doubtnut
India's Number 1 Education App

CHEMISTRY

BOOKS - GRB CHEMISTRY (HINGLISH)

MOLE CONCEPT, STOICHIOMETRY & CONCENTRATION TERMS

Straight objective type

1. If the atomic mass of sodium is 23, the number of moles in $46gm$ of sodium is:

A. 1

B. 2

C. 2.3

D. 4.6

Answer: B

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2. The charge on 1 gram ions of AI^{3+} is .

(a). $\frac{1}{27}N_Ae$ coulomb

(b). $\frac{1}{3}N_Ae$ coulomb

(c). $\frac{1}{9}N_Ae$ coulomb

(d). $3 \times N_Ae$ coulomb

A. $\frac{1}{27}N_{A^e}$ coulomb

B. $\frac{1}{3}N_{A^e}$ coulomb

C. $\frac{1}{9}N_{A^e}$ coulomb

D. $13 \times N_{A^e}$ coulomb

Answer: D

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3. Which of the following contains the greatest number of atoms?

A. 1.0g of butane (C_4H_{10})

B. 1.0 g of nitrogen (N_2)

C. $1.0g$ of silver (Ag)

D. $1.0g$ of water (H_2O)

Answer: A

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4. A gaseous mixture contains CO_2(g) and $N_2O(g)$ in $2:5$ ratio by mass. The ratio of the number of molecules of $CO_2(g)$ and $N_2O(g)$ is:

A. $5:2$

B. $2:5$

C. $1:2$

D. $5:4$

Answer: B

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5. A sample of aluminium has a mass of $54.0g$. What is the mass of the same number of magnesium atoms? $(At. Wt. Al = 27, Mg = 24)$

A. 12g

B. 24g

C. 48g

D. 96g

Answer: C

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6. The weight of a molecule of the compound $C_{60}H_{22}$ is:

A. 1.09×10^{-21}g

B. 1.24×10^{-21}g

C. 5.025×10^{-23}g

D. 16.023×10^{-23}g

Answer: B

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7. Four 1-1 litre flasks are seperately filled with the gases H_2, He and O_2 and O_3 at the same temperature and pressure. The ratio of total number of atomsof these gases present in different flask would be:

A. $1:1:1:1$

B. $1:2:2:3$

C. $2:1:2:3$

D. $3:2:2:1$

Answer: C

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8. which of the following expressions is correct (n= number of moles of the gas, $N_A =$ Avogadro constant, m = mass of 1 molecule of the gas, N = number of molecules of the gas)?

A. $n = mN_A$

B. $m = N_A$

C. $N = nN_A$

D. $m = n/N_A$

Answer: C

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9. The volume of 1 mole of a gas at standard temperature and pressure is:

A. 11.35 litres

B. 22.7 litres

C. 100 litres

D. 22.4 litres

Answer: B

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10. One mole of a gas is defined as:

A. the number of molecules in one litre of gas

B. the number of molecules in one formula weight of gas

C. the number of molecules contained in 12 grams of (12 C) isotope

D. the number of molecules in 22.7 litres of a gas at S.T.P.

Answer: D

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11. if two moles of an ideal at $546K$ occupies a volume of 44.8 litres, the pressure must be:

A. 2 atm

B. 3 atm

C. 4 atm

D. 1 atm

Answer: A

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12. A container consists of O_2 gas at 4 atm pressure and 400K. If the volume of the container is 8.21 litre then calculte number of oxygen atoms present in the container.

A. 2

B. $1.5 \times N_A$

C. 6.023×10^{23}

D. 12.04×10^{23}

Answer: D

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13. 2 moles of nitrogen atoms at STP occupy a volume of:

A. 11.35 L

B. 45.4 L

C. 22.7 L

D. 5.6L

Answer: C

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14. Under the same conditions, two gases have the same number of molecules. They must:

A. be noble gases

B. have equal volumes

C. have a volume of $22.4 dm^3$ each

D. have an equal number of atoms

Answer: B

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15. 3g of a hydrocarbons on combustion in excess of oxygen produces $8.8g$ of CO_2 and 5.4g of H_2O. The data illustrates the law of:

A. conservation of mass

B. multiple proportions

C. constant proportions

D. none of these

Answer: A

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16. The mass of 1 mole of neutrons $\left(m_n = 1.675 \times 10^{-27}\right.$ kg) is:

A. 1.800×10^{-3}

B. 1.008×10^{-4} kg

C. 1.080×10^{-3} kg

D. 1.008×10^{-3}kg

Answer: D

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17. 10^{21} molecules are removed from 200 mg of CO_2.

The moles of CO_2 left are:

A. 2.88×10^{-3}

B. 28.2×10^{-23}g

C. 1.5×10^{-23}g

D. 2.5×10^{-24}g

Answer: A

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18. If the mass of 0.25 moles of an element Xis 2.25g, the mass of one atom of X is about:

A. 1.5×10^{-24}g

B. 2.5×10^{-23}g

C. 1.5×10^{-23}g

D. $2.5 \times 10^{-24} g$

Answer: C

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19. From 392 mg of H_2SO_4, 1.204×10^{21} molecules of H_2SO_4 are removed. How many moles of H_2SO_4 are left?

A. 2×10^{-3}

B. 1.2×10^{-3}

C. 4×10^{-3}

D. 1.5×10^{-3}

Answer: A

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20. The number of molecules of water in 333 g of $Al_2(SO_4)_3.18H_2O$ is:

A. $18 \times 6.022 \times 10^{23}$

B. $9 \times 6.022 \times 10^{23}$

C. 18

D. 36

Answer: B

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21. The atomic weight for a triatomic gas is a. The correct formula for the number of moles of gas in its w g is:

A. $\frac{3w}{a}$

B. $\frac{w}{3a}$

C. 3wa

D. $\frac{a}{3w}$

Answer: B

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22. Which ofhte following will have maximum number of C atoms ?

A. 5.8 g of glyoxal $\left(C_2H_2O_2\right)$

B. 3.1g of acetone$\left(C_3H_6O\right)$

C. 11.6 g of fumaric (acid) $\left(C_4H_4O_4\right)$

D. 12 g of urea $\left(CON_2H_4\right)$

Answer: C

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23. An organic compound contains 14 atoms of carbon per molecules. If mass % of carbon in the compound is 22.4%, then molecular mass of the compound will be:

A. 3000

B. 750

C. 12000

D. 600

Answer: B

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24. A sample of clay contains 50% silica and 10% water. The sample is partially dried by which it loses 8 gm of water. If the percentage of silica in the partially dried clay is 52, what is the percentage of water is the partially dried clay?

A. 2.0%

B. 6.4%

C. 10.4%

D. 2.4%

Answer: B

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25. which of the following samples must have molar mass greater than a mixture of CO and CO_2?

A. Pure Ne

B. Mixture of CH_4 and $\left(SO_3\right)$

C. Mixture of O_3 and SO_2

D. Pure O_2

Answer: C

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26. $1gm - a \rightarrow m$ of nitrogen may represent:

A. $6.02 \times 10^{23} N_2$ molecules

B. $22.4 lit$of N_2 at 1 atm and $0^\circ C$

C. 11.2 lit. of N_2 at 1 atm and 0° C

D. 22 g of nitrogen

Answer: C

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27. The mass of CO_2 that must be mixed with 20 gm of oxygen such that 27 ml of a samples of the resulting mixture would contain equal number of molecular of each gas:

A. $13.75 gm$

B. $27.50gm$

C. $41.25gm$

D. 55 gm

Answer: B

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28. The mass of 3.2×10^{5} atoms of an element is 8.0×10^{-18}gm. The atomic mass of the element is about:

A. 2.5×10^{-22}

B. 15

C. 8.0×10^{-18}

D. 30

Answer: B

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29. 132 amu of B_{12} will contain:

A. $12N_A$ atoms of boron

B. 1 atom of boron

C. 1 molecule of boron

D. N_A molecules of boron

Answer: C

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30. which of the following contains largest number of atoms?

$[C = 12, Ca = 40, Cu = 63.5, Cd = 1121]$

A. 4gm carbon

B. 12 gm calcium

C. 6.356 gm copper

D. 22.4 gm cadmium

Answer: A

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31. The only incorrect information related with 9.6g ozone is:

A. contains 0.2g molecules of ozone

B. contains 0.6 g atomsof oxygen

C. occupy 4.48 L at 273K and 1 bar

D. occupy 4.48L at $273^{\circ}C$ and 2 atm

Answer: C

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32. Total number of neutrons present in 4g of heavy water $\left(D_2O\right)$ is :

(Where N_A represetns Avogadro's number)

A. $2.4N_A$

B. $4N_A$

C. $1.2N_A$

D. $2N_A$

Answer: D

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33. 30 g of element x contains 18.069×10^{23} atoms of x. Calculate gram-molecular mass of x_2

A. 20 amu

B. 10 amu

C. 10g

D. 20g

Answer: D

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34. If a sample of $CuSO_4.5H_2O$ contains 64g S. Calcualte mass of H present in sample. (S = 32)

A. 10g

B. 20g

C. 5g

D. 40g

Answer: B

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35. Volume at STP of $0.44gm$ of CO_2 is the same as that of:

A. 0.02gm of hydrogen gas

B. 0.085gm of ammonia gas

C. 320 mgof sulphur dioxide gas

D. none of the above

Answer: A

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36. The sodium salt of methyl orange has 7% sodium. What is the minimum molecular weight of the compound?

A. 420

B. 375

C. 329

D. 395

Answer: C

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37. In the preceding problem, if the compound contains 12.8% nitrogen and 9.8% sulphur how many nitrogen and sulphur atoms are present per atomof sodium?

A. 2 and 1

B. 1 and 3

C. 1 and 2

D. 3 and 1

Answer: D

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38. Which of the following will contain same number of atoms as 20g of calcium?

