%?



8. An element forms two oxides containing 50% and 40% of the element by mass. Prove that the results are in agreement with the law of multiple proportions.



9. Elen A and B combine to form three different compounds:

0.3 gofA + 0.4 gofB
ightarrow 0.7 g of compound X

18.0 gofA + 48.0 gofB
ightarrow 66.0 g of compound Y

40.0 gofA + 159.99 gofB
ightarrow 199.99 g of compound Z

Show that the law of multiple proportions is illustrated by the data given above.

A. (a) 1

B. (b) 2

C.

D.

Answer: A



10. An impure sample of sodium chloride that weighed 0.50g gave 0.90g of silver choride as precipitate on treatment with excess of silver nitrate solution. Calculate the percentage purity of the sample.

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11. How much magnesium sulphide can be obtained from 2.00g of Mg

and 2.00g of S by the reaction.

Mg + S
ightarrow MgS. Which is the limiting reagent? Calculate the amount

of one of the reactants which remains unreacted?

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12. 1.00g of a hydrated salt contains 0.2014g of iron, 0.1153g fo sulphur, 0.2301g of oxygen and 0.4532g of water of crystallisation. Find its empirical formula. (Fe = 56, S = 32, O = 16)



13. A compound on analysis gave the following percentage composition

by weight: hydrogen = 9.09, oxygen = 36.36 carbon = 54.55

Its VD is 44. Find the molecular formula of the compound.



Exercises Subjective (Limiting Reagent)

1. An inorganic substance has the following composition:

 $N=35\,\%\,H=5\,\%\,,O=60\,\%$

On being heated, it yielded a gaseous compound containing

N = 63.63~% and O = 36.37~%. Suggest a formula for each substance and equation for the chemical change. Watch Video Solution

2. A compound of carbon, hydrogen, and nitrogen contains the three elements in the respective ratio of 9:1:3.5 Calculculate the empirical formula. If the molecular weight of the compound is 108, what its molecular formula?



Exercises Subjective (Empirical And Molecular Formulae)

1. Carbohydrates are compounds containing only carbon, hydrogen and oxygen having the atomic ratio of H:O as 2:1. When heated in the absence of air, these compounds decompose to form carbon and water. a. If 310g of a carbohydrates leaves a residue of 124g of carbon on heating in absence of air, whatis the empirical formula of the carbohydrate?

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2. 0.45g of an orgainc compound containing only C, H and N on combustion gave 1.1g of CO_2 and 0.3g of H_2O . What is the percentage of C, H and N in the orgainc compound.

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3. A pure sample of cobalt chloride weighting 1.30g was found to contains 0.59g cobalt and 0.71g chloride on quantitative analysis. What is the percentage composition of cobalt chloride?

Watch Video Solution

4. Glucose is a physiological sugar. What is the mass% C mass% H and

mass% O in glucose $(C_6H_{12}O_6)$?



Exercises Subjective (Avogadros Hypothesis And Mole Concept)

1. Find the weight of NaOH in its 50 milli equivalents.

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2. Find the normality of H_2SO_4 having 50 milli equivalents in 2 litres.

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3. Find the weight of H_2SO_4 in 1200mL of a solution of 0.2N strength.



4. What weight of Na_2CO_3 of 93% purity would be required to neutralise 45.6mL of 0.235N acid?

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5. What is the strength in gram per litre of a solution of $H_2SO_4,\,12mL$

of which neutralised by 15mL of N/10~NaOH solution?

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6. Two litre of NH_3 at $30\,^\circ C$ and 0.20 atmosphere is neutralised by

134mL of a solution of H_2SO_4 . Calculate the normality of H_2SO_4 .

Watch Video Solution

7. 1g of calcium was burnt in excess of O_2 and the oxide was dissolved in water to make up 1L solution. Calculate the normality of alkaline soluiton.



8. calculate the amount of KOH requried to neutralise 15 mEq of the

following:

 $\mathsf{a.}\,HCl$

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9. What volume of a solution of hydrochloric acid containing 73g acid per litre would sufficient for the exact neutralisation of sodium hydroxide obtained by allowing 0.46g of metallic sodium to act upon water.

10. Find out the equivalent weight of H_3PO_4 in the reaction:

 $Ca(OH)_2 + H_3PO_4
ightarrow CaHPO_4 + 2H_2O$



11. What weight of AgCl will be precipitated when a solution containing 4.77gNaCl is added to a solution of 5.77g of $AgNO_3$.

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Exercises Subjective (Mole Concept In Solution)

1. A sample of an alloy weighing 0.50g and containing 90% Ag was dissolved in concentrated HNO_3 . Ag was analysed by volhard method in which 25mL of KCNS was required for complete neutralisation. Determine the normality of KCNS.



3. Find the molality fo H_2SO_4 solution whose specific gravity is $1.98gmL^{-1}$ and 98% (Weight/volume) H_2SO_4 .

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4. A piece of Al wieghing 2.7g is titrated with 75.0mL of H_2SO_4 (specific gravity $1.8mL^{-1}$ and 24.7% H_2SO_4 by weight). After the metal is completely dissolved, the solution is diluted to 400mL. Calculate the molarity of free H_2SO_4 solution. 5. A 10mL sample of human urine was found to have 5mg of urea on analysis. Calculate the molarity of the given sample w.r.t. urea. (molecular mass of urea = 60)

Watch Video Solution

6. Calcualate the molarity and molality of 20% aqueous ehtanol (C_2H_5OH) solution by volume. (density of solution $= 0.96gmL^{-1}$)

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7. If 4gNaOH are dissolved in 100mL of aqueous solution, what will be

the differnce in its normality and molarity?

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8. An aqueous of diabasic acid (molecular mass = 118) containing 35.4gof acid per litre of the solution has density $1.0077gmL^{-1}$. Express the concentration in as many ways as you can?



9. A solution contains 2.80 moles of acetone $(CH_3COCH)_3$ and 8.20

mole of $CHCl_3$. Calculate the mole fraction of acetone.

Watch Video Solution

10. The percentage composition (by weight) of a solution is 45 % X, 15 % Y, and 40 % Z. Calculate the mole fraction of each component of the solution. (Molecular mass of X = 18, Y = 60, and Z = 60)

1. A sample of urine containing 0.3g of urea was treated with an excess of 0.2M nitrous acid, according to the equation.

 $NH_2CONH_2+2HNO_2
ightarrow CO_2+2N_2+2H_2O$

The gass produced passed through aqueous KOH solution and the final valume is measured.

(Given, $Mw_{\text{urea}} = 60 gmol^{-1}$, molar volume of gas at standard condition, i.e., at room temperature $25^{\circ}C$ and 1 atm pressure. RTP(room temperature pressure) also is 24.4L or $24400mLmol^{-1}$) What is the volume at RTP?

A. 122mL

 $\mathsf{B.}\,244mL$

 $\mathsf{C.}\,366mL$

D. 488mL

Answer: B

2. A sample of urine containing 0.3g of urea was treated with an excess of 0.2M nitrous acid, according to the equation.

 $NH_2CONH_2 + 2HNO_2 \rightarrow CO_2 + 2N_2 + 2H_2O$

The gass produced passed through aqueous KOH solution and the final valume is measured.

(Given, $Mw_{\rm urea} = 60 gmol^{-1}$, molar volume of gas at standard condition, i.e., at room temperature $25^{\circ}C$ and 1 atm pressure. RTP(room temperature pressure) also is 24.4L or $24400mLmol^{-1}$) What is the volume of HNO_2 consumed by urea?

A. 12.5mL

 $\mathrm{B.}\,25mL$

 $\mathsf{C.}\,50mL$

D. 75mL

Answer: C

3. Fluoro carbon polymers can be made by fluorinationg polythene. (i) $(CH_2)_n + 4nCoF_3 \rightarrow (CF_2)_n + 2nHF + 4nCoF_2$ Where n is large integer. The CoF_3 can be regenarted by the above reaction.

(ii) $2CoF_2+F_2
ightarrow 2CoF_3$

If the HF formed in reactionn (i) cannot be reused, calculate the weight of F_2 consumed by 1.0g of $(CF_2)_n$ produced.

A. 2.0g

B. 2.52g

 $\mathsf{C}.\,1.52g$

 $\mathsf{D.}\,3.0g$

Answer: C

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4. Fluoro carbon polymers can be made by fluorinationg polythene. (i) $(CH_2)_n + 4nCoF_3 \rightarrow (CF_2)_n + 2nHF + 4nCoF_2$ Where n is large integer. The CoF_3 can be regenarted by the above reaction.

(ii) $2CoF_2+F_2
ightarrow 2CoF_3$

If HF can be recovered and electrolyzed to H_2 and if F_2 , is used for regenerating CoF_3 , what is the net consuption of F_2 for 1.0g of $(CF_2)_n$.

 $\mathsf{A.}\,1.0g$

B. 1.26g

C. 0.76g

 $D.\,1.5g$

Answer: C

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5. Consider the following series of reaction:

 $Cl_2 + 2NaOH
ightarrow NaCl + NaClO + H_2O$

 $3NaClO \rightarrow 2NaCl + NaClO_3.$

 $4NaClO_3 \rightarrow 3NaClO_4 + NaCl$

How much Cl_2 is needed to prepare $122.5gNaClO_4$ by above sequence?

A. 284.0g

B. 213.0g

 $\mathsf{C}.\,142.0g$

D. 71.0g

Answer: A



6. How much Cl_2 in needed to prepare 106.5g of $NaClO_3$ by the above

sequence?

A. 284.0g

B. 213.0g

C. 142.0g

D. 71.0g

Answer: B



7. One of the reactions used in the petroleum industry for improving

octance number of fuels is

 $C_7H_{14}
ightarrow C_7H_8 + 3H_2$

The two hydrocarbons C_7H_{14} and C_7H_8 are liquid, H_2 formed is gas.

Whatis the percentage reduction in liquid weight accompanying the completion of the above reaction?