A. 24g magnesium

B. 12g carbon

C. 8g oxygen gas

D. 16g oxygen atom

Answer: C

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39. A sample of ammonium phosphate $(NH_4)_3PO_4$ contains 3.18 mol of H atoms. The number of moles of O atoms in the sample is:

A. 0.265

B. 0.795

C. 1.06

D. 3.18

Answer: C

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40. Cortiosone is a molecular substance containing 21 atoms of carbon per molecules. The mass percentage of carbon in cortisone is 69.98%. Its molar mass is:

A. 176.5

B. 0.795

C. 1.06

D. 3.18

Answer: D

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41. The molar massof normal water is....as compared to heavy water.

A. 10° less

B. 10° high

C. 2° less

D. zero % less

Answer: A

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42. How many mole of magnesium phosphate $Mg_3(PO_4)_2$ will contain 0.25mole of oxygen atoms?

A. 0.02

B. 3.125×10^{-2}

C. 1.25×10^{-3}

D. 2.5×10^{-2}

Answer: B

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43. Number of atoms in 560gm of Fe(atomic mass $56 gm \text{ mol}^{-1}$) is:

A. twice that of 70g N

B. half that of 20g H

C. both a and b

D. none of these

Answer: C

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44. If $1/6$, in place of $1/12$, mass of carbon atom is taken to be the relative atomic mass unit, the mass of one one of a substance will:

A. decrease twice

B. increase two fold

C. remains unchanged

D. be a function of the molecular mass of the substance.

Answer: B

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45. How many moles of electrons weigh one kilogram?

A. 6.023×10^{23}

B. $\frac{1}{9.108} \times 10^{31}$

C. $\frac{6.023}{9.108} \times 10^{54}$

D. $\frac{1}{9.108 \times 6.023} \times 10^{8}$

Answer: D

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46. Which has maximum number of atoms:

A. 24gm of C(12)

B. 56g of Fe(56)

C. 27g of Al(27)

D. 108 g of Ag(108)

Answer: A

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47. which of the following statement is correct?

A. 1 mole of electron has 1.6×10^{-19} C of charge

B. 1 mole of electrons weigh 0.548mg

C. 1 mole of electrons weigh 5.48mg

D. 1 mole of electrons weigh 0.548kg

Answer: B

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48. 5.85g of NaCl is dissolved in 1L of pure water. The number of ions in 1ml of this solution is:

A. 6.02×10^{19}

B. 1.2×10^{22}

C. 1.2×10^{20}

D. 6.02×10^{20}

Answer: C

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49. How many gram ions of SO_4^{-2} are present in 1 gram molecule of $K_2SO_4.Al_2(SO_4)_3.24H_2O$?

A. 2

B. 3

C. 1

D. 4

Answer: D

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50. If KOTA CLASSES is writtedn by a graphite pencil, it weighs 3.0×10^{-10} gm. How many carbon atoms are present in it? $\left(N_A = 6 \times 10^{23}\right)$

A. 1.5×10^{13}

B. 5×10^{12}

C. 2×10^{33}

D. 1.5×10^{10}

Answer: A

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51. A compound contains 7 carbon atoms, 2 oxygen atoms and 1.0×10^{-23} gmof other elements. The molecular mass of compound is : $\left(N_A = 6 \times 10^{23}\right)$

A. 122

B. 116

C. 148

D. 154

Answer: A

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52. Total number of electrons present in 4.4 gm oxalate ion $\left(C_2O_4^{-2}\right)$ is:

A. $0.05N_A$

B. $2.3N_A$

C. $2.2N_A$

D. $2.1N_A$

Answer: B

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53. Which of the following options correctly represent mass of 10 molecules of Marshall's acid?

A. 10 amu

B. 1940 amu

C. 1940 amu

D. 10gm

Answer: B

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54. Which of the following options consist of substances that will illustrate law of reciprocal proportions?

A. Water, carbon-di-oxdide and ethanol

B. Ammonia, water and di-nitrogen pentaoxide

C. Ferrous oxide, Ferric oxide and Fe_3O_4

D. Nitrous oxide, Nitric oxide and sulphur di-oxide.

Answer: B

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55. Identify the option containing maximum number of atoms:

A. 18mg of glucose

B. 2 mg of hydrogen gas

C. 10 mg of H_2O

D. 7.8 mg of benzene

Answer: A

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56. 13.5 gmof aluminium when changes to Al^{+3} ion in solution, will lose:

$\left[Ai = 27, N_A = 6 \times 10^{23}\right]$

A. 18.0×10^{23} electrons

B. 6.0×10^{23} electrons

C. 3.0×10^{23} electrons

D. 9.0×10^{23} electrons

Answer: D

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57. One of the following combinations illustrate law of reciprocal proportions:

A. N_2O_3, N_2O_4, N_2O_5

B. NaCl, NaBr, NaI

C. CS_2, CO_2, SO_2

D. PH_3, P_2O_3, P_2O_5

Answer: C

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58. The weight of 1×10^{22} molecules of $CuSO_4 . 5H_2O$ is

A. 41.59g

B. 415.9g

C. 4.159g

D. 0.4159g

Answer: C

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59. The largest number of molecules is in:

A. 34 g of water

B. 28g of CO_2

C. 46 g of CH_3OH

D. 54gm of N_2O_5

Answer: A

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60. A substance contains 7% by mass of N and 4% by massof oxygen. Calcualte minimum possible molar mass of the substance.

A. 200

B. 300

C. 400

D. 600

Answer: C

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61. Molar mass of electron is nearly : $\left(N_A = 6 \times 10^{23}\right)$

A. $9.1 \times 10^{-31} kgmol_{-1}$

B. $9.1 \times 10^{-31} gmmol^{-1}$

C. $54.6 \times 10^{-8} \text{gm mol}^{-1}$

D. $54.6 \times 10^{-8} kg mol^{-1}$

Answer: D

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62. Which one of the following parts of gases contains the same number of molecules?

A. 16g of O_2 and 14g of N_2

B. 8g of O_2 and 22g of CO_2

C. 28g of N_2 and 22g of CO_2

D. 32g of CO_2 and 32gm of N_2

Answer: A

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63. Calcualte the number of oxygen atoms and its weight in 50 gm of $CaCO_3$

A. 6.02×10^{23} and 12gm

B. 9.033×10^{23} and 24gm

C. 9.033×10^{23} and 12 gm

D. 9.033×10^{23} and 12gm

Answer: B

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64. Equal masses of oxygen, hydrogen and methane are taken in identical conditions. What is the ratio of the volume of the gases under identical conditions?

A. $16:1:8$

B. $1:16:2$

C. $1:16:8$

D. $2:16:1$

Answer: B

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65. Which of the following options correctly represent the increasing order of number of O atoms in the following samples?

(P) 1.8 gm of glucose

(Q) 1gm-atom of oxygen

(R) Mixture of ozone and oxygen gas having total millimoles of the two gases

(S) Mixture of CO_g and NO_g having total millimoles of the two gases.

A. R lt S lt P lt Q

B. S lt P lt Q lt R

C. P lt R lt S lt Q

D. S lt R lt Q ltP

Answer: A

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66. If equal mass of following substance are taken the which will have maximum number of molecles.

A. $C_6H_{12}O_6$

B. $C_{12}H_{22}O_{11}$

C. C_2H_6

D. CO_2

Answer: C

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67. Law of multiple proportion is illustrated by:

A. Calcium carbonate and Barium carbonate

B. sodium chloride and potassium chloride

C. sulphur dioxide and sulphur trioxide

D. Carbon dioxide and sulphur dioxide

Answer: C

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68. 1 atomof X, 2 atoms of Y and 3 atoms of Z combining together to give a molecule XY_2Z_3. Now we take 16 gm of X and 2×10^{23} atoms of Y and 0.06 moles of Z in a container, to give $5.6gm$ of XY_2Z_3. What is the molar mass of Z?

Given : $M_X = 60gm/molM_Y = 80gm/mol$

A. 25

B. 24

C. 32

D. 20

Answer: D

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69. 1.61gm of anhydrous $ZnSO_4$ was placed in moist air after few days its weight was found to be 2.87 gm. What is the molecular formular by hydrated salt? [Zn = 65]

A. $ZnSO_4 . H_2O$

B. $ZnSO_4 . 3H_2O$

C. $ZnSO_4 . 7H_2O$

D. $ZnSO_4 . 10H_2O$

Answer: C

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70. A rock contains $1.02\,\%\,Al_2O_3$ and $1.80\,\%\,SiO_2$ by mass). Apart from free SiO_2, some SiO_2 in the rock is present as kaolin $\left(Al_2O_3.\,2SiO_2\right)$. All Al_2O_3 in the rock is present as kaolin. The mass percentage of free SiO_2 in the rock is : (Al = 27, Si=28)

A. $1.2\,\%$

B. $0.6\,\%$

C. $1.8\,\%$

D. $0.8\,\%$

Answer: B

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71. A gaseous mixture contains $SO_3(g)$ and $C_2H_6(g)$ in a 16:15 ratio by mass. The ratio of total number of atoms present in $C_2H_6(g)$ and $SO_3(g)$

is:

A. $2:5$

B. $1:5$

C. $5:1$

D. $5:2$

Answer: C

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72. Haemoglobin$C_{2952}H_{4664}N_{812}O_{832}S_8Fe_4$, molar mass = 65248 g/mol is the oxygen carrier in blood. An average adult has about 5.0L of blood. Every milliliter of blood has approximately 6.0×10^9 erythrocytes, or red blood cells and every red blood cell has about 3×10^8 haemoglobin molecules. The mass of haemoglobin molecules in an average adult is : $\left(N_A = 6 \times 10^{23}\right)$

A. 978.72gm

B. 652.48gm

C. 434.99 gm

D. 0.015gm

Answer: A

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73. A sample of protein was analysed for metal content and analysis revealed that it contained magnesium and titanium in equal amounts, by mass. If these are the only metallic species present in the protein and it contains 0.008% metal by mass, the minimum possible molar mass of the protein is :

[Mg = 24, Ti = 48]

A. 1.2×10^{22}

B. 1.2×10^{25}

C. 7.2×10^{21}

D. 1.08×10^{22}

Answer: D

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74. Total number of protons, neutrons and electrons present in 14 mg of $\cdot{}_6C^{14}$ is :

(Take $N_A = 6 \times 10^{23}$)

A. 1.2×10^{22}

B. 1.2×10^{25}

C. 7.2×10^{21}

D. 1.08×10^{22}

Answer: A

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75. Which of the following has the smallest number of molecules?