A. $\approx 1 \%$ B. $\approx 3 \%$ C. $\approx 5 \%$ D. $\approx 6 \%$

Answer: D

Watch Video Solution

8. In aviation gasoline of 100 octane number, 1.0mL of tetraethy lead $(TEL), (C_2H_5)_4Pb$, of density $1.615gmL^{-1}$, per litre is added to the product. TEL is prepared as follows: $4C_2H_5Cl + 4Na(Pb) \rightarrow (C_2H_5)_4Pb + 4NaCl + 3Pb$ Calculate the amount of C_2H_5Cl required to make enough TEL for 1.0L of gasoline. A. 0.645g

 $\mathsf{B}.\,1.29g$

C. 1.935g

D. 2.58g

Answer: B

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9. The percentage labelling (mixture of H_2SO_4 and SO_3) refers to the total mass of pure H_2SO_4 . The total amount of H_2SO_4 found after adding calculated amount of water to 100g oleum is the percentage labelling of oleum. Higher the percentage lebeling of oleum higher is the amount of free SO_3 in the oleum sample.

What is the amount of free SO_3 in an oleum sample labelled as '118%'.

B. 0.5

A. 0.4

C. 0.7

D. 0.8

Answer: D

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10. The percentage labelling (mixture of H_2SO_4 and SO_3) refers to the total mass of pure H_2SO_4 . The total amount of H_2SO_4 found after adding calculated amount of water to 100g oleum is the percentage labelling of oleum. Higher the percentage lebeling of oleum higher is the amount of free SO_3 in the oleum sample.

The percent free SO_3 is an oleum is 20%. Label the sample of oleum in terms of percent H_2SO_4 .

A. 1.135

B. 1.045

C. 1.0675

Answer: B

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11. The percentage labelling (mixture of H_2SO_4 and SO_3) refers to the total mass of pure H_2SO_4 . The total amount of H_2SO_4 found after adding calculated amount of water to 100g oleum is the percentage labelling of oleum.Higher the percentage lebeling of oleum higher is the amount of free SO_3 in the oleum sample.

100g sample of '149%' oleum was taken and calculated amount of H_2O was added to make $H_2SO_4.500mL$ solution of xMKOH solution is required to neutralize the solution. The value of x is.

A. 1M

 $\mathsf{B.}\,2M$

 $\mathsf{C.}\,4M$

 $\mathsf{D.}\, 6M$

Answer: D



12. Cisplation is used an anticancer agent for the treatment of solid tumors, and its prepared as follows:

Given 83.0g of $K_2[PtCl_4]$ is used with 83.0g of NH_3 .

Atomic weights: K = 39, Pt = 415, Cl = 35.5N = 14]

Which reactant is the limiting reagent and which is in excess?

A. $K_2[PtCl_4] NH_3$

B. $NH_3 K_2[PtCl_4]$

C. None None

D. Both Both

Answer: A



13. Cisplation is used an anticancer agent for the treatment of solid

tumors, and its prepared as follows:

Given 83.0g of $K_2[PtCl_4]$ is used with 83.0g of NH_3 .

Atomic weights: K = 39, Pt = 415, Cl = 35.5N = 14]

The number of mol of $K_2[PtCl_4]$ and NH_3 used, respectively, are

A. 0.1,0.2

B. 0.2,0.4

C. 0.3,0.6

D. 0.03,0.06

Answer: B

14. Cisplation is used an anticancer agent for the treatment of solid

tumors, and its prepared as follows:

 $egin{array}{lll} K_2[PtCl_4] &+2NH_3
ightarrow \left[Pt(NH_3)_2Cl_2
ight]+2KCl \ {
m Ciplatin} \ {
m Chloro\ platinate} \end{array}$

Given 83.0g of $K_2[PtCl_4]$ is used with 83.0g of NH_3 .

Atomic weights: K = 39, Pt = 415, Cl = 35.5N = 14]

The number of mol of excess reactant is

A. 4.68

B. 4.78

C. 4.58

D. 4.48

Answer: D

Watch Video Solution

15. Iodine can be prepared by the following reactions.

 $2NaIO_3 + 5NaSO_3 \rightarrow 2NaSO_4 + 2Na_2SO_4 + H_2O + I_2$

How much $NaIO_3$ is reuired to produce 127g is I_2 ?

A. 1.98kg

B. 3.96kg

 $\mathsf{C.}\,5.94kg$

D.0.99kg

Answer: A

Watch Video Solution

16. Iodine can be prepared by the following reactions.

 $2NaIO_3 + 5NaHSO_3 \rightarrow 2NaSO_4 + 2Na_2SO_4 + H_2O + I_2$

How much $NaHSO_3$ is required to produce 381g of I_2 ?

A. 156.0g

B. 390.0g

 $\mathsf{C.}\,520.0g$

D. `780.0 g

Answer: D

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17. When phosphours (P_4) is heated in limited amount of O_2 . P_4O_6 (tetraphosphorous hexaoxide) is obtained, and in excess of O_2 , P_4O_{10} (tetraphosphours decaoxide) is obtained.

i. $P+3O_2
ightarrow P_4O_6$, ii. $P_4+5O_2
ightarrow P_4O_{10}$

What mass of P_4O_6 will be produced by the combustion of 2.0g of P_4 with 2.0g of O_2 .

A. 0.0145 mol

B. 0.0072 mol

C. 0.029
D. 0.0048

Answer: B



18. What mass of P_4O_{10} will be produced by the combustion of 2.0g of

 P_4 with 2.0g of O_2

A. 1.04g

 $\mathsf{B.}\,0.52g$

 $\mathsf{C.}\,2.04g$

 $\mathsf{D.}\,3.04g$

Answer: C

Watch Video Solution

19. When phosphours (P_4) is heated in limited amount of O_2 . P_4O_6 (tetraphosphorous hexaoxide) is obtained, and in excess of O_2 , P_4O_{10} (tetraphosphours decaoxide) is obtained.

i. $P+3O_2
ightarrow P_4O_6$, ii. $P_4+5O_2
ightarrow P_4O_{10}$

How many moles of ${\cal O}_2$ left unreacted initially in reaction (i) when 2g of

 $P_4 reacts with 2 gof O_(2)$?

A. 0.0145 mol

B. 0.072 mol

C. 0.029 mol

D. 0.0048 mol

Answer: A



20. Copper (Cu) and (Zn) react differently with HNO_3 as follows: $Cu + 4H^{\oplus}(aq) + 2NO_3^{\Theta}(aq) \rightarrow 2NO_2(g)_C u^{2+} + 2H_2O$ $4Zn + 10H^{\oplus}(aq) + 2NO_3^{\Theta}(aq) \rightarrow NH_4^{\oplus} + 4Zn^{2+} + 3H_2O$ What volume of $2.0MHNO_3$ would react with 10.0g of a brass (90. % Cu, 10.0 % Zn) according to the above equation?

A. pprox 100 mL

- B. $\approx 150mL$
- C. pprox 200 mL
- D. pprox 300 mL

Answer: D

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21. Copper (Cu) and (Zn) react differently with HNO_3 as follows: $Cu + 4H^{\oplus}(aq) + 2NO_3^{\Theta}(aq) \rightarrow 2NO_2(g)_C u^{2+} + 2H_2O$ $4Zn + 10H^{\oplus}(aq) + 2NO_3^{\Theta}(aq) \rightarrow NH_4^{\oplus} + 4Zn^{2+} + 3H_2O$ What volume of NO_2 gas at $27^{\circ}C$ and 1.0 atm pressure would be produced? if given 2 M HNO_3 react with 10 g of a brass (90 % Cu 10% Zn) according to the above equation.

A. 6.97L

 $\mathsf{B.}\,5.97L$

 $\mathsf{C.}\,4.97L$

 $\mathsf{D.}\,3.97L$

Answer: A

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22. In coal, pyrites (FeS_2) is present as a pollution-causing impurity, which is removed by combustion.

 $2FeS_2 + 5O_2
ightarrow 4SO_2 + 2FeO.$

Calculate the moles of SO_2 produced by burning 1.0metric ton $(10^3 kg)$ of coal containing 0.05% by mass of pyrites impurity?

 ${\sf A.}\,8.32mol$

B. 4.16mol

 $\mathsf{C}.\,12.48mol$

 $\mathsf{D.}\,2.08mol$

Answer: A

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23. In coal pyrites (FeS_2) is present as a pollution-causing impurity, which is removed by combustion.

 $2FeS_2 + 5O_2
ightarrow 4SO_2 + 2FeO.$

What volume of 3.0MKOH would be required to react with the SO_2 produced in

 $\mathsf{A.}\,2.77L$

 $\mathsf{B.}\,5.54L$

 $\mathsf{C.}\,1.38L$

 $\mathsf{D.}\,8.31L$

Answer: B

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24. In coal, pyrites (FeS_2) is present as a pollution-causing impurity, which is removed by combustion.

 $2FeS_2+5O_2
ightarrow 4SO_2+2FeO.$

A process designed to remove orgainc sulphur from coal prior to combustion involves the reaction.

 $egin{aligned} X-S-Y+2NaOH &
ightarrow X-O-Y+Na_2S+H_2O\ CaCO_3 &
ightarrow CaO+CO_2\ Na_2S+CO_2+H_2O &
ightarrow Na_2CO_3+H_2S\ CaO+H_2O &
ightarrow Ca(OH)_2 \end{aligned}$

 $Na_2CO_3 + Ca(OH)_2
ightarrow CaCO_3 + 2NaOH$

In the processing in 320 metric tons of a coal having 1.0% sulphur content, how much limestone $(CaCO_3)$ must be edecomposed to provied enough $Ca(OH)_2$ to regenerate the NaOH used in the original leaching step?

A. 2.0 metric ton

B. 4.0 metric ton

C. 8.0 metric ton

D. 10.0 metric ton

Answer: D

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25. In coal, pyrites (FeS_2) is present as a pollution-causing impurity, which is removed by combustion.

 $2FeS_2 + 5O_2
ightarrow 4SO_2 + 2FeO.$

What mass of H_2SO_4 can be prepared from 3.0g of Cu_2S if each atom of S in Cu_2S is converted into 1 molecule of H_2SO_4 ?

A. 1.85g

 $\mathsf{B.}\,68.62g$

C. 3.85g

 $\mathsf{D.}\,4.85g$

Answer: A

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26. Salt cake (Na_2SO_4) is prepared as follows:

 $2NaCl + H_2SO_4
ightarrow Na_2SO_4 + 2HCl$

How much salt cake could be produced from 100.0g of 90% pure saltin

the above reaction?

A. 109.8g

B. 54.9g

C. 36.6g

D. 209.8g

Answer: A

Watch Video Solution

27. Salt cake (Na_2SO_4) is prepared as follows:

 $2NaCl + H_2SO_4
ightarrow Na_2SO_4 + 2HCl$

How much 80% pure salt cake could be produced form 100.0g of 90%

pure salt in the above reaction?

A. 43.92g

 $\mathsf{B.}\,68.62g$

C. 87.84g

D. 137.25g

Answer: D

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28. A mixture of a mol of C_3H_8 and b mol of C_2H_4 was kept is a container of VL exerts a pressure of 4.93 atm at temperature T. Mixture was burnt in presence of O_2 to convert C_3H_8 and C_2H_4 into CO_2 in the container at the same temperature. The pressure of gases after the reaction and attaining the thermal equilirium with atomsphere at temperature T was found to be 11.08 atm.

The moles fraction of C_3H_8 in the mixture is

A. 0.25

B. 0.75

C. 0.45

D. 0.55

Answer: A

29. A mixture of a mol of C_3H_8 and b mol of C_2H_4 was kept is a container of VL exerts a pressure of 4.93 atm at temperature T. Mixture was burnt in presence of O_2 to convert C_3H_8 and C_2H_4 into CO_2 in the container at the same temperature. The pressure of gases after the reaction and attaining the thermal equilirium with atomsphere at temperature T was found to be 11.08 atm. The mole fraction of C_2H_4 in the mixture is

A. 0.25

B. 0.75

C. 0.45

D. 0.55

Answer: B

30. A mixture of a mol of C_3H_8 and b mol of C_2H_4 was kept is a container of VL exerts a pressure of 4.93 atm at temperature T. Mixture was burnt in presence of O_2 to convert C_3H_8 and C_2H_4 into CO_2 in the container at the same temperature. The pressure of gases after the reaction and attaining the thermal equilirium with atomsphere at temperature T was found to be 11.08 atm.

The moles of O_2 needed for combustion at temperature T is equal to

A. 14a

 $\mathsf{B.}\,14b$

 $\mathsf{C}.\,15a$

D. 12b

Answer: A

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1. Which of the statement are correct?

A. Physical quantity represented by work in joule is kgm^2s^{-2}

- B. physical quantity represented by force in newton is kgm^2S^{-1}
- C. physical quantity represented by work in joule is $kgms^{-2}$
- D. Physical quantity represented by fore in newton is kgm^2s^{-2}

Answer: A::B

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2. Which of the statements are false?

A. Physical quantity represented by volume is dm^3

B. The length of pencil is 5cms.

C. The work done by a system is 5 Joules.

D. Air sometimes is considered as a hetrogeneous mixture due to

the presence of dust particles which form a separate phase.

Answer: B::C

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3. Which of the statement are true?

A. Law of constant compositon is true for all types of compounds.

B. Molar volume of a gas at standard conditions is 22.4L.

C. vapour density of a gas is twice of its molecula mass.

D. Atomic masses of most elements are fractional.

Answer: D

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4. Which of the statement are true??

A. (a) The equivalent weight of $Ca_3(PO_4)_2$ is Mw/6.

B. The equivalent weight of $Na_3PO_4.12H_2O$ is Mw/3.

C. The equivalent weight of K_2SO_4 is Mw/2.

D. The equivalent weight of potas alum $K_2SO_4Al_2(SO_4)_3.24H_2O$

is Mw/8

Answer: A::B::C::D

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5. Which of the statement are ture?

A. Brass is an elements

B. Dry ice is a mixture

C. Aerated drink, e.g., coca cola, is a mixture.

D. Diesel is a mixture

Answer: C::D



6. Two bulbs A and B contains $16gO_2$ and $16gO_3$, respectively. Which of the statements are ture?

A. Both bulbs contains same number of atoms.

B. Both bulbs contains different number of atoms.

C. Both bulbs contain same number of molecules.

D. Bulb A contains $N_A/2$ molecules while bulb B contains $N_A/3$

molecules. (N_A = Avogadro's number).

Answer: A::D

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7. A bulb contains 1.6g of O_2 contains.

A. 0.05 mol of O_2

B. $3.011 imes 10^{22}$ molecules of O_2

C. 1.12L of O_2 at STP

D. 1.22L of O_2 at STP

Answer: A::B::C::D

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8. Which of the following have same significant figures?

A. 0.07

B. 0.7

C. 7

D. 70

Answer: A::B::C::D



9. Which of the following have same significant figures?

A. $6.02 imes 10^{23}$

B. $7.70 imes10^{-20}$

C. 7.50

D. 0.75

Answer: A::B::C



10. Which of following relations are correct?

A. $1 eV = 9.11 imes 10^{-4} J$

 $\mathsf{B}.\,1L=1dm^3$

C. 1J = 1.98 cal

D. 1 atm = 1.01325 bar

Answer: A::B::C::D

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11. Which of the following statements are correct?

A. French chemist A. Lavoisier is called th father of chemistry and

proposed the law of conservation of mass.

B. French chemist joseph proust proposed the law of definite

proportions

- C. Dalton proposed the law of multiple proportion.
- D. Richter proposed the law of reciprocal proportions.



12. Whichof the statement are ture about the law of chemical combination?

- A. Potassium combines with two isotopes of chlorine $.^{35} Cl$ and $.^{37} Cl$) to form two samples of KCl. Their formation follows the law of definite composition.
- B. Different proportion of oxygen in the varius oxidies of sulphur prove the law of multiple proportiens.
- C. H_2O and H_2S contains 11.11% hydrogen and 5.88% hydrogen, respectively, whereas SO_2 contains 50% sulphur. The above data prove the law of reciprocal proportions.

D. In the decomposition of $NH_3,\,2NH_3 \stackrel{\Delta}{\longrightarrow} N_2 + 3H_2$, the ratio of

volumes of NH_3 , N_2 and H_2 is 2:1:3 The above data proves the

Gay Lussac law.

Answer: A::B::C::D

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13. Which of the following statements are wrongs?

A. 1.6g of a hydrocarbon on combustion in excess of oxygen produces 1.2 of CO_2 and 0.4 of H_2O . The data illustrates the law of conservation of mass.

B. The product of atomic mass and specific heat of any element is a constant and is approximately 6.4. Thus is known as Dulong Petit's law.

C. The atomic masses of any elements is fractional because they are

mixtures of allotropes.

D. The best standard of atomic mass is hydrogen - 1.008`

Answer: C::D

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14. Which of the following pair of compounds illustrate the law of multiple proportions?

A. SO_2 and SO_3

B. NO_2 and N_2O

C. MgO and $Mg(OH)_2$

D. NO and N_2O_5

Answer: A::B::D





15. Which of the following statements are correct?

- A. A sample of $CaCO_3$ contains Ca = 40%, C = 12%, and O = 48%. If the law of constant compositon is true, then the mass of Ca in $10g CaCO_3$ from another source is 4.0g
- B. 12g of carbon is heated in vacuum and there is no change in the

mass, is the best example of the law of conservation of mass.

- C. Air is heated at constant pressure and there is no change in mass but the increases, is the best example of the law of conservation of mass.
- D. SO_2 gas was prepared by (i) heating Cu with cone H_2SO_4 (ii) burning sulphur in oxygen, (iii) reacting observed that is each case, S and O combines in the ratio of 1:1. This data illustrates the law of constant composition.

Answer: A::D

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Exercises Multiple Correct (Mole Concept)

1. Which of the following statements is/are correct?

A. Chloropicrin (CCl_3, NO_2) can made cheapy for use as an

insectide by the following reaction:

 $CH_3NO_2 + Cl_2 \rightarrow CCl_3NO_2 + HCl$

B. In a rocket motor fueled with butane (C_4H_{10}) , 0.1 mol of butane

requires 14.56L of O_2 at STP for complete combustion.

C. A portable hydrogen generator utilises the reaction:

$$(CaH_2 + H_2O
ightarrow Ca(OH)_2 + H_2), 2.1gofCaH_2$$
 would

produce 2.24L "of" H_2 at STP

D. In the Mond process for purifying nickel, the volatile nickel carbonyl $[Ni(CO)_4]$ is produced by the reaction. $Ni + Co \rightarrow Ni(CO)_4$. 58.87g of Ni utilises 89.6L of CO at

standard conditions.

Answer: A::B::C



2. Which of the following statements is/are correct?

A. CaC_2 is made in an electric furnace by the reaction

 $CaO + C
ightarrow CaC_2 + CO$

16.0g of CaC_2 is obtained from 9.0gofC

B. Polyethene can be proudced form CaC_2 as follows

 $CaC_2 + H_2O
ightarrow Ca + HC \equiv CH$

 $HC \equiv CH + H_2
ightarrow H_2C = CH_2$

 $n(CH_2=CH_2)
ightarrow ~- \left(CH_2-CH_2
ight)_n -$ (polyethene)

 $32.0kgofCaC_2$ produces 14.0kg of polyethene.

C. 1.435g of AgCl is obtained from 17.55 of $[Ag(NH_3)_2]Cl$ by the following reaction:

 $ig[Ag(NH_3)_2ig]Cl+2HNO_3
ightarrow AgCl+2NH_4NH_3.$

D. Commercial sodium hydrosulfite is 50% pure $Na_2S_2O_4$. It is prepared as follows:

i.
$$Zn+2SO_2
ightarrow ZnS_2O_4$$

ii. $ZnS_2O_4 + Na_2CO_3 \rightarrow ZnCO_3 + Na_2S_2O_4)$

174.0 metric ton of commerical product $(Na_2S_2O_4)$ can be made

from 65.4 metric ton of Zn, with a sufficient supply of other

reactants.

Answer: A::B



3. Which of the following statements is/are corrects?

A. 21.2g sample of impure of $Na_2CO_3 = CaCO_3 = 0.1mol$.

B. The percentage of moles of Na_2CO_3 is 60%

C. The number of mole of $Na_2CO_3 = CaCO_3 = 0.1mol$

D. The number of moles of NaCl formed is 0.1 mol

Answer: A::C

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4. Which of the following statements is/are correct

A. The reaction.

 $Bi+4HNO_3+3H_2O
ightarrow Bi(NO_3)_3.\,5H_2O+NO$

2.09g of Bi in HNO_3 produces 48.5g of bismuth nitrate.

(Atomic weight Bi = 209g, $MwofBi(NO_3)_3.5H_2O = 485g$)

B. 4.0g of 63% HNO_3 by mass is required to react with 2.09g of Bi

C. The volume of NO gas produced at STP (1 bar 273K) is 0.227L

D. The volume of NO gas produced at STP (1 bar, 298K) is 0.247L.

Answer: B::C::D

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5. Which of the following statement is/are correct

1.0 g mixture of CaCO 3 (s) and glass beads liberate 0.22 g of CO 2

upon treatment with excess of HCl. Glass does not react with HCl.