A. 22.7 mL of CO_2 gas at STP

B. 22 g opf CO_2 gas at STP

C. 11.35L of CO_2 gas at STP

D. 0.1 mole of CO_2 gas

Answer: A

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76. If a mole is defined to be 3×10^{21} (instead of Avogadro's Number, 6×10^{23}). What would be the mass of one mole of Argon atoms? [Atomic of zinc, Find gram atoms of aluminium in given mixture?]

A. 40 gm

B. 200 gm

C. 20 gm

D. 8 gm

Answer: B

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77. 1.19gm mixture of Cu, Zn and Al contains $50u\%$ copper by weight and 3×10^{21} atoms of zinc. Find gram atoms of aluminum in given mixture? (At. Mass of Al= 27, Cu=63.5, Zn=65.0)

$N_A = 6 \times 10^{23}$

A. 0.001

B. 0.27

C. 0.01

D. 0.027

Answer: C

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78. In the blood of an infant there are about 1.3×10^{12} red blood cells, which contain a total of 0.15gm of iron ions. On an average, how many iron ions are present, in each red blood cell of an infant? [Fe = 56]

A. 8.8×10^{23}

B. 4.7×10^{13}

C. 1.2×10^{9}

D. 3.0×10^{19}

Answer: C

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79. Ratio of number of protons to neutrons present in 27.83×10^{29} molecules of ND_4^+

(where D is $._1H^2$)

A. $\dfrac{27.83 \times 10^{19}}{N_A}$

B. 1

C. 27.83

D. 27.83×10^{19}

Answer: B

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80. At certain temperature, two moles of A combines with five moles of B to, produce two moles of C. If atomicity of A and B is 2, the formula of compound C is :

A. AB_3

B. A_2B_5

C. AB_6

D. A_5B_2

Answer: B

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81. Which of the following will occupy greater volume under the similar conditions of pressure and temperature?

A. 6gm oxygen

B. 0.98 gm hydrogen

C. 5.25 gm of nitrogen

D. 1.32 gm of helium

Answer: B

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82. The number of electrons in 3.1 mg NO_3^- is:

A. 32

B. 1.6×10^{-3}

C. 9.6×10^{20}

D. 9.6×10^{23}

Answer: C

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83. The number of neutrons in 0.45g water, assuming that all the hydrogen atoms are H^1 atoms and all the oxygen atoms are O^{16} atoms, is:

A. 8

B. 0.2

C. 1.2×10^{23}

D. 4.8×10^{24}

Answer: C

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84. The volume of one mole of water at 277K is 18ml. One ml of water contains 20 drops. The number of molecules in one drop of water will be:

A. 1.07×10^{21}

B. 1.67×10^{21}

C. 2.67×10^{21}

D. 1.67×10^{20}

Answer: B

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85. 1.61 gm of $Na_2SO_4.\ 10H_2O$ contains same number of oxygen atoms as present in:

A. 0.98 gm H_2SO_4

B. 0.08 gm SO_2

C. 1.78gm $H_2S_2O_7$

D. 0.05 gm $CaCO_3$

Answer: C

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86. The number of hydrogen atoms in 0.9 gm glucose, $C_6H_{12}O_6$ is same as:

A. 0.048 gm hydrazine, N_2H_4

B. 0.17gm ammonia, NH_3

C. 0.30gm ethane, C_2H_6

D. 0.03 gm hydrogen, H_2

Answer: C

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87. Find the number of g-molecules of oxygen in $6.023 \times 10^{24} CO$ molecules.

A. 1g molecule

B. 0.5g of molecule

C. 5g molecule

D. 10g molecule

Answer: C

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88. One atomic mass unit in kilogram is:

A. $\frac{1}{N_A}$

B. $\frac{12}{N_A}$

C. $\frac{1}{1000N_A}$

D. $\frac{1000}{N_A}$

Answer: C

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89. Rearrange the following (P to S) in the order of increassing masses:

(P) 0.5 mole of O_3

(Q) 0.5gm molecules of nitrogen

(R)3.011×10^{23} molecule of O_2

(S) 11.35 L of CO_2 at STP

A. $S < R < Q < P$

B. $Q < R < S < P$

C. $R < Q < P < S$

D. $P < Q < R < S$

Answer: B

Watch Video Solution

90. Number of electrons in 36mg of $._{8}^{18}O^{-2}$ ions are : (Take $N_A = 6 \times 10^{23}$)

A. 1.2×10^{21}

B. 9.6×10^{21}

C. 1.2×10^{22}

D. 1.9×10^{22}

Answer: C

Watch Video Solution

91. The number of g-atoms of nitrogen in its 7gm is equal to number of g-atoms in:

A. 6gm Mg

B. 28gm Fe

C. 30gm Ca

D. 20gm Hg

Answer: B

Watch Video Solution

92. From 2 mg calcium, 1.2×10^{19} atoms are removed. The number of g-atoms of calcium left is:

A. 5×10^{-5}

B. 2×10^{-5}

C. 3×10^{-5}

D. 5×10^{-6}

Answer: C

Watch Video Solution

93. The shape of Tobacco Mosaic Virus (TMC) is cylindrical, having length and diameter 3000Å and 170Å, respectively. The density of the virus is

$0.08 gm / ml$. The molecular weight of TMC is:

A. 3.28

B. 5.44×10^{-24}

C. 5.44×10^{-18}

D. 3.28×10^{6}

Answer: D

Watch Video Solution

94. Same mass of glucose $\left(C_6H_{12}O_6\right)$ and acetic acid $\left(CH_3COOH\right)$ contain:

A. same number of carbon atoms

B. same number of hydrogen atoms

C. same number of oxygen atoms

D. all of the above

Answer: D

Watch Video Solution

95. 400 gm mixture of AB and AC_2 contains 26.25% of A by mass. Select the correct statements. (Atomic masses of A = 15, B = 25, C= 22.5)

A. % mass of AB is 10

B. Number of moles of AC_2 in the mixture is 4

C. Number of moles AB is 1

D. Total moles of A atoms in mixture is 7

Answer: D

Watch Video Solution

96. The numberof nitrogen atoms in 3.68g of $K_4\left[Fe(CN)_6\right]$ is: [N_0 = Avogadro number]

A. 0.06

B. $0.01N_0$

C. $0.06N_0$

D. none of these

Answer: C

Watch Video Solution

97. An unknown compound contains 8% sulphur by mass. Calculate :

(P) Least molecular weight of the compound and

(Q) Molecular weight if one molecule contains 4 atokms of S

A. 200, 400

B. 300, 400

C. 400, 1600

D. 4001200

Answer: C

Watch Video Solution

98. The ratio of the masses of methane and ethane in a gas mixture is $4:5$. The rate of number of their molecules in the mixture is:

A. $4:5$

B. $3:2$

C. $2:3$

D. $5:4$

Answer: B

Watch Video Solution

99. How many surcose molecules $\left(C_{12}H_{22}O_{11}\right)$ are present in $3.42g$ sucrose ? .

A. 6.0×10^{23}

B. 1.3×10^{23}

C. 3.8×10^{22}

D. 6.0×10^{21}

Answer: B

Watch Video Solution

100. If 1.50g of $H_2C_2O_4.2H_2O$ were heated to drive of the water of hydration, how much anhydrous $H_2C_2O_4$ would remain?

A. 0.34g

B. 0.92g

C. 1.07g

D. $1.50g$

Answer: C

View Text Solution

101. How many millimoles of methane, CH_4 are present in 6.4 g of this gas?

A. 0.4

B. 4

C. 40

D. 4.0×10^2

Answer: D

Watch Video Solution

102. Adipic acid, $HOOC\left(CH_2\right)_4COOH$, is used in making nylon. What is the total number of atoms in 1.0g of adipic acid?

Molar mass	$g.\,\text{mol}^{-1}$
Adipic acid	146.26

A. 20

B. 4.1×10^{21}

C. 8.2×10^{22}

D. 7.2×10^{24}

Answer: C

Watch Video Solution

103. How many moles are there in $2.24m^3$ of any gas 190 torr and $273\,^{\circ}C$?

A. 1.25 moles

B. 12.5 moles

C. 1.25×10^{-3} moles

D. 1.25×10^{3} moles

Answer: B

Watch Video Solution

104. How many ozone molecules are iin 3.20g of O_3?

A. 4.0×10^{22}

B. 6.0×10^{22}

C. 1.2×10^{23}

D. 6.0×10^{23}

Answer: A

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105. Number of neutrons in 5.5gm T_2O (T is $._1H^3$) are.

A. $0.25N_A$

B. $2.5N_A$

C. $3N_A$

D. $4 \times N_A$

Answer: C

Watch Video Solution

106. 80 gm of SO_x gas occupies 15 litre at 2atm and 300K. The value of x is : (Given: R= 0.08 L-atm/K-mole)

A. 3

B. 2

C. 1

D. none

Answer: B

Watch Video Solution

107. Mass ratio of NH_3 and $\left(CO_2\right.$ for maximum product formation as per reaction :

$2NH_3 + CO_2 \Rightarrow NHCOONH_4$

A. $\frac{17}{22}$

B. $\frac{17}{44}$

C. $\frac{22}{17}$

D. $\frac{44}{17}$

Answer: A

Watch Video Solution

108. How many moles of ptoton weigh 1 Kg?

A. 10^3

B. N_A

C. $\frac{1}{N_A} \times 10^3$

D. $\frac{10^8}{9.11 \times 6.022}$

Answer: A

Watch Video Solution

109. If mass % of oxygen in monovalent metal carbonate is 48%, then the number of atoms of metal present in 5mg of this metal carbonate sample is:

A. 3×10^{21}

B. 6×10^{19}

C. 30×10^{16}

D. 6.0×10^{18}

Answer: B

Watch Video Solution

110. How many water molecules are in a 0.10g sample of $CuSO_4.5H_2O(MM = 249.7)$?

A. 1.2×10^{21}

B. 2.4×10^{21}

C. 2.4×10^{22}

D. 1.2×10^{23}

Answer: A

Watch Video Solution

111. What is the mass of one molecule of water in grams?

A. 18

B. 1.1×10^{-21}

C. 3.0×10^{-23}

D. 1.7×10^{-24}

Answer: C

Watch Video Solution

112. A 1.0g sample of which substance contains the largest number of molecules?

A. HN_3

B. N_2H_4

C. H_2O_2

D. HCl

Answer: B

Watch Video Solution

113. The mass of a single molecule of an allotrope of sulphur is 3.20×10^{-22}g. How many sulphur atoms are present in a molecular of this allotrope?

A. 4

B. 6

C. 8

D. 12

Answer: B

Watch Video Solution

114. A 1.0 gram sample of which substance contains the largest number of molecules?

A. $COCl_2$

B. CS_2

C. CH_3Cl

D. $C_2H_2F_2$

Answer: C

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115. The mass of one atom of an element is 1.71×10^{-22}g. What is the atomic mass of this element in $g - mol^{-1}$?

A. 101

B. 103

C. 105

D. 107

Answer: B

Watch Video Solution

116. How do the number of molecules, n, in 1.0L of each of the following gases, CH_4, N_2, CO_2, compare at 1 atm and $25^{\circ}C$?

A. $n_{CH_4} < n_{CO_2} < n_{N_2}$

B. $n_{N_2} < n_{CO_2} < n_{CH_4}$

C. $n_{CO_2} < n_{CH_4} < n_{N_2}$

D. $n_{CH_4} = n_{CO_2} = n_{N_2}$

Answer: D

Watch Video Solution

117. How many neutrons are in 0.025 molof the isotope .$_{24}^{54}Cr$?

A. 1.5×10^{22}

B. 3.6×10^{23}

C. 4.5×10^{23}

D. 8.1×10^{23}

Answer: C

Watch Video Solution

118. A typical polyethylene bag froma grocery store weighs $12.4g$. How many molecules of ethylene, C_2H_4, must be polymerized to make such a bag?

A. 1.36×10^{24}

B. 6.02×10^{23}

C. 5.33×10^{23}

D. 2.67×10^{23}

Answer: D

Watch Video Solution

119. How many atoms are in 4.0×10^{-5} gams of Al?

A. 8.9×10^{17}

B. 2.4×10^{19}

C. 6.5×10^{20}

D. 2.0×10^{22}

Answer: A

Watch Video Solution

120. What massof the compound CrO_3 (M = 1000) contains 4.5×10^{23} oxygen atoms?

A. 2.25g

B. 12.0g

C. 25.0g

D. 75.0g

Answer: C

Watch Video Solution

121. A sample of a hydrate of barium chloride weighing 61g was heated until all the water of hydration is removed. The dried sample weighted 52g. The formular of the hydrated salt is: (Atomic mass, Ba = 137 amu, Cl = 35.5 amu)

A. $BaCl_2 . 2H_2O$

B. $BaCl_2 .4H_2O$

C. $BaCl_2 . H_2O$

D. $BaCl_2 .3H_2O$

Answer: A

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122. Vanillin, $C_8H_8O_3(m = 152g/mol)$, is the molecule responsible for the vanilla flavour in food. How many oxygen atoms are present in a $45.0mg$ sample of vanillin?

A. 1.78×10^{20}

B. 5.35×10^{20}

C. 1.78×10^{23}

D. 5.35×10^{23}

Answer: B

Watch Video Solution

123. Which of the following has maximum mass?

A. 0.1 g atom of C

B. 0.1 mole of NH_3

C. 6.02×10^{22} molecule of H_2 gas

D. 1120 ml of CO_2 at 1 atm, 273 K

Answer: D

Watch Video Solution

124. A metallocene derivates (molecular weight = 282) has approximately (100/3)% sulphur by mass. Number of S atoms in 2.82kg of metallocene derivative is:

[S=32], $\left[N_A = 6.022 \times 10^{23}\right]$

A. $10N_A$

B. $3N_A$

C. $30N_A$

D. $6.6N_A$

Answer: C

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Density

1. Density of azone relative to oxygen is under the same temperature & pressure :

A. 1

B. 3

C. 1.5

D. 2.5

Answer: B

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2. Vapour density of a gas if its density is $0.178g/L$ at 1atm, 273K is

A. 0.178

B. 2

C. 4

D. 0.089

Answer: B

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3. A nuggest of gold and quartz was found to contain x g of gold y g of quartz and has density d. If the densities of gold and quartz are d_1 and d_2 respectively, then the correct relations is:

A. $\frac{x}{d_1} + \frac{y}{d_2} = \frac{x+y}{d}$

B. $xd_1 + yd_2 = (x+y)d$

C. $\frac{x}{d_2} + \frac{y}{d_1} = \frac{x+y}{d}$

D. $\frac{x+y}{d} + \frac{x}{d_1} + \frac{x}{d_2} = 0$

Answer: A

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4. The vapour density of a gas A is twice that of a gas B. If the molecular weight of B is M, the molecular weight of A will be:

A. M

B. 2M

C. 3M

D. $\frac{M}{2}$

Answer: B

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5. The relative density of a gas A with respect to another gas B is 2. The vapour density of the gas B is 20, the vapour density of the gas A is:

A. 30

B. 40

C. 50

D. 60

Answer: B

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6. The density of air is $0.001293 g / ml$ at S.T.P. Its vapour density will be:

A. 10

B. 15

C. 1.468

D. 14.68

Answer: D

Watch Video Solution

7. Ethanol is the substance commonly called alcohol. The denisty of liquid alcohol is $0.8 gm / ml$ at 293 K. if 1.2 mole of ethanol are needed for a particular experiment, what volume of ethanol should be measured out?

A. 55.2 ml

B. 57.5 ml

C. 69ml

D. 47.9ml

Answer: C

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8. Which of the following options represent correct composition of a gaseous mixture containing $CH_4(g)$ and $N_2O_5(g)$ and having vapour denisty equal to 19.5?

A. Mass % of $CH_4 = 25\,\%$

B. Mole % of CH_4= 25%

C. Mass % of CH_4= 75%

D. Mole % of CH_4 = 75%

Answer: D

Watch Video Solution

9. The density of water at $4\,^{\circ}C$ is $1.0 \times 10^3 kgm^{-3}$. The volume occupied by one molecule of water is approximately $\left(N_A = 6.0 \times 10^{23}\right)$:

A. 3.0×10^{-23}ml

B. 6.0×10^{-23} mL

C. 4.0×10^{-23} mL

D. 9.0×10^{-23} mL

Answer: A

Watch Video Solution

10. A sample of impure air contains 80% N_2, 10% O_2 5% CO_2 and 5% Ar by volume. The average (At wt. of Ar = 40)

A. 29.4

B. 29.8

C. 30

D. 29.6

Answer: B

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11. One mole of a mixture of N_2, NO_2 and N_2O_4, has a mean molar mass of 55.4. On heating to a temperature at which N_2O_4 may be dissociated : $N_2O_4 \rightarrow 2NO_2$, the mean molar mass tends to the lower value of 39.6. What is the mole ratio of $N_2 : NO_2 : N_2O_4$ in the original mixture?

A. $0.5 : 0.1 : 0.4$

B. $0.6 : 0.1 : 0.3$

C. $0.5 : 0.2 : 0.3$

D. $0.6 : 0.2 : 0.2$

Answer: A

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Watch Video Solution

12. Find vapour density of mixture having 64% by mass of CH_4, 32% by mass of O_2 and remaining H_2

A. 3.57

B. 0.07

C. 0.14

D. 7.14

Answer: D

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13. The percentage by mole of $NO_2(g)$ and NO(g) having average molecular mass 34 is :

A. 0.25

B. 0.2

C. 0.4

D. 0.75

Answer: A

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14. 113.5 mL of NO_2 at STP was liquefied, the density of the liquid being 1.15g mL^{-1}. Calculate the volume of NO_2 and the number of molecules in the liquid NO_2. (At wt. N =14)

A. 0.10 mL and 3.01×10^{22}

B. 0.20 mL and 3.01×10^{21}

C. 0.20 mL and 3.01×10^{23}

D. 0.40 mL and 6.02×10^{21}

Answer: B

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15. 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. 55.85

B. 55.95

C. 55.75

D. 56.05

Answer: B

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16. The density of liquid (mol.wt. $= 70$) is $1.2gmL^{-1}$. If $2mL$ of liquid contains 35 drops, the number of molecules of liquid in one drop are:

A. $\frac{1.2}{(35)^2} \times N_A$

B. $\frac{1}{35} \times N_A$

C. $\frac{1.2}{35} \times N_A$

D. $1.2N_A$

Answer: C

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17. The density of a pure liquid (molecular mass = 80) is $1.5 gm/ml$. If 4 ml of liquiid contains 60 drops. Then the numberof molecules per drop of liquid is given by : [Given : $N_A = 6 \times 10^{23}$]

A. 7.5×10^{20}

B. 1.33×10^{21}

C. 4×10^{23}

D. 2×10^{22}

Answer: A

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18. The density of nitrogen gas is maximum at:

A. STP

B. 273 K and 1 atm

C. 546 K and 2 atm

D. 546 K and 4 atm

Answer: D

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19. A gas has a density of $1.25gL^{-1}$ at 1 atm and 273 K. Identify it:

A. NO_2

B. O_2

C. N_2

D. SO_2

Answer: C

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20. 11.35L of a gas at STP weighs 14g. The gas could be :

A. N_2O

B. N_2

C. CO

D. Both (b) and (C)

Answer: D

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21. What is the molar mass of a gas that has a density of $5.66 gL^{-1}$ at $35^{\circ} C$ and 745mm Hg?