A. The weight of $CaCO_3$ in the original mixture is 0.5g.

B. The weight of calcium in the original mixture is 0.2g

C. The weight percent of calcium in the original mixture is 40% Ca

D. The weight percent of Ca in the original mixture is 20% Ca

Answer: A::B::D

6. Question : Which of the following statements is/are correct

A. 196.0g of pure H_2SO_4 is required for the production of 365.0g of

conc HCl containing 40% HCl by weight.

B. 245.0g of 80% H_2SO_4 by weight is required for the production

of 365.0g conc. HCl containing 40% HCl be weight

C. 2 mol of pure H_2SO_4 is required for the production of 365g of

D. 2.5 mol of 80% H_2SO_4 is required for the production of $36.5g\,{\rm of}$

40% HCl`.

Answer: A::B::C::D



 $^{40\%\,}HCl$

1. 4.8 g of O_2 is mixed with 0.15 moles of Fe. Which of the following statements is/are correct ?

A. Fe is the limiting reagent.

B. The mass O_2 left over at the end of the reaction is 1.2g

C. The mass of Fe_2O_3 produced is 12.0g

D. O_2 is the limiting reagent.

Answer: A::B::C

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2. Which of the following statements is/are correct?

A mixture containing $64.0gH_2$ and $64.0gO_2$ is ignited so that water is

formed as follows:

 $2H_2+O_2
ightarrow 2H_2O$

A. $H_2 + O_2
ightarrow 2H_2 O$

B. O_2 is the limiting reagent

C. The reaction mixture contains $72.0gofH_2O$ and 56.0g of unreacted H_2 .

D. The reaction mixture contains 56.0g of H_2O and 72.0g of

unreacted H_2 .

Answer: B::C

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3. Which of the following statements is / are wrongs?

The following reactions occur:

A. P_4 is the limiting quantity

B. O_2 is the limiting quantity

C. mass of P_4O_{10} obtained is 2.2g

D. Mass ov P_4O_6 obtained is 2.84g

Answer: B::C::D



4. Which of the following is / are correct.

The following reaction occurs: ltrgt $CS_2 + 3Cl_2 \stackrel{\Delta}{\longrightarrow} CCl_4 + S_2Cl_2$

1.0g of CS_2 and 2.0g of Cl_2 reacts.

A. $0.714gCS_2$ is used in the reaction.

- B. $0.286gCS_2$ is in formed.
- C. $1.45gofCCl_4$ is formed
- D. $0.8gCl_2$ is in excess

Answer: A::B::C



5. Which of the following statements $is \, / \, are$ correct"

The following reaction occurs:

 $2Al + 3MnO \xrightarrow{\Delta} Al_2O_3 + 3Mn.$

108.0g of Al and 213.0g of MnO was heated to initiate the reaction.

(MwofMnO = 71, atomic weight of <math>Al = 13)

A. Al is present in excess

- B. MnO is present is excess.
- C. 54.0g of Al is required
- D. 159.0g of MnO is in excess.

Answer: A::C



6. Which of the following statements is / are correct?

i. 21.0 o lithium reacts with $32.0gofO_2$.

 $4Li + O_2
ightarrow 2Li_2O$

ii. 3.9g of K reacts with 4.26gof Cl_2

 $2K+Cl_2
ightarrow 2KCl$

Atomic weights of Li=7 and K=39. $MwofLi_2O=30$ and $KCl=74.5gmol^{-1}$

A. In reaction (i), O_2 is in excess.

B. $45.0gofLi_2O$ is formed in reaction (i)

C. In reaction (ii), Cl_2 is in excess.

D. 7.45gofKCl is formed is reaction (ii).

Answer: A::B::C::D

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7. Which of the following is/are correct?

The following reaction occurs:

 $Na_2CO_3 + 2HCl \rightarrow 2NACl + CO_2 + H_2O$

106. $gofNa_2CO_3$ reacts with 109.5gofHCl.

A. The HCl is in excess.

B. 117.0g of NaCl is formed.

C. The volume of CO_2 produced at 1 bar and 273K is 22.7L

D. The volume of CO_2 produced at 1 bar and 298K is 24.7L

Answer: A::B::C::D

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Exercises Multiple Correct (Mole Concept In Solution)

1. Which of the following solution contains approximately equal hydrogen ion concentration

A. $100mLof 0.1MHCl + 50mLH_2O$

B. $75mLof0.1MHCl + 75mLH_2O$

 $\mathsf{C.}\, 50mLof 0.1MH_2SO_4 + 100mLH_2$

D. $100mLof 0.1NH_2SO_4 + 50mLH_2O$

Answer: C::D

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2. Which of the following solution contains same molar concentration?

A. 166g. KI/L solution.

B. $33.0g(NH_4)_2SO_4$ in 200mL solution

C. $25.0gCuSO_4.5H_2O$ in 100mL solution

D. $27.0 mgAl^{3+}$ per mL solution.

Answer: A::C::D

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3. Which of the following have equal mass of Cl^{Θ} ions in 1.0*L* of each of the following solution?

or the following solution.

A. $5\,\%\,NaCl$ (density $\,=\,1.07gmL^{-1}$)

B. 5 % $KCl \left(d = 1.06 gm L^{-1}
ight)$

 $\mathsf{C.}\,58.5gNaCl$

D. $55.5gBaCl_2$

Answer: C::D

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4. Which of the following statement is / are correct?

Excess of $H_2(g)$ is bubbled into 1.0L of $0.1MCuCl_2$ solution.

$$Cu^{2+} + H_2S(g)
ightarrow CuS(s) + 22H^{\oplus}$$

A. 9.55 of CuS is produced.

B. The concentratikon of $H^{\,\oplus}$ ions is 0.2M

C. The concentration of $H^{\,\oplus}$ ions is 0.1M

D. 95.5gCuS is produced

Answer: A::B

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5. Which of the following statement is / are correct?

20.0mL of 6.0MHCl is mixed with 50.0mL of $2.0MBa(OH)_2$, and

30mL of water is added.

A. The concentration of $\stackrel{\Theta}{OH}$ remaining in solution is 0.8M.

B. The concentration of Cl^{Θ} remaining in solution is 1.2M

C. The concentration of Ba^{2+} remaining in solution is 1.0M

D. 80 mmols of $\stackrel{}{OH}$ is in excess.

Answer: A::B::C::D

6. Which of the following is/are correct?

100mL of $3.0MHClO_3$ reacts with excess of $Ba(OH)_2$ according to

the equation:

 $Ba(OH)_2+2HClO_3
ightarrow Ba(ClO_3)+2H_2O$ $(Mw ext{ of } Ba(ClO_3)_2=304gmol^{-1})$

A. 1.5 mol of $Ba(ClO_3)_2$ is formed

B. 3 mol of $Ba(ClO_3)_2$ is formed

C. 45.6g of $Ba(ClO_3)_2$ is obtained

D. 4.56g of $Ba(ClO_3)_2$ is obtained.

Answer: A::C

7. An excellent solution for cleaning grease stains from cloth of leather consists of the following components: CCl_4 (80% by volume), ligroin (16%) and amyl alcohol (4%) How many mL of each should to taken to make up 80mL of solution?

A. $64mLCCl_4$

B. 12.8mL ligroin

C. 32mL of amy alcohol

D. 3.2mL of amyl alcohol

Answer: A::B::D

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8. Which of the following statements is/are correct ?

A. Mass of $Al_2(SO_4)_3.18H_2O$ needed to make up 100mL of an aqueous solution of concentration 27.0mg of Al^{3+} per mL is 33.3g

B. Mass of $CrCl_3.6H_2O(Mw=266.5g)$ needed to prepare 1.0L solution containing $26.0gCr^{3+}$ per litre is 133.25g. (Atomic

weight of $\mathit{Cr}=5\mathit{g}$)

C. Mass of NH_4Cl needed to prepare 100ml for solution containing

 $80mg \, NH_4 Cl$ per mL is 8.0g

D. Mass of NH_3 per mL of solution needed for solution of NH_3 in

water containing 20% NH_3 by weighter (density $= 0.8 gmL^{-1}$ _

is $0.16 gm L^{-1}$

Answer: A::B::C::D



9. $100mlof0.06MCa(NO_3)_2$ is added to 50mL of $0.06MNa_2C_2O_4$.

After the reaction is complete.

A. 0.003 moles of calcium oxalate will get precipated

B. 0.03 M of excess Ca^{2+} will remains in excess.

C. $Na_2C_2O_4$ is the limiting reagent

D. $Ca(NO_3)_2$ is the excess reagent.

Answer: A::C::D

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10. If $100mLof1MH_2SO_4$ solution is mixed with 100mL of 98% (W/W) of H_2SO_4 solution $\left(d=0.1gmL^{-1}
ight)$, then

A. Concentration of solution becomes half.

B. Volume of solution beomces 200mL.

C. Mass of H_2SO_4 is the solution is 98g

D. mass of H_2SO_4 in the solution is 19.6g.

Answer: B::D

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11. $KClO_4$ can be prepared by following reactions:

i. $Cl_2 + 2KOH \rightarrow KCl + KClO + H_2O$

ii. $3KClO \rightarrow 2KCl + KClO_3$

iii. $4KClO_3 \rightarrow 3KlI_4 + KCl$

(Atomic weight of K, Cl, and O are 369,35.5 and 16)

A. The amount of Cl_2 required to prepare 277g of $KClO_4$ by above

series of reaction is 568g.

B. The volume of KOH in litres used by Cl_2 , if KOH is 1.5M, is

1.067L.

C. The amount of Cl_2 required to prepare $200gofKClO_4$ by above

series of reaction s 284g

D. The volume of KOH in litres used by Cl_2 , if KOH is 1.5M, is

10.76L

Answer: A::D

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12. When 100mL of $0.1MKNO_3$ and 400mL of 0.2MHCl and 500mL

of $0.3MH_2SO_4$ are mixed, then in the resulting solution

A. The molarity of $K^{\,\oplus}\,=\,0.01M$

- B. The molarity of $SO_4^{2\,-}\,=0.15M$
- C. The molarity of $H^{\,\oplus}\,=\,0.38M$
- D. The molarity of $NO_3^{\, m heta} = 0.08$ and $Cl^{\, m heta} = 0.01 M$



13. 100g sample of clay (containing 19% H_2O , 40% silica, and inert inpurities as rest) is partically dried so as to contains 10% H_2O . Which of the following is / are correct statements (s) ?