A. 127

B. 141

C. 143

D. 146

Answer: D

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22. If molecular weight of glucose-1-phosphate is 260 and its density is $1.5 g / ml$. What is the average volume occupied by 1 molecule of this compound?

A. $43 \times 10^{-23} ml$

B. $0.67 ml$

C. $0.17 \times 10^{23} ml$

D. $29 \times 10^{-23} ml$

Answer: D

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23. A mixture weight of glucose-1-phosphate is 260 and its density is $1.5 g/ml$. What is the average volume occupied by 1 molecular of this compound?

A. 24

B. 20

C. 26

D. 40

Answer: A

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24. A container of gas X (mol.wt. 16) and gas Y (mol. Wt. 28) in the mole ratio a:b has a mean molecular weight 20. What would be mean molecular weight if the gases are mixed in the ratio b:a under identical conditions (gases are non reacting)?

A. 0.25 dm^3

B. 0.5 dm^3

C. 1 dm^3

D. 2 dm^3

Answer: D

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25. The relative density of a mixture of $CO_2(g)$ and $H_2O(g)$ w.r.t. gaseous hydrogen atoms is 30. The mol% of the CO_2 is

A. $\frac{600}{13}$

B. $\frac{2400}{13}$

C. $\frac{2000}{13}$

D. none of these

Answer: A

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26. Vapour density of a metal chloride is 6.6. Its oxide contains 53% metal. The atomic weight of metal is:

A. 21

B. 54

C. 27

D. 37

Answer: C

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27. Calculate percentage change in M_{avg} of the mixture, if PCl_5 undergo 50% decomposition.

$PCl_5 \Rightarrow PCl_3 + Cl_2$

A. 0.5

B. 0.6666

C. 0.3333

D. zero

Answer: C

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28. What is the density of propane, C_3H_8, at $25^\circ C$ and 740 mmHg?

A. $0.509gL^{-1}$

B. $0.570gL^{-1}$

C. $1.75gL^{-1}$

D. $1.96gL^{-1}$

Answer: C

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29. Five pellets of a metal have a total mass of 1.25g and a total volume of 0.278mL. What is the density of the metal in g mL^{-1}?

A. 0.348

B. 0.9

C. 4.5

D. 22.5

Answer: C

Watch Video Solution

30. What volume of liquid A has the same mass as $80.0 cm^3$ of liquid B?

	Density g/cm^3
Liquid A	0.660
Liquid B	1.59

A. $40.0 cm^3$

B. $160 cm^3$

C. $97.0 cm^3$

D. $11.7 gcm^{-3}$

Answer: D

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31. Naturally occuring thallium consists of two stable isotopes, Tl-203 and Tl-205 (atomic masses = 203.0 and 205.0, respectively) and has an average atomic massof 204.4. What is the percentage of Tl-205?

A. 0.14

B. 0.7

C. 0.5

D. 0.647

Answer: D

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32. When a 25.00 mL volumetric flask weighing 20.340 g is filled partially with metal shot, the mas is 119.691g. The flask is then filled to the 25.00 mL mark with methanol $\left(d = 0.791 gcm^{-3}\right)$ and has a total mass of $130.410g$. What is the density of the metal?

A. $6.96 gcm^{-3}$

B. $8.68 gcm^{-3}$

C. $9.27 gcm^{-3}$

D. $11.7 gcm^{-3}$

Answer: B

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33. The density of vapours of a particualr volatile diatomic species A_2 was found to be 10 milligram/ml at 1 atm and 273 K. Its atomic weight is given by : [Assume ideal gas behaviour]

A. 20

B. 112

C. 224

D. 56

Answer: B

Watch Video Solution

34. A gas has a density of $2.68gL^{-1}$ at 1 atm and 273 K. Identify it:

A. NO_2

B. Kr

C. COS

D. SO_2

Answer: C

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35. A regular cube of metal measures exactly 10cm on an edge and has density $8\frac{g}{c}c$. If the cube contains 6×10^{25} atoms of the metal, determine atomic weight of metal? (Take $N_A = 6 \times 10^{23}$)

A. 40

B. 60

C. 80

D. 100

Answer: C

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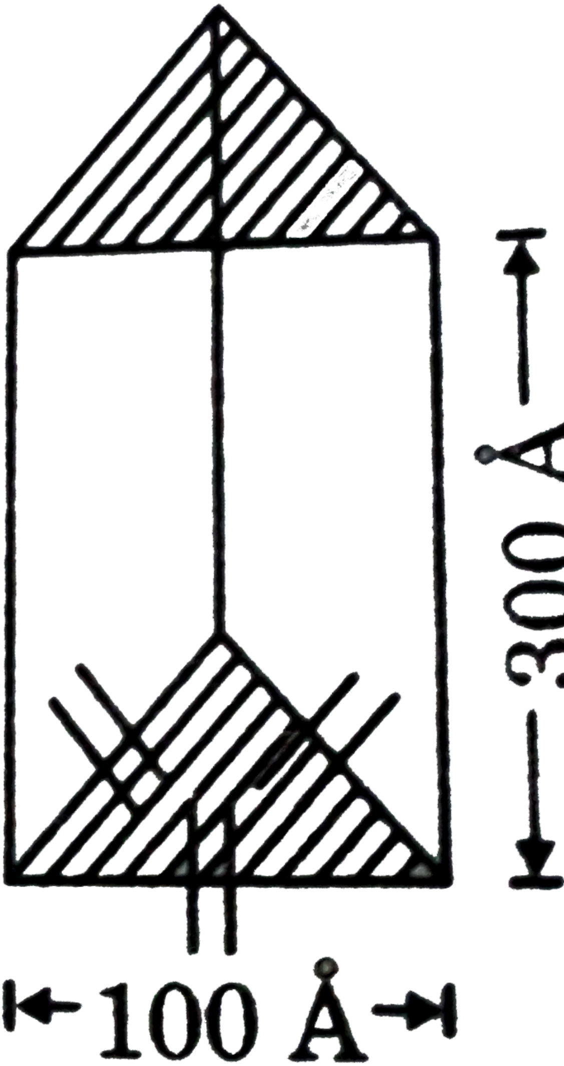
36. A crystalline polymer molecule is uniform prismatic in shape with dimension as shown. If density of the polymer is $1.2\frac{g}{c}m^3$. Find its molar



mass.

A. 939×10^3

B. 939×10^{-3}

C. 632×10^3

D. Insufficient data

Answer: A

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Stoichiometry

1. 0.5 mole of H_2SO_4 is mixed with 0.2 mole of $Ca(OH)_2$. The maximum number of mole of $CaSO_4$ formed is:

A. 0.2

B. 0.5

C. 0.4

D. 1.5

Answer: A

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2. 100g of impure $CaCO_3$ on heating gives 5.675 it. CO_2 gas at STP. Find the percentage of calcium in the lime stone sample. [At. Wt, Ca=40, C=12, O=16]

A. 10

B. 20

C. 1

D. 30

Answer: A

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3. 84 gm of iron (Fe) is required with sufficient amount of steam of produce 45.4 L, H_2 gas at S.T.P. according the following reaction, $aFe + bH_2O \Rightarrow cFe_3O_4 + dH_2$.The stoichimetric coefficients of the reaction is (At. Wt., Fe = 56, O=16, H=1):

A. 4,3,1,4

B. 3,4,1,4

C. 1,4,2,3

D. none of these

Answer: B

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4. The number of moles of C and D produced on mixing 5 moles of A and 7 moles of B are respectively:

$(3A + 5B \Rightarrow 7C + 9D)$

A. 9 moles and 11 moles

B. 11.66 moles and 15 moles

C. 9.8 moles and 12.6 moles

D. 1 mole and 13 moles

Answer: C

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5. when a mixture of aluminium powder and iron (III) oxide is ignited, it produces molten iron and aluminium oxide. In an experiment, 5.4gm of aluminium was mixed with 18.5 gm of iron oxide. At the end of the reaction, the mixture contained 11.2 gm of iron, 10.2 gm of aluminium oxide and an undetermined amount of unreacted iron (III) oxide. No aluminium was left. What is the mass of the iron (III) oxide left?

A. 2.5 gm

B. 7.3gm

C. 8.3gm

D. 2.9gm

Answer: A

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6. Each moleof substance A (molar mass = 720) requires 10moles of water for complete hydrolysis and gives B,C and D as the hydrolysed products in a molar ratio of $2:3:2$. If molecular mass of B is 40 and it contributes 40° of total mass of hydrolysed product then moles pof C obtained will be

A. 9

B. 13.5

C. 3

D. 2

Answer: B

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7. How many moles of Zn $\left(FeS^{2}\right)$ can be made from a mole zinc, 3 mole iron and 5 mole sulphur?

A. 2 mole

B. 3 mole

C. 4 mole

D. 5 mole

Answer: A

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8. Equal weights of X (At. Wt. = 36) and Y(At. Wt. = 24) are reacted to form the compound X_2Y_3. Then:

A. X is the limiting reagent

B. Y is the limiting reagent

C. no reactant is left over and mass of X_2Y_3 formed is double the mass of X taken:

D. none of the above

Answer: C

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9. 28gm lithium is fixed with 48gm O_2 to react according to the following reaction

$Li + O_2 \Rightarrow Li_2O$

The mass of Li_2O formed is:

A. 30gm

B. 15gm

C. 45gm

D. 95gm

Answer: D

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10. The mass of 70% H_2SO_4 required for neutralization of one mole of NaOH is:

A. 70g

B. 35g

C. 30g

D. 95gm

Answer: A

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11. The number of moles of oxygen obtained by the electrolytic decomposition of 90g water is :

A. 2.5

B. 5

C. 7.5

D. 10

Answer: A

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12. To prepare a solution of concentration of 0.03 g/ml. of $AgNO_3$. What amount of $AgNO_3$ should be added in 60mL of solution?