A. The percentage of silica in it is 44.4%

B. The mas of partically dried clay is 90.0g.

C. The precentage of inert impurity in it is 45.6%

D. The mass of water evaporated is 10.0g

Answer: A::C

14. In which of the following pairs, 10g of each have an equal number of

molecules?

- A. N_2O and CO
- B. N_2 and C_3O_2
- C. N_2 and CO
- D. N_2O and CO_2

Answer: C::D

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15. Equal weights of X (atomic weight = 36) and Y (atomic weight = 24) are reacted to form the compound X_2Y_3 , which of the following is/are correct

A. X is the limiting reagent

B. Y is the limiting reagen.

C. NO reactant is left over.

D. Mass of X_2Y_3 formed is double the mass of X taken.

Answer: C::D

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Exercises Single Correct

1. 10 g of $CaCO_3$ contains :

A. 10 moles of $CaCO_3$

B. 0.1g atom of Ca

C. $6 imes 10^{23}$ atoms of Ca

D. 0.1 of equivalent of Ca

Answer: B

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2. A candle is burnt in a beaker until extinguishers itseft. A sample of gaseous mixutre in the beaker contains 6.08×10^{20} molecules of O_2 , and 0.50×10^{20} molecules of CO_2 . The total pressure is 734mm of Hg. The partial pressure of O_2 would be

A. 760.0mmofHg

B. 76.0mmofHg

C. 7.6mmofHg

 $D.\,0.76mmofHg$

Answer: B

3. Two glucose solution are mixed. One has a volume of 480mL and a c oncentration of 1.50M and the second has a volume of 250mL and concentration 1.20M. The molarity of final solution is

 $\mathsf{A.}\,1.20M$

 $\mathsf{B}.\,1.50M$

 $\mathsf{C.}\,1.344M$

 $\mathsf{D}.\,2.70M$

Answer: C

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4. 1.0g of a monobasic acid when completely acted upon Mg gave

1.301g of anhydrous Mg salt. Equivalent weight of acid is

A. 35.54

B. 36.54

C. 17.77

D. 18.27

Answer: B

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5. 0.1g of metal combines with 46.6mL of oxygen at STP. The equivalent weight of metal is

A. 12

B. 24

C. 6

D. 36

Answer: A

6. The vapour density of chloride of an element is 39.5. The Ew of the elements is 3.82. The atomic weight of the elements is

A. 15.28

B. 7.64

C. 3.82

D. 11.46

Answer: B

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7. The Mw of a oxide of an element is 44. The Ew of the element is 14.

The atomic weight of the element is

A. 14

B. 28

C. 42

D. 56

Answer: A

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8. Potassium selenate is isomorphous with potassium sulphate and contains 50.0~% of Se. The atomic weight of Se is

a. 142, b. 71, c. 47.33, d. 284

A. 142

B. 71

C. 47.33

D. 284

Answer: A



9. The Ew of an element is 13. It forms an acidic oxide which KOH forms a salt isomorphous with K_2SO_4 . The Aw of element is a. 13, b. 26, c. 52, d. 78

A. 13

B. 26

C. 52

D. 78

Answer: D

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10. 0.05g of a piece of metal in dilute acid gave 24.62mL of H_2 at $27^{\,\circ}C$

and 760mm pressure. The Ew of metal is

A. 25

B. 12.5

C. 50

D. 37.5

Answer: A

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11. An element A (atomic weight = 12) and B (atomic weight = 35.5) combines of form a compound X. If 5 mol of B comibnes with 1 mol of A to give 1 mol of X. The weight of 1 mol of X would be

A. 47.5g

B.74.0g

C. 154.0g

D. 148.0g

Answer: C



12. If 1L of O_2 at $15^{\circ}C$ and 750mm pressure contains N molecules, the number of molecules in 2 litre of SO_2 under the same conditions of temperature and pressure will be

A. N/2

 $\mathbf{B}.\,N$

 $\mathsf{C.}\,2N$

 $\mathsf{D}.\,N$

Answer: C

13. When 2g of a gas A is introduced into an evacuated flask kept at $25^{\circ}C$, the pressure is found to be one atmosphere. If 3 g of another gas B are then added to the same flask, the total pressure becomes 1.5 atm. Assuming ideal gas behaviour, calculate the ratio of molecular weights $M_A: M_B$.

A. 1:3

B.3:1

C.2:3

 $\mathsf{D}.\,3\!:\!2$

Answer: A



14. How many moles of ferric alum

 $(NH_4)_2SO_4Fe_2(SO_4)_3.\ 24H_2O$ can be made from the sample of Fe

containing 0.0056g of it?

- A. $10^{-4} mol$
- ${
 m B.}\,0.5 imes10^{-4}mol$
- $\text{C.}\,0.33\times10^{-4}mol$
- D. $2 imes 10^{-4}mol$

Answer: B

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15. Suppose elements X and Y combine to form two compounds XY_2 and X_3Y_2 when 0.1 mole of former weigh 10g while 0.05 mole of the latter weigh 9g. What are the atomc weights of X and Y.

A. 40,30

B. 60,40

C. 20,30

Answer: A

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16. In an experiment, 6.67g of $AlCl_3$ was produced and 0.654g Al remainded unreacted. How many g atoms of Al and Cl_2 were taken originally (Al = 27, Cl = 35.5)?

A. 0.07,0.15

B. 0.07,0.05

C. 0.02,0.05

D. 0.02,0.15

Answer: A

17. Nine volumes of gaseous mixture consisting of gaseous organic compound A and just sufficient amount of oxygen required for complete combustion yielded on burning 4 volumes of CO_2 , 6 volumes of water vapours, and 2 volumes of N_2 , at all volumes measured at the same temperature and pressure. If the compounds contains C, H, and N only, the molecular formula of compound A is

A. $C_2H_3N_2$

 $\mathsf{B.}\, C_2 H_6 N_2$

 $\mathsf{C.}\,C_3H_6N_2$

 $\mathsf{D.}\, C_3 H_6 N$

Answer: B

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18. 27g of Al will react completely with..... g of O_2

A. 8g

B. 10g

 $\mathsf{C.}\,24g$

 $\mathsf{D.}\,49g$

Answer: C

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19. 2L of air formed 1915mL of ozonised air when passed through Brodio's apparatus. The volume of ozone formed is

A. 85mL

 $\mathrm{B.}\,170mL$

 $\mathsf{C.}\,225mL$

 ${\rm D.}\,425=.5mL$

Answer: B



20. n – Butance (C_4H_{10}) is produced by monobromation of C_2H_6 followed by the Wurtz reaction. Calculate the volume of ethane at STP requried to produce 55g of n-butane. The bromination takes place with 90% yield and the Wurtz reaction with 85% yield.

 $\mathsf{A.}\,27.75L$

 $\mathsf{B.}\,55.5L$

 $\mathsf{C}.\,111L$

D. 5.55L

Answer: B

21. 1g of the carbonate of a metal was dissolved in 25mL of N - HCl. Te resulting liquid 5mL of N - NaOH for neutralisation. The Ew of the metal `Carbonate is

A. 50

B. 30

C. 20

D. None

Answer: A

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22. 5mL of N - HCl, 20mL of $N/2H_2SO_4$ and 30mL of N/3 HNO_3 are mixed together and the volume is made to 1L. The normality of the resulting solution is

A.
$$N/5$$

B. N/10

C. N/20

D. N/40

Answer: D

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23. Find out the equivalent weight of H_3PO_4 in the reaction:

 $Ca(OH)_2 + H_3PO_4
ightarrow CaHPO_4 + 2H_2O$

A. 49

B. 98

C. 32.66

D. 147

Answer: A

24. 10g of a sample of a mixture of $CaCl_2$ and NaCl is treated to precipitate all the calcium as $CaCO_3$. This $CaCO_3$ is heated to convert all the Ca to CaO and the final mass of CaO is 1.62 g.The percent by mass of $CaCl_2$ in the origial mixture is

A. 0.321

B. 0.162

C. 0.218

D. 0.11

Answer: A



25. A gaseous mixture contains oxygen and nitrogen in the ratio 1:4 by

weight. Therefore, the ratio of the number of molecules is:

A.1:4

B.1:8

C. 7: 32

D. 3:16

Answer: C

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26. If 0.5 mole of $BaCl_2$ mixed with 0.20 mole of Na_3PO_4 the maximum number of moles of $Ba_3(PO)_2$ then can be formed is

A. 0.1

B. 0.2

C. 0.5

D. 0.7

Answer: A



27. Upon mixing 50.0mL of 0.1M lead nitrate solution with 50.0mL of 0.05M chromic sulphate solution, precipitation of lead sulphate takes place. How many moles of lead sulphate are formed and what is the molar concertration of chromic suplhate left in the solution?

A. 0.0005,0.0084

B. 0.0084,0.005

C. 0.005,0.00084

D. 0.05,0.00084

Answer: A

28. The melting point of a substance was quoted as $52.5^{\circ}C$, $52.57^{\circ}C$, $52.571^{\circ}C$, and $52.5713^{\circ}C$. Which of these values would be most acceptable and which will have maximum uncertanity?

A. $52.5^{\,\circ}\,C$

 $\mathsf{B.}\,52.57^\circ C$

C. $52.571^{\circ}C$

D. 52.5713 $^{\circ}C$

Answer: A::B

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29. 600mL of ozonised oxygen at STP were found to weigh one gram.

What is the volume of ozone in the ozonised oxygen?

A. 200mL

 $\mathsf{B.}\,150mL$

 $\mathsf{C}.\,100mL$

 ${\rm D.}\,50mL$

Answer: A

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30. The weight of 1L of ozonised oxygen at STP was found to be 1.5g. When 100mL of this mixture at STP was treated with turpentine oil, the volume was reduced to 90mL. The molecular weight of ozone is

A. 49

B.47

C. 46

D. 47.9

Answer: D



31. Calculate the density of NH_3 at $30\,^\circ C$ and 5 atm pressure.

A. $3.42gL^{-1}$

B. $2.42gL^{-1}$

C. $1.71gL^{-1}$

D. $3.84gL^{-1}$

Answer: A

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32. What weight of a metal of equivalent weight 12 will give 0.475g of

its chloide?