A. 1.8g

B. 0.8g

C. 0.18g

D. None of these

Answer: A

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13. 20gm of $CaCO_3$ on decomposition gives CO_2 at STP:

A. 4.48 litre

B. 22.4 litre

C. 2.24 litre

D. 4.54 litre

Answer: D

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14. The odour of skunk is caused by chemical compounds called thiols $\left(C_4H_{10}S\right)$. These can be deodorized by reaction with household bleach (NaOCl) according to following unbalanced reaction:

$C_4H_{10}S + NaOCl(aq) \Rightarrow C_8H_{18}S_2 + NaCl(aq) + H_2O(aq)$

How many gram of thiol can be deodorized by 74.5 gm of NaOCl?

A. 90gm

B. 45gm

C. 180gm

D. 22.5gm

Answer: C

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15. What will be the percentage loss in mass when $NaHCO_3$ is heated at $300^{\circ}C$?

A. 0.6

B. 0.455

C. 0.369

D. 0.7

Answer: C

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16. Tungsten metal , W is used to make incandescent bulb filaments. The metal is produced from WO_3 by reaction with hydrogen. [Atomic mass W = 184]

$WO_3 + 3H_2 \Rightarrow W(s) + 3H_2O(g)$

Calcualte mass of WO_3 required to produce 368 gm of W.

A. 928gm

B. 464gm

C. 232gm

D. 116gm

Answer: B

Watch Video Solution

17. A typical polyethylene grocery bag weighs 12.4g. How many metric tons of CO_2 would be released into the atmosphere if the 102 billion bags used in one year in Kota were bured ?

[1 metric ton = 1000Kg]

A. 4.52×10^4

B. $1.99x10^6$

C. 3.98×10^6

D. 3.98×10^9

Answer: C

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18. 20 gmof a mixture of NaCl and NaOH exactly requires 7.3gm HCL for complete reaction. The mass percent of NaCl in the original mixture is:

A. 0.4

B. 0.6

C. 0.5

D. 0.8

Answer: B

Watch Video Solution

19. Three substances A,B and C can react to form D and E as shown :

$2A + 3B + C \Rightarrow 4D + 2E$

If molar masses of A,B, C and D are 40,30,20 and 15 respectively and 285 gm of mixture of A, B and C is reacted then maximum mass of E which can be obtained will be:

A. 285 gm

B. 200gm

C. 195gm

D. 100gm

Answer: C

Watch Video Solution

20. One mole of potassium chlorate ($KClO_3$) is thernally decomposed and excess of aluminum is aluminium oxide (Al_2O_3) are formed?

A. 1

B. 1.5

C. 2

D. 3

Answer: A

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21. How many moles of potassium chlorate need to be heated to produce 11.35 litre oxygen at STP?

A. 1/2 mol

B. 1/3 mol

C. 1/4 mol

D. 2/3 mol

Answer: B

Watch Video Solution

22. When x gm carbon is burnt with y gm oxygen in a closed vessel, no residue is left behind. Which of the following statement is correct regarding the relative amounts of oxygen and carbon?

A. $\frac{y}{x}$ must lie between 1.33 and 2.67

B. $\frac{y}{x}$ must be greater than or equal to 2.67

C. y/x must be less than or equal to 1.33

D. y/x must be greater than or equal to 1.33

Answer: D

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23. If $1\frac{1}{2}$ moles of oxygen combine with Al to form Al_2O_3 the weight of Al used in the reaction is (Al=27)

A. 27g

B. 54g

C. 40.5g

D. 81g

Answer: B

Watch Video Solution

24. Consider the following statements:

(1) If all the reactants are not taken in their stoichiometric ratio, then at least one reactant will be left behind.

2 moles of $H_2(g)$ and 3 moles of $O_2(g)$ produce 2 moles of water.

(3) Equal wt. of carbon and oxygen are taken to produce CO_2 then O_2 is

limiting reagent. (Assume 100% yield in all cases)

The above statements (1), (2), (3) respectively are (T = True, F=False):

A. TTT

B. FTF

C. FFF

D. TFT

Answer: A

Watch Video Solution

25. In the reaction $4A + 2B + 3C \Rightarrow A_4B_2C_3$ what will be the number of moles of product formed ? Starting from 2 moles of A, 1.2 moles of B and 1.44 moles of C.

A. 0.5

B. 0.6

C. 0.48

D. 4.64

Answer: C

Watch Video Solution

26. 3 gm mixture of SiO_2 and Fe_2O_3 on very strong heating leaves a residue weighing 2.92gm because of conversion of Fe_3O_4 liberating oxygen gas. What is the percentage by mass of SiO_2 in original mixture?

A. 0.2

B. 0.8

C. 0.4

D. 0.6

Answer: A

Watch Video Solution

27. A 1.50gm samples of type metal (an alloy of S_n, Pb, Cu and Sb) is dissolved in nitric acid and metastannic acid, H_2SnO_3 precipitate. This is dehydrated by heating to Tin(IV) oxide, which is found to weigh 0.50gm. What percentage of tin was in the original type metal sample? (Sn= 119)

A. 0.3333

B. 0.2627

C. 0.2938

D. 0.5254

Answer: B

View Text Solution

28. What mass of solid ammonium carbonate

$H_2NCOONH_4(s) \Rightarrow CO_2(g) + 2NH_3(g)$

A. 15.6gm

B. 5.2gm

C. 46.8gm

D. 7.8gm

Answer: B

Watch Video Solution

29. 40 gm of a carbonate of an alkali metal or alkaline earth metal containg some insert impurities was made to react with excess HCl solution. The liberated CO_2 occupied 12.315 litre at 1 atm and 300K. The corrrect option is:

A. Mass of impurity of 1gm and metal is Be

B. Mass of impurity is 3gm and metal is Li

C. Mass of impurity is 6gm and metal is Li

D. Mass of impurity is 2gm and metal is Mg

Answer: B

View Text Solution

30. Identify in which of the following case can the average molecular mass of the mixture be 150 at same instant in a reaction

A. $N_2(g) + 3H_2(g) \Rightarrow 2NH_3(g)$

B. $PCl_3(g) + Cl_2(g) \Rightarrow PCl_5(g)$

C. $H_2(g) + \frac{1}{2}O_2(g) \Rightarrow H_2O(g)$

D. $H_2(g) + Cl_2(g) \Rightarrow 2HCl(g)$

Answer: B

Watch Video Solution

31. Calcualte the mass % of Na_2CO_3 in a mixture having mass 206 gm which produces 24 litre of CO_2 at 1 atm pressure and 300K with excess of HCL. [R = 0.08 atm lit/mol K]

A. 0.485

B. 0.515

C. 0.4

D. 0.6

Answer: B

Watch Video Solution

32. Two elements A and B combine to form compound X and Y. For the fix mass of A, masses of B contained for the compounds X and Y are in 3:7 ratio. If in compound X, 4gm of A combines with 12gm B, then in compound Y, 8gm of A will combine with... gm of B.

A. 24

B. 56

C. 28

D. 8

Answer: B

Watch Video Solution

33. 1.0 mole of Fe reacts completely with 0.65 mole of O_2 to give a mixture of only FeO and Fe_2O_3 the mole ratio of ferrous oxide to ferric oxide is

A. $3:2$

B. $4:3$

C. $20:13$

D. none of these

Answer: B

Watch Video Solution

34. The molar ration of Fe^{++} to Fe^{+++} in a mixture of $FeSO_4$ and $Fe_2(SO_4)_3$ having equal number of sulphate ions in both ferrous and ferric sulphate is:

A. $1:2$

B. $3:2$

C. $2:3$

D. 25.67

Answer: B

Watch Video Solution

35. If a piece of iron gains 10% of its weight due to partial rusting into Fe_2O_3 the percentage of total iron that has rusted is:

A. 23

B. 13

C. 23.3

D. 25.67

Answer: C

Watch Video Solution

36. If $1g$ of HCl and $1g$ of MnO_2 heated together the maximum weight of Cl_2 gas evolved will be :

$\left[MnO_2 + 4HCl \rightarrow MnCl_2 + Cl_2 + 2H_2O\right]$:

A. 2 gm

B. 0.975gm

C. 0.486gm

D. 0.972gm

Answer: C

Watch Video Solution

37. 12g of alkaline earth metal gives $14.8g$ of nitiride. Atomic weight of metal is

A. 12

B. 20

C. 40

D. 14.8

Answer: C

View Text Solution

38. A metal oxide has the formular M_2O_3. It can be reduced by hydrogen to give free metal and water 0.1596g of the metal oxide required 6 mg hydrogen for complete reduction. The atomic weight of the metal is:

A. 27.9

B. 159.6

C. 0.486gm

D. 55.80gm

Answer: D

Watch Video Solution

39. Mass of Cl_2 produced by the complete reaction 230 gm As_2O_5 with 182.5 gm HCl according reaction is : [As = 75]

A. 71gm

B. 142gm

C. 177.5gm

D. 35.5gm

Answer: A

Watch Video Solution

40. If 10 g of Ag reacts with 1 g of sulphur, the amount of Ag_2S formed will be [Atomic weight of Ag=108, S=32]?

A. 7.75g

B. 0.755g

C. 11g

D. 10g

Answer: A

Watch Video Solution

41. A 10.0 g sample of a mixture of $CaCl_2$ and $NaCl$ is treated to precipitate all the calcium as calcium carbonate. Thus $CaCO_3$ is heated to convert all the Ca to CaO and the final mass of CaO is 1.62 g. What is the percentage by mass of $CaCl_2$ in the original mixture?