A. 0.12g

 $\mathsf{B.}\,0.24g$

C. 0.36g

 $D.\,0.48g$

Answer: A

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33. 4.2g of a metallic carbonate MCO_3 was heated in a hard glass tube and CO_2 evolved was found to have 1120mL of volume at STP. The Ew of the metal is

A. 12

B. 24

C. 18

D. 15

Answer: A

34. If 0.5g of a mixture of two metals. A and B with respective equivalent weights 12 and 9 displace 560mL of H_2 at STP from an acid, the composition of the mixture is

A. 40 % A, 60 % B

B. 60 % A, 40 % B

C. 30 % A, 70 % B

D. 70 % A, 30 % B

Answer: A

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35. What is the valency of an element of which the eqivalent weight is

12 and the specific heat is 0.25?

A. 1	
B. 2	
C. 3	

D. 4

Answer: B



36. The mineral rutile is an oxide of titanium containing 39.35% oxygen and is isomorphous with cassiterite (SnO_2) . The atomic weight of titanium is

A. 68.1

B. 58.1

C. 48.1

D. 38.1
Answer: C

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37. A mixture of ethylene and excess of H_2 had a pressure of 600mmHg the mixture was passed over nickel catalyst to convert ethylene to ethane. The pressure of the resultant mixture at the similar conditions of temperature and volume dropped to 400mmHg The fraction of C_2H_4 by volume in the original mixture is

A. 1/3 rd of the total volume

- B. 1/4 th of the total volume
- C. 2/3 rd of the total volume
- D. 1/2 nd of the total volume

Answer: A



38. 13.4g of a sample of unstable hydrated salt Na_2SO_4 . XH_2O was found to contains 6.3g of H_2O . The number of molecular of water of crystalistion is

A. 5	
B. 7	
C. 2	
D. 10	

Answer: B



39. A bag contains 0.32g of oxygen. The same valume of an unknown gas A under similar conditions of temperature and pressure weigh 0.26g. The gas A is known to contain only C and H in 1:1 ratio. The molecular formula of the compound is

A. C_2H_2

 $\mathsf{B.}\,C_4H_4$

 $\mathsf{C.}\,C_3H_4$

 $\mathsf{D.}\, CH$

Answer: A



40. A mineral consists of an equimolar mixture of the carbonates of two bivalent metals. One metal is present to the extent of 15.0% by weight, 3.0g of the mineral on heating lost 1.10g of CO_2 . The percent by weight of other metal is

A. 65

B. 25

C. 75

Answer: D



41. One litre of 0.15MHCl and one ltire of 0.3MHCl is given. What is the maximum volume of 0.2MHCl which one can make from these two solution. Now water is added.

A. 1.2L

B. 1.5 L`

 $\mathsf{C}.\,1.3L$

D. 1.4 L`

Answer: B

42. Ammonia in 0.224g of a compound $Zn(NH_3)_xCl_2$ is neutralised by

30.7mL of 0.20MHCl. The value of x in the formula is

A. 4 B. 5 C. 6 D. 8

Answer: C



43. The normility of a solution that results from mixing 4g of NaOH, 500mL of 1MHCl, and 10.0mL of H_2O_4 (specific gravity 1.149% H_2SO_4 by weight) is

The total volume of solution was made to 1L with water)

B. 0.71

C. 1.02

D. 0.45

Answer: A

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44. A 4: 1 molar mixture of He and CH4 is contained in a vessel at 20 bar pressure. Due to a hole in the vessel, the gas mixture leaks out. What is the composition of the mixture effusing out initially?

A. 33.3 $\%~He,\,66.7~\%~CH_4$

B. 66.7 % He, 33.3 % CH₄

C. $40 \% He, 60 \% CH_4$

D. 60 % He, 40 % CH_4

Answer: B

45. An organic compound contains C, H and O. If $C(\%): H^{\%} = 6:1$, what is the simplest formula of the compound, given that one mole of the compound contains half as much oxygen as would be required to burn all the C and H atoms in it to CO_2 and H_2O ?

A. CH_2O

 $\mathsf{B.}\, C_2 H_2 O_3$

 $C. C_3 H_6 O$

 $\mathsf{D.}\, C_3 H_6 O_2$

Answer: B

46. 10mL of a gaseous hydrocarbon is exploded with 100mL of oxygen. The residual gas on cooling is found to measure 95mL of which 20mL is absorbed by caustic soda and the remainder by alkaline pyrollgallol. The fomula of the hydrocarbon is

A. CH_4

 $\mathsf{B.}\, C_2 H_6$

 $\mathsf{C.}\, C_2 H_4$

D. C_2H_2

Answer: D

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47. A mixture of formic acid and oxalic acid is heated with conc. H_2SO_4 . The gas producted is collected and treated with KOH solution, whereby the volume decrease by 1/6th. The molar ratio of the two acids (formic acid/oxalic acid) is

A. 4:1

B.1:4

C.2:1

 $\mathsf{D}.\,1\!:\!2$

Answer: A

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48. $2H_2O_2(l) o 2H_2o(l) + O_2(g)$

100mL of X molar H_2O_2 gives 3L of O_2 gas under the condition when

1 moe occupies 24L. The value of X is

A. 2.5

C. 0.5

D. 0.25

Answer: D

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49. One mole of potassium chlorote is thermally decomposed and excess of aluminium is burnt in the gaseous product. How many mole(s) of aluminium oxide are formed?

A. 1

B. 1.5

C. 2

D. 3

Answer: A

50. A certain compound has the molecular formula X_4O_6 . If 10g of X_4O_6 has 5.72gX, the atomic mass of X is

A. 32 amu

B. 37 amu

C. 42 amu

D. 98 amu

Answer: A

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51. 5.6g of a metal forms 12.7g of metal chloride. Hence equivalent weight of the metal is

B. 254

C. 56

D. 25

Answer: D

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52. The molarity of H_2SO_4 is 18M. Its density is $1.8gmL^{-1}$. Hence, molality is :

A. 36

B. 200

C. 500

D. 18

Answer: C

53. 10L of hard water required 0.56g of lime (CaO) for removing hardness. Hence, temporary hardness in ppm (part per million 10^6) of $CaCO_3$ is:

A. 100

B. 200

C. 10

D. 20

Answer: B

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54. How many grams of phosphoric acid would be needed to neutralise 100g of magnesium hydroxide? (The molecular weight are: $H_3PO_4 = 98$ and $Mg(OH)_2 = 58.3$) A. 66.7g

 $\mathsf{B.}\,252g$

 $\mathsf{C}.\,112g$

 $\mathsf{D}.\,168g$

Answer: C

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55. The simplest formula of a compound containing 50% of an element

X (atomic weight 10) and 50% of element Y (atomic weight 20) is:

 $\mathsf{A.}\,XY$

 $\mathrm{B.}\, X_2Y$

 $\mathsf{C}.\,XY_2$

 $\mathsf{D.}\, X_2Y_3$

Answer: B



56. On repeated sparking, 10mL of a mixture of carbon monoxide and nitrogen required 7mL of oxygen for combustion. What was the volume of nitrogen? (All volumes are measured under identical conditions).

A. 7/2mL

 $\mathsf{B.}\,4mL$

 $\mathsf{C}.\,7mL$

D. 17/2mL

Answer: B

57. When 10mL of ehtyl alcohol (density $= 0.7893gmL^{-1}$) is mixed with 20mL of water (density $0.9971gmL^{-1}$) at $25^{\circ}C$, the final solution has a density of $0.9571gmL^{-1}$. The percentage change in total volume on mixing is

A. 3.1~%

 $\mathsf{B}.\,2.4\,\%$

 $\mathsf{C}.1\,\%$

D. None of these

Answer: A

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58. The molality of 1L solution with $x \% H_2SO_4$ is equal to 9. The weight of the solvent present in the solution is 910g. The value of x in g per 100 mL is

A. 90

B. 80.3

C. 49.2

D. 9

Answer: B

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59. The density of 1M solution of NaCl is $1.0585gmL^{-1}$. The molality

of the solution is

A. 1.0585

 $B.\,1.00$

C.0.10

D. 0.0585



60. 100mL of mixture of NaOH and Na_2SO_4 is neutralised by 10mL of $0.5MH_2SO_4$. Hence, the amount of NaOH in 100mL solution is

 $\mathsf{A.}\,0.2g$

 $\mathsf{B.}\,0.4g$

 $\mathsf{C.}\,0.6g$

D. None

Answer: B



61. A organic compound contains 4% sulphur. Its minimum molecular

weight is

A. 200

B.400

C. 800

D. 1600

Answer: C

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62. A gaseous mixture contains oxygen and nitrogen in the ratio 1:4 by

weight. Therefore, the ratio of the number of molecules is:

A. 1:4

B.1:8

C. 7: 32

D.3:16

Answer: C

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63. 0.116g of $C_4H_4O_4(A)$ in neutralised by 0.074g of $Ca(OH)_2$. Hence protonic hydrogen (H^{\oplus}) in (A) will be

A. 1

B. 2

C. 3

D. 4

Answer: B

64. A hydrate of Na_2SO_3 has 50% water by mass. It is

A. $Na_2SO_3.5H_2O$

 $\mathsf{B.}\,Na_2SO_3.6H_2O$

 $C. Na_2SO_3.7H_2O$

D. $Na_2SO_3.2H_2O$

Answer: C

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65. 10g mixture of $NaHCO_3$ and Na_2CO_3 has $1.68gNaHCO_3$.

It is heated at 400K. Weight of the residue will be

A. 9.38g

B. 8.32g

 $\mathsf{C}.\,10.0g$

 $D.\, 1.68g$

Answer: A



66. Mole fraction of ethanol is ethanol water mixture is 0.25. Hence, the percentage concentration of ethanol by weight of mixture is

A. 0.25

B. 0.75

C. 0.46

D. 0.54

Answer: C

67. $N_2+3H_2
ightarrow 2NH_3$

Molecular weight of NH_3 and N_2 and x_1 and x_2 , respectively. Their equivalent weights are y_1 and y_2 , respectively. Then $(y_1 - y_2)$



Answer: A

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68. How may moles of electrons weigh one kilogram?

A. $6.023 imes^{23}$

B.
$$rac{1}{9.108} imes 10^{31}$$

C.
$$rac{6.023}{9.108} imes 10^{54}$$

D. $rac{1}{9.108 imes 6.023} imes 10^{8}$

Answer: D

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69. The weight of $1 imes 10^{22}$ molecules of $CuSO_4.~5H_2O$ is:

A. 4.14g

B. 5.14g

C. 6.14g

D. 7.14g

Answer: A

70. How many moles of O_2 will be liberated by one mole of CrO_5 is the following reaction:

 $CrO_5 + H_2SO_4
ightarrow Cr_2(SO_4)_5 + H_2O + O_2$

A. 4.5

B. 2.5

C. 1.25

D. None

Answer: D

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71. $BrO_3^{\, \Theta} + 5Br^{\, \Theta}
ightarrow Br_2 + 3H_2O$

IF $50mL0.1MBrO_3^{\theta}$ is mixed with 30mL of $0.5MBr^{\theta}$ solution that contains excess of H^{\oplus} ions, the moles of Br_2 formed are

A. $6.0 imes10^4$

B. $1.2 imes 10^{-4}$

 $\mathsf{C}.\,9.0 imes10^{-3}$

D. $1.8 imes 10^{-3}$

Answer: C

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72. To 1L of 1.0M impure H_2SO_4 sample, 1.0MNaOH solution was

added and a plot was obtained as follows:

The % purity of H_2SO_4 and the slope of curve, respectively, are:



- A. 75~%~,~-1/2
- B. 75 % , -1
- C. 50~% , -1/3
- D. $50\,\%\,,\,-1/2$

Answer: B

73. The expression relating mole fraction of solute (χ_2) and molarity (M) of the solution is: (where d is the density of the solution in gL^{-1} and Mw_1 and Mw_2 are the molar masses of solvent and solute, respectively

$$egin{aligned} \mathsf{A}.\, x_2 &= rac{M imes M w_1}{M(M w_1 imes M w_2) + 1000 d} \ \mathsf{B}.\, x_2 &= rac{M imes M w_1}{M(M w_1 imes M w_2) + d} \ \mathsf{C}.\, x_2 &= rac{M imes M w_1}{M(M w_1 imes M w_2) - 1000 d} \ \mathsf{D}.\, x_2 &= rac{M imes M w_1}{M(M w_1 imes M w_2) - d} \end{aligned}$$

Answer: B

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74. At 100°C and 1 atm, if the density of liquid water is $1.0gcm^{-3}$ and that of water vapour is 0.0006 gcm-3, then the volume occupied by water molecules in 1 litre of steam at that temperature is:

A. $6cm^3$

 $\mathsf{B.}\,60 cm^3$

 ${\rm C.}\,0.6cm^3$

 ${\rm D.}\, 0.06 cm^3$

Answer: D

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75. Consider the ionisation of H_2SO_4 as follow"

 $H_2SO_4+2H_2P
ightarrow 2H_3O^\oplus SO_4^{2\,-}$

The total number of ions furnised by 100mL of $0.1M~H_2SO_4$ will be

A. $1.2 imes 10^{23}$ B. $0.12 imes 10^{23}$ C. $0.18 imes 10^{23}$ D. $1.8 imes 10^{23}$

Answer: C



76. Calculate the number of oxygen atoms requried to combine with 7.0g of N_2 to form N_2O_3 if 82% of N_2 is converted into products. $N_2+rac{3}{2}O_2 o N_2O_3$ A. $3.24 imes10^{23}$ B. $3.6 imes10^{23}$

C. $18 imes 10^{23}$

D. $6.02 imes10^{23}$

Answer: B

77. 36.5% HCl has density has density equal to $1.20gmL^{-1}$. The molarity (M) and molality (m), respectively, are

A. 15.7,15.7

B. 12,12

C. 15.7,12

D. 12,15.7

Answer: D

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78. 10mL of $1MBaCl_2$ solution & $5mL0.5MK_2SO_4$ are mixed together to precipitate out $BaSO_4$. The amount of $BaSO_4$ precipated will be

A. 0.005 mol

B. 0.00025 mol`

C. 0.025 mol

D. 0.0025 mol

Answer: D

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79. Mole fraction of a solute in an aqueous solution is 0.2. The molality

of the solution will be

A. 13.88

B. 1.388

C. 0.138

D. 0.0138

Answer: A

80. An excess of NaOH was added to 100mL of a $FeCl_3$ solution which gives 2.14g of $Fe(OH)_3$. Calculate the molarity of $FeCl_3$ solution.

 ${\rm A.}\, 0.2N$

 ${\rm B.}\,0.3N$

 ${\rm C.}\,0.6N$

 ${\rm D.}\,1.8N$

Answer: C



81. Two samples of HCl of 1.0M and 0.25M are mixed. Find volumes of these samples taken in order to prepare 0.75MHCl solution. Assume no water is added.

(I) 20mL, 10mL (II) 100mL, 50mLk

(III) 40mL, 20mL (IV) 50mL, 25mL

A. I,II,IV

B. I,II

C. II,III,IV

D. I,II,III,IV

Answer: D

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82. If 100mL of H_2SO_4 and 100mL of H_2O are mixed, the mass percent of H_2SO_4 in the resulting solution $(d_{H_2SO_4} = 0.09gmL^{-1}, d_{H_2O} = 1.0mL^{-1})$

A. 90

B. 47.36

C. 50

D. 60

Answer: B

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83. 12.5mL of a solution containing 6.0g of a dibasic acid in 1L was found to be neutralized by 10mL a decinormal solution of NaOH. The molecular weight of the acid is

A. 150

B. 120

C. 110

D. 75

Answer: A



84. One litre of a sample of hard water contains 5.55mg of $CaCl_2$ and

4.75mg of $MgCl_2$. The total hardness of ppm of $CaCO_3$ is

A. 5 ppm

B. 10 ppm

C. 20 ppm

D. None of these

Answer: B

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85. 10mL of 0.2NHCl and 30mL of 0.1NHCl to gether exactly neutralises 40mL of solution of NaOH, which is also exactly neutralised by a solution in water of 0.61g of an organic acid. What is the equivalent weight of the organic acid?
A. 61

B. 91.5

C. 122

D. 183

Answer: C

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86. A metal oxide has the formul Z_2O_3 . It can be reduced by hydrogen to give free metal and water. 0.2g of the metal oxide requires 12mg of hydrogen for complete reduction. The atomic weight of the metal is

A. 52

B. 104

C. 26

D. 78

Answer: C



87. The reaction between yttrium metal and dilute HCl produces $H_2(g)$ and Y^{3+} ions. The molar ratio of yttrium to that hydrogen produced is

A. 2:3

B. 3:2

C.1:2

 $\mathsf{D}.\,2\!:\!1$

Answer: A

88. What volume of H_2 at 273K and 1 atm will be consumed in obtaining 21.6g of elemental boron (atomic mass of B = 10.8) from the reduction of BCl_3 with H_2 .

 $\mathsf{A.}\,89.6L$

 $\mathsf{B.}\,67.2L$

 $\mathsf{C.}\,44.8L$

 $\mathsf{D.}\,22.4L$

Answer: B

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Exercises Assertion-Reasoning

1. Assertion (A): Atomic mass of potassium is 39.

Reason (R): An atom of postassium is 39 times heavier than 1/2th of

the mass of carbon atom (C^{12}) .

A. If both (A) and (R) are correct and (R) is the correct explantion for (A)

B. If both (A) and (R) are correct but (R) is not the correct

explantion for (A)

C. If (A) is correct but (R) is incorrect.

D. If (A) and (R) are incorrect.

Answer: A



2. Assertion (A): Both 138g of K_2CO_3 and 12g of carbon have some number of carbon atoms.

Resaon (R): Both contains 1g atom of carbon which contains $6.022 imes 10^{23}$ carbon atoms.

A. If both (A) and (R) are correct and (R) is the correct explantion

for (A)

B. If both (A) and (R) are correct but (R) is not the correct

explantion for (A)

C. If (A) is correct but (R) is incorrect.

D. If (A) and (R) are incorrect.

Answer: A

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3. Assetion (A): 1 Avogram is equal to 1 amu.

Reason (R): Avogram is reciprocal of Avogadro's

A. If both (A) and (R) are correct and (R) is the correct explantion

for (A)

B. If both (A) and (R) are correct but (R) is not the correct

explantion for (A)

C. If (A) is correct but (R) is incorrect.

D. If (A) and (R) are incorrect.

Answer: C

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4. Assertion (A): 1g of O_2 and 1g atom of O_3 have equal number of molecules.

Reason (R): Mass of 1 mol atom is equal to its gram atomic mass.

A. If both (A) and (R) are correct and (R) is the correct explantion

for (A)

B. If both (A) and (R) are correct but (R) is not the correct

explantion for (A)

C. If (A) is correct but (R) is incorrect.

D. If (A) and (R) are incorrect.

Answer: B

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5. Assetion (A): 1 mol H_2 and N_2 have same volume at same temperature and pressure.

Reason (R): 1 mol gas at STP occupies 24.4L volume.

- A. If both (A) and (R) are correct and (R) is the correct explantion for (A)
- B. If both (A) and (R) are correct but (R) is not the correct explantion for (A)

C. If (A) is correct but (R) is incorrect.

D. If (A) and (R) are incorrect.

Answer: B



6. Assertion (A): The equivalent mass of element is varialbe.

Reason (R): It depents on the valency of the element.

A. If both (A) and (R) are correct and (R) is the correct explantion

for (A)

B. If both (A) and (R) are correct but (R) is not the correct

explantion for (A)

C. If (A) is correct but (R) is incorrect.

D. If (A) and (R) are incorrect.

Answer: A

7. Assertion (A): Calmel is a chemical compound whereas brass is a mixture.

Reason (R): Calomel always contains 5.6 times as much mercury as chlorine by weight. Brass can be made with widely different ratios of copper and zine.

A. If both (A) and (R) are correct and (R) is the correct explantion

for (A)

B. If both (A) and (R) are correct but (R) is not the correct

explantion for (A)

C. If (A) is correct but (R) is incorrect.

D. If (A) and (R) are incorrect.

Answer: A

8. Assertion (A): pure water obtained from different states of india always contains hydrogen and oxygen in the ration of 1:8 by mass. Reason (R): Total mass of reactants and products during chemical change is always the same.

A. If both (A) and (R) are correct and (R) is the correct explantion

for (A)

B. If both (A) and (R) are correct but (R) is not the correct

explantion for (A)

C. If (A) is correct but (R) is incorrect.

D. If (A) and (R) are incorrect.

Answer: B



9. Assertion (A): The standard unit of expressing the mass of atom is amu.

Reason (R): amu is also called as avogram.