A. 0.152

B. 0.321

C. 0.218

D. 0.1107

Answer: B

Watch Video Solution

42. According to following reaction:

$A + BO_3 \Rightarrow A_3O_4 + B_2O_3$

The number of moles of moles of A_3O_4 produced if 1 mole of A is missed with mole of BO_3 is:

A. 3

B. 1

C. $\frac{1}{3}$

D. $\frac{2}{3}$

Answer: C

Watch Video Solution

43. Calculate the amount of Ni needed in the Mond's process given below

$Ni + 4CO \rightarrow Ni(CO)_4$

If CO used in this process is obtained through a process, in which 6 g of carbon is mixed with 4 gCO_2.

A. 14.675g

B. 29.5g

C. 58.7g

D. 28g

Answer: A

Watch Video Solution

44. For the reaction 2P + Q rArr R, 8 mol of p and 5 mol of Q will produce:

A. 8 mol of R

B. 5 mol of R

C. 4 mol of R

D. 13 mol of R

Answer: C

Watch Video Solution

45. What volume of hydrogen gas at 273K and 1 atm pressure will be consumed in obtaining 21.6g of elemential boron (Atomic mass = 10.8) from the reduction of boron trichloride by hydrogen?

A. 44.8L

B. 22.4L

C. 89.6L

D. 67.2L

Answer: D

Watch Video Solution

46. Temporary hardness is due to bicarbonates of Mg^{2+} and Ca^{2+}. It is removed by addition of CaO as follows:

$$Ca\left(HCO_3\right)_2 + Cao \Rightarrow 2CaCO_3 + H_2O$$

Mass of CaO required to precipitate 2g $CaCO_3$ is:

A. 2g

B. 0.56g

C. 0.28g

D. 1.12g

Answer: B

Watch Video Solution

47. When a 2.00 gm sample of rock containing lime stone was dissolved in acid 0.44 gm of CO_2 was generated. If the rock contains no carbonates other than $CaCo_3$, What was the percent of $CaCO_3$ by mass in the limestone?

A. 0.5

B. 0.64

C. 0.86

D. 0.92

Answer: A

Watch Video Solution

48. Consider the following reaction

$A + 2B \Rightarrow C + D$

If $\dfrac{W_A}{W_B}$ = 0.5, which condition will make B a limiting reagent and A to be present in excess?

A. $\left(\frac{M_B}{M_A}\right) < 1$

B. $\frac{M_B}{M_A} > 1$

C. $\left(\frac{M_B}{M_A}\right) = 1$

D. B will always be limiting reagent

Answer: B

View Text Solution

49. 5 moles of VO and 6 moles of Fe_2O_3 are allowed to react completely according to reaction

$VO + Fe_2O_3 \Rightarrow FeO + V_2O_5$

The number of moles of V_2O_5 formed is:

A. 6

B. 2

C. 3

D. 5

Answer: B

Watch Video Solution

50. 5.33 mg of salt $\left[Cr\left(H_2O\right)_5Cl\right].Cl_2\ H_2O$ is treated with excess of $AgNO_3(aq)$ then mass of AgCl ppt. obtained will be :

[Given :Cr=52, Cl = 35.5]

A. 5.74gm

B. 2.87gm

C. 4.3gm

D. 8.61gm

Answer: A

Watch Video Solution

51. For the reaction :

$7A + 13B + 15C \Rightarrow 17P$

If 15 moles of A, 26 moles of B and 30.5 moles of C are taken initially, then limiting reactant is:

A. A

B. B

C. C

D. none of these

Answer: B

Watch Video Solution

52. 12 moles of each A and B are allowed to react as given : $3A + 2B \Rightarrow C + \frac{1}{2}D$. If 60g of D is produced then calculate the atomic mass of D.

A. 30

B. 45

C. 60

D. 15

Answer: A

Watch Video Solution

53. According to the following reaction the minimum quantity in gm of H_2S needed to precipitate 63.5gm of Cu^{2+} ions will be nearly:

$$Cu^{2+} + H_2S \Rightarrow CuS + 2H^+$$

A. 63.5gm

B. 31.75gm

C. 34gm

D. 1.24gm

Answer: C

Watch Video Solution

54. What mass of HNO_3 is needed to convert 5 gm of iodine into iodic acid according to the reaction?

$I_2 + HNO_3 \Rightarrow HIO_3 + NO_2 + H_2O$

A. 12.4gm

B. 24.8gm

C. 0.248gm

D. 1.24gm

Answer: A

Watch Video Solution

55. 0.6 mol of barium chloride in solution is mixed with 0.2 mol of sodium phosphate, the amount of barium phosphate produced is:

A. 0.1mol

B. 0.3mol

C. 0.4mol

D. 0.5mol

Answer: A

Watch Video Solution

56. Large quantities of ammonia are burned in the presence of a platinum catalyst to give nitric oxide, as the first step in the preparation of nitric acid, $NH_3(g) + O_2(g) \Rightarrow NO_g + H_2O(g)$ (unbalanced).

Suppose a vessel contains 0.12mole of NH_3 and 0.14 mol O_2. How many moles of NO may be obtained?

A. 0.12

B. 0.112

C. 0.14

D. 0.07

Answer: B

Watch Video Solution

57. 1.0×10^{-3} mol of Ag^{+} and 1.0×10^{-3} mol of CrO_4^{2-} react together to form solid Ag_2CrO_4. What is the amount of $Ag_2CrO_4 = 332)$

A. 0.268gm

B. 0.166gm

C. 0.212gm

D. 1.66gm

Answer: B

Watch Video Solution

58. 280 gm of ethylene polymerises to polyethylene according to the equation.

$$n\left(CH_2 = CH_2 \Rightarrow \left(CH_2 - CH_2\right)_n - \right.$$

The weight and mole of polyethylene formed will be:

A. 280, 10n

B. $\left(\frac{280}{n}\right)$, n

C. $\frac{280}{n}$, 280

D. 280, $\left(\frac{10}{n}\right)$

Answer: D

Watch Video Solution

59. A sample containing $CaBr_2$ and NaI in the mass ratio $\frac{2}{9}$ was dissolved in water and treated with sufficient amount of aq. $AgNO_3$ solution to form a mixed precipitate of AgI and AgBr. The weight of mixed precipitate was found to be 1786gm.

[Na= 23, Br=80, I=127, Ca=40]

Select the correct option.

A. Moles of $CaBr_2$ and NaI in the original sample was 1 and 6 respectively

B. Mass of original sample was 900cm

C. Mass of $CaBr_2$ in the original sample was 400 gm

D. Number of moles of AgBr produced is 1

Answer: A

Watch Video Solution

60. A metal carbonate decomposes according to following reaction

$M_2CO_3(s) \Rightarrow M_2O_s + CO_2(g)$

Percentage loss in mass on complete decomposition of $M_2CO_3(s)$ (Atomic mass of M = 102) is:

A. $\left(\frac{100}{3}\right)\%$

B. $\left(\frac{50}{3}\right)\%$

C. `(25/3)%

D. 0.15

Answer: B

Watch Video Solution

61. 0.4 g of polybasic acid HnA (all the hydrogens are acidic) requries 0.5 g of NaOH for complete neutralisation. The number of replaceable hydrogen atoms and the molecular weight of A would be (Mw of $acid = 96$)

A. 1

B. 2

C. 3

D. 4

Answer: C

Watch Video Solution

62. A mixture contains 40% Cr and 60% Zn by mass. Find the volume of $\left(H_2(ml)\right)$ at 760mm Hg at $31^\circ C$ which will be produced from 1gm of mixture and sufficient amount of HCl solution (Cr is in `+3 oxidation state in salt). [Cr=52, Zn=65]

A. 500ml

B. 416ml

C. 552ml

D. 620ml

Answer: A

Watch Video Solution

63. A mineral consists of an equimolar mixture of the carbonates of two bivalent metals. One metal is present to the extent of 12.5% by weight. 2.8gm of the mineral on heating lost 1.32gm of CO_2. What is the % by weight of the other metal?

A. 87.5

B. 23.21

C. 65.11

D. 40.35

Answer: B

View Text Solution

64. A 0.6gm sample consisting of only CaC_2O_4 and MgC_2O_4 is heated at $500\,^{\circ}C$gets converted into $CaCO_3$ and $MgCO_3$. The sample then weighed 0.465gm. If the sample had been heated to $900\,^{\circ}C$ where the products are CaO and MgO, then what would the mixture of oxides weigh?

A. 0.12gm

B. 0.21gm

C. 0.252gm

D. 0.3gm

Answer: C

Watch Video Solution

65. Chlorine can be prepared by reacting HCl with MnO_2. The reaction is represented by this equation.

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

Assuming the reaction goes to completion what mass of concentrated HCL solution (36.0% HCl by

A. 5.15g

B. 14.3g

C. 19.4g

D. 26.4g

Answer: B

Watch Video Solution

66. The amount of chloride ion in a water sample is to be determined by adding excess silver nitrate. If 1.0g of silver chloride is precipitated, What mass of chloride ion is in the original sample?

Molar Mass	$gmol^{-1}$
$AgNO_3$	169.91
$AgCl$	143.25

A. 0.25g

B. 0.34g

C. 0.50g

D. 0.75g

Answer: A

Watch Video Solution

67. According to the equation

$SnO_2 + 2H_2 \Rightarrow Sn + 2H_2O$

What volume of hydrogen, measured at 1 atm and 273K, is required to react with 2.00g of SnO_2? [sn = 50]

A. 0.00135L

B. 0.00265 L

C. 0.595 L

D. 1.093 L

Answer: D

Watch Video Solution

68. $4KO_2(s) + 2CO_2(g) \Rightarrow 2K_2CO_3(s) + 3O_2(g)$

What is the maximum volume of oxygen that canbe produced when 150 mL of CO_2 is passed over 0.500g of KO_2? Assume all gases are measured at $0\,^{\circ}C$ and 1atm

A. 118mL

B. 157 mL

C. 225 mL

D. 475 mL

Answer: A

Watch Video Solution

69. Silicon carbide, SiC,is produced by heating SiO_2 and C to high temperature according to the equation:

$SiO_2(g) + 3C(s) \Rightarrow SiC(s) + 2CO(g)$

How many grams of SiC could be formed by reacting 2.00g of SiO_2 and 2.00g of C? [Si=28]

A. 1.33

B. 2.26

C. 3.59

D. 4

Answer: A

Watch Video Solution

70. A 7.66 g sample of hydrated sodium sulphate, $Na_2SO_4 . xH_2O$, forms 4.06g of anhydrous Na_2SO_4. What is the value of x?