A. If both (A) and (R) are correct and (R) is the correct explantion

for (A)

B. If both (A) and (R) are correct but (R) is not the correct

explantion for (A)

- C. If (A) is correct but (R) is incorrect.
- D. If (A) and (R) are incorrect.

Answer: B



10. Assertion (A) : If 30mL of H_2 and 20mL of O_2 react to form water,

5mL of H_2 is left at the end of the reaction.

Reason (R): H_2 is the limiting reagent.

A. If both (A) and (R) are correct and (R) is the correct explantion for (A)

B. If both (A) and (R) are correct but (R) is not the correct

explantion for (A)

C. If (A) is correct but (R) is incorrect.

D. If (A) and (R) are incorrect.

Answer: D



Exercises Integers

1. What volume of 90% alcohol by weight $\left(d=0.8gmL^{-1}
ight)$ must be used to prepared 80mL of 10% alcohol by weight $\left(d=0.9gmL^{-1}
ight)$

2. 50mL of 1MHCl, 100mL of $0.5MHNO_3$, and xmL of $5MH_2SO_4$ are mixed together and the total volume is made upto 1.0L with water. 100mL of this solution exactly neutralises 10mL of $M/3Al_2(CO_3)_3$. Calculate the value of x.



3. How many mL of a solution of concertration $100mgCo^{2+}$ per mL is needed to prepare 10mL of a solution of concentration $20mgCo^{2+}$ per mL.



4. HCl gas is passed into water, yielding a solution of density $1.095gmL^{-1}$ and containing 30% HCl by weight. Calculate the





5. A solution contains 75mgNaCl per mL. To what extent must it be diluted to give a solution of concentration 15mgNaCl per mL of solution.

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6. To prepare 100g of a 92% by weight solution of NaOH how many g

of H_2O is needed?



7. To make a benzene soluble cement, 60g rosion is melted in an ion pot and 68g beeswax and 12g shellac are added. How much of shellac

should be taken to makes 35g cement?



9. Silver is removed from the solutions of its salts with metallic zinc, according to the reaction

 $Zn+2Ag^{\oplus}
ightarrow Zn^{2+}+2Ag.$

A 65.4g piece of Zn is put into a 100L vat containing 3.24g $Ag^{\,\oplus}$ per

litre. How amny moles of reactant remained unreacted?



10. A sample contains a mixtrure of $NaHCO_3$ and Na_2CO_3 .

HCl is added to 15.0g.of the sample, yielding 11.0g of NaCl. What

percent of the sample is Na_2CO_3 ?

 $egin{array}{l} ext{Reaction are} \ ext{Na}_2CO_3+2HCl
ightarrow 2NaCl+CO_2+H_2O \ ext{Na}HCO_2+HCl
ightarrow NaCL+CO_2+H_2O \end{array}
ightarrow$

 $MwofNaCl = 58.5, MwofNaHCO_3 = 84, MwofNa_2CO_3 = 106 gmol^{-1}$

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11. A person takes 6.1g of an anta-acid tablet comprising bicarbonate ion at 20.8%. The volume of CO_2 evolved at (1 atm and $25^{\circ}C$) in the stomach (on neutralisation) multipled by a factor of '10' will be xL. Calculate the approximate (integer) value of x.

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12. The specific gravity of a salt solution is 1.025. If VmL of water is added to 1L of this solution to make its density $1.02gmL^{-1}$, what

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13. A 19.6g of a given gaseous sample contains 2.8g of molecules $(d = 0.75gL^{-1})$, 11.2g of molecules $(d = 3gL^{-1})$ and 5.6g of molecules $(d = 1.5gL^{-1})$. All density measurements are made at STP. Calculate the total number of molecules (N) present in the given sample. Report your answer in $10^{23}N$

Assume Avogardro's number as $6 imes 10^{23}$.

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Archives Single Correct

1. The largest number of molecules in

A. 36g of water

- B. 28g of carbon monoxide
- C. 46g of ethly alcohol
- D. 54g of nitrogen pentoxide

Answer: A

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2.5g of zine is treated separated with an excess of

(a) dilute hydrochloric acid and

(b) aqueous sodium hydroxide .

The ratio of the volumes of H_2 evolved in these two reactions is :

- A. 1:1
- B. 1:2
- C.2:1
- D. 9:4

Answer: A
Vatch Video Solution
3. The total number of electrons in one molecular of carbon dioxide is

A. 22 B. 44 C. 66

Answer: C

D. 88



4. 2.76 g of Ag_2CO_3 on being heated yields a residue weighing

 $\mathsf{A.}\,2.16g$

B. 2.48g

 $\mathsf{C.}\,2.32g$

 $\mathsf{D}.\,2.64g$

Answer: A

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5. Equal mass of methane and oxygen are mixed in an empty container

at $25\,^\circ$ C. The fraction of the total pressure exerted by oxygen is:

A.
$$\frac{1}{3}$$

B. $\frac{1}{2}$
C. $\frac{2}{3}$
D. $\frac{1}{3} \times \frac{273}{298}$

Answer: A

6. If 0.5 mole of $BaCl_2$ mixed with 0.20 mole of Na_3PO_4 the maximum

number of moles of $Ba_3(PO_4)_2$ then can be formed is

A. 0.7

B. 0.5

C. 0.2

D. 0.1

Answer: D

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7. An isotope of $Ge^{\,\prime76}_{\,\,32}\,$ is

A. Ge. $^{77}_{32}$

B. As. $^{77}_{32}$

C. Se. $^{77}_{32}$

D. Se. $^{78}_{34}$

Answer: A

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8. A molal solution is one that contains 1 mol of a solute in

A. 1000g of solvent

B. 1L of solven

C. 1L of solution

D. 22.4L of solution

Answer: A

9. In which mode of expression, the concentration of a solution remains independent of temperature?

A. Molarity

B. Normality

C. Formality

D. Molality

Answer: D

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10. The normality of 0.3M phosphorous acid (H_3PO_3) is

A. 0.1

B. 0.9

C. 0.3

D. 0.6

Answer: D



11. At 100°C and 1 atm, if the density of liquid water is $1.0gcm^{-3}$ and that of water vapour is 0.0006 gcm-3, then the volume occupied by water molecules in 1 litre of steam at that temperature is:

A. $6cm^3$

 $B.60cm^3$

 ${\rm C.}\,0.6cm^3$

 ${\rm D.}\, 0.06 cm^3$

Answer: D

12. 6.3 g of oxalic acid dihydrate have been dissolved in water to obtain a 250 ml solution. How much volume of 0.1 N NaOH would be required to neutralize 10 mL of this solution ?

A. 40mL

B. 20mL

 $\mathsf{C}.\,10mL$

 $\mathsf{D.}\,4mL$

Answer: A

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13. How many moles of electrons weigh one kilogram?

A. $6.023 imes 10^{23}$

B.
$$rac{1}{9.108} imes 10^{31}$$

C.
$$rac{6.023}{9.108} imes 10^{54}$$

D. $rac{1}{9.108 imes 6.023} imes 10^{8}$

Answer: D

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14. A mixture x containing 0.02 mol of $[Co(NH_3)_5SO_4]Br$ and 0.02 mol of $[Co(NH_3)_5Br]SO_4$ was prepared in 2L of solution.

 $1L ext{ of mixture } X + ext{ excess } AgNO_3 o Y$

 $1L ext{ of mixture } X + ext{ excess } BaCl_2 o Z$

The number of moles of Y and Z are

A. 0.01,0.01

B. 0.02,0.01

C. 0.01,0.02

D. 0.02,0.02



- A. 24gofC(12)
- B. 56gofFe(56)
- C. 270fAl(27)
- D. 108gofAg(108)

Answer: A



16. Given that the abundacne of isotopes $.^{54}$ Fe, $.^{56}$ Fe, and $.^{57}$ Fe is 5%, 90% and 5% respectively. The atomic mass of Fe is

A. 55.58

B. 55.95

C. 55.75

D. 55.05

Answer: B

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17. The density of a solution prepared by dissolving 120 g of urea (mol.Mass = 60 u) in 1000 g of water is 1.15 g/mL. The molarity of this solution is:

 $\mathsf{A.}\,1.78M$

 $\mathrm{B.}\,2.00M$

 $\mathsf{C.}\,2.05M$

 $\mathsf{D}.\,2.22M$

Answer: C
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Archives Integer
1. The value of n in the molecular formula $Be_nAl_2Si_6O_{18}$ is
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2. A student of performs a titration with different burettes and finds
titre values of $25.2mL$, $25.25mL$, and $25.0mL$. The number of
significant figures in the average titre value is



3. Silver (atomic weight $108gmol^{-1}$) has a density of $10.5gcm^{-3}$. The number of silver atoms on a surfaces of area $10^{-12}m^2$ can be expressed in scientific notation as $Y \times 10^{-x}$, The value of x is



4. Among the following, what is the number of elements showing only

one non-zero oxidation state O, Cl, F, N?

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Archives Fill In The Blanks

1. The total number of electrons present in 18 mL of water (density of

water is $1gmL^{-1}$ is:

2. The modern atomic mass unit if based on the mass of



Archives Subjective

1. What is the molarity and molality of a 13% solution (by weight) of sulphric acid with a density of $1.02mL^{-1}$?

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2. The density of ammonia at $30^\circ C$ and 5 atm pressure is
Watch Video Solution

3. 4.215 g a metallic carbonate was heated in a hard glass tube and CO_2 evolved was found to measure 1336 mL at 27°C and 700 mm pressure. What is the equivalent mass of the metal ?



4. The density of a $3MNa_2S_2O_3$ (sodium thiosulphate) solution is $1.25gmL^{-1}$. Calculate:



7. Calculate the volume occupied by 5.0g of acetylene gas at $50\,^\circ\,C$ and

740mm pressure.



8. On mixing 45.0mL of 0.25M lead nitrate solution with 25.0mL of 0.10M chromic sulphate solution, precipitation of lead sulphate takes place. How many moles of lead sulphate are formed? Also calculate the molar concentration of the species left behind solution. Assume the lead sulphate is completely insoluble.

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9. When $0.575 \times 10^{-2} kg$ of Glaube's salt is dissolved in water, we get $1 dm^3$ of a solution of density $1077.2 kgm^{-3}$. Calculate the molarity, molality, and mole fraction of Na_2SO_4 in the solution.

10. Calculate the molarity of water if its density is $1000 kgm^{-3}$

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11. Calculate the amount of calcuium oxide required when it reacts with

852g of P_4O_{10} .