Molar mass	$\left(gmol^{-1}\right)$
Na_2SO_4	142

A. 0.2

B. 3.6

C. 5

D. 7

Answer: D

Watch Video Solution

71. Consider the following reaction

$N_2 + 3H_2 \Rightarrow 2NH_3$

Which condition will make H_2 a limiting reagent under all cases (where W is weight of substance)?

A. $\dfrac{W_{N_2}}{W_{H_2}} < \dfrac{14}{3}$

B. $\dfrac{W_{N_2}}{W_{H_3}} > \dfrac{14}{3}$

C. $\dfrac{W_{N_2}}{W_{H_2}} = 1$

D. N_2 will always be present as limiting reagent

Answer: B

Watch Video Solution

72. $Mg(OH)_2$ in the form of Milk of Magnesia is used to neutralize excess stomach acid. How many moles of stomach acid can be neutralized by 1.00g of $Mg(OH)_2$?

$$\begin{array}{ll} \text{Molar Mass} & g/mol \\ \left(mg(OH)_2\right) & 58.33 \end{array}$$

A. 0.0171

B. 0.0343

C. 0.686

D. 1.25

Answer: B

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73. A 1.871 gram sample of an unkown metallic carbonate is decomposed by heating to form the metalling oxide and 0.656g of carbon dioxide according to the equation

$MCO_3(s) \Rightarrow MO(s) + CO_2(g)$

What is the metal?

A. Ca

B. Mn

C. Ni

D. Zn

Answer: D

Watch Video Solution

74. A mineral containing iron(II) sulphide but no other sulphides is treated with excess hydrochloride acid to produce hydrogen sulphide. . If a 3.15g sample of the mineral yields 448 mL of hydrogen sulphide gas (measured at $0^{\circ} C$ and 760 mm Hg), what is the mass percentage of iron (II) sulphide inthe sample?

A. 20.4

B. 35.5

C. 55.8

D. 71

Answer: C

Watch Video Solution

75. What is the maximum mass of (in grams) of NO that could be obtained from 15.5g of N_2O and 4.68g of N_2H_4 when they react? The balanced chemical equation is:

$2N_2O_4 + N_2H_4 \Rightarrow 6NO + 2H_2O$

Molar mass	$\left(gmol^{-1}\right)$
N_2O_4	92.0
N_2H_4	32.0

A. 4.38

B. 5.04

C. 15.2

D. 26.2

Answer: C

Watch Video Solution

76. Iodine adds to the double bonds in fatty acids(one iodine molecule per double bond). How many double bonds are in a molecule of arachidonic acid (Molar mass = `304.5g/mol) if 0.125 g of the acid require 0.417 of iodine?

A. 2

B. 3

C. 4

D. 8

Answer: C

Watch Video Solution

77. According to the equation

$N_2O_3(g) + 6H_2(g) \Rightarrow 2NH_3(g) + 3H_2O(g)$

how many moles of $NH_3(g)$ could be formed from the reaction of 0.22 mol of N_2O_3(g) with 0.87 mol of $H_2(g)$?

A. 0.29mol

B. 0.44mol

C. 0.73mol

D. 1.1mol

Answer: A

Watch Video Solution

78. How many moles of oxygen gas are produced by the decomposition of 245g of potassium chlorate?

Molar mass	(g/mol)
$KClO_3$	122.6

$2KClO_3(s) \Rightarrow 2KCl(s) + 3O_2(g)$

A. 1.5

B. 2

C. 2.5

D. 3

Answer: D

Watch Video Solution

79. what is the maximum mass of $Ba_3\left(PO_4 - (2)\right.$ that can be formed from 0.00240 mol of $Ba\left(NO_3\right)_2$ and 0.131 g of Na_3PO_4?

A. 0.240g

B. 0.480g

C. 1.44g

D. 7.22g

Answer: A

Watch Video Solution

80. Enzymes convert glucose (M = 180.2) to ethanol (M= 46.1) according to the equation

$C_6H_{12}O_6 \Rightarrow 2C_2H_5OH + 2CO_2$

What is the maximum mass of ethanol that can be made from 15.5kg of glucose?

A. 0.256kg

B. 0.512kg

C. 3.96kg

D. 7.93gk

Answer: D

Watch Video Solution

81. A reaction mixture is prepared containing 0.60 mol of aluminum and 1.20 mol of manganese dioxide. The mixture is heated until one of the reactants has been completely consumed according to the equation :

$2Al + 3MnO_2 \Rightarrow 3Mn + Al_2O_3$

What quantity of which reactant remains uncombined?

A. 0.20 mol Al

B. 0.40 mol Al

C. 0.30mol MnO_2

D. 0.60 mol MnO_2

Answer: C

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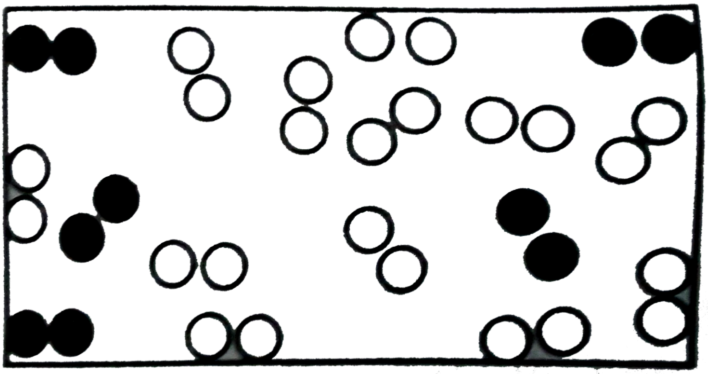
82.



In the above diagram, the paired open spheres represent H_2 molecules and the paired solid spheres represent N_2 molecules. When the molecules in the box react to form the maximum possible amount of ammonia (NH_3 molecules, what is the limiting reactant and how many molecules of NH_3 can be formed?

A. N_2 is limiting. 5 molecules of NH_3 can be formed.

B. N_2 is limiting. 10 molecules of NH_3 can be formed.

C. H_2 is limiting. 8 molecules of NH_3 can be formed.

D. H_2 is limiting, 12 molecules of NH_3 can be formed.

Answer: C

Watch Video Solution

83. Calcium carbonate, $CaCO_3$ decomposes upon heating to calcium oxide and carbon dioxide. What mass of solid calcium carbonate is required to produce 2.40 liters of carbon dioxide measured at STP?

A. 10.7g

B. 21.4g

C. 50.0g

D. 10.6g

Answer: D

Watch Video Solution

84. Percentage loss in mass on heating mixture of Na_2CO_3 and $CaCO_3$ containing equal mass fo the two components will be: [Note: Na_2CO_3 is thermally stable]

A. 0.44

B. 0.22

C. 0.35

D. 0.5

Answer: B

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85. The value of x, if hydrated salt $A_2SO_4.xH_2O$ undergoes 45% loss in mass on heating and becomes anhydrous, is: (where atomic weight of A is 7).

A. 8

B. 9

C. 10

D. 5

Answer: D

Watch Video Solution

86. What is the maximum amountof nitrogen dioxide that can be produced by mixing 4.2gm of NO(g) and 3.2 gm of $O_2(g)$?

A. 4.60gm

B. 2.30gm

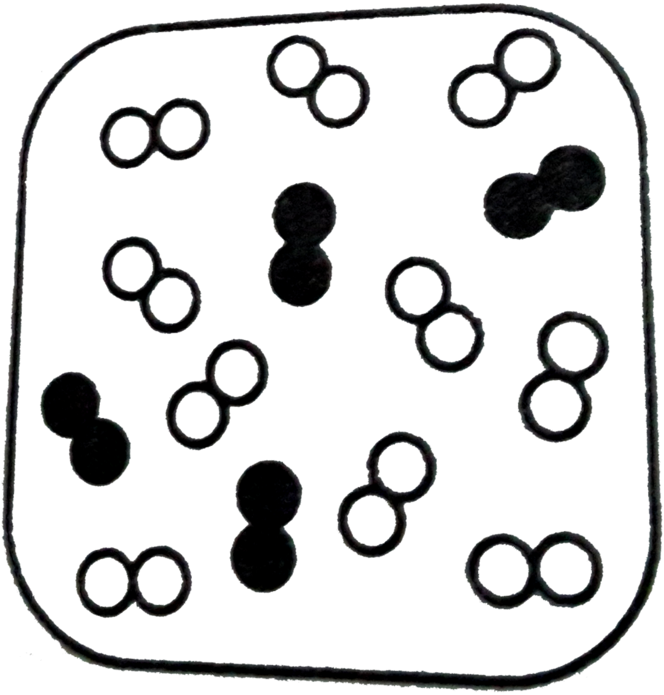
C. 3.22gm

D. 6.44gm

Answer: D

Watch Video Solution

87. If nitrogen atoms are represented as filled circle and oxygen atoms as open circles, how much NO_2 can be prepared from the mixture shown?



A. 4 molecules

B. 5 molecules

C. 6 molecules

D. 8 molecules

Answer: D

Watch Video Solution

88. H_2SO_4 can be prepared in following two step process : [% yield of each step is indicated]

$(P) S(g) + O_2(g) \xrightarrow{50\% \, yield} SO_2(g)$

(Q) $NO_2(g) + SO_2(g) + H_2O(l) \xrightarrow{80\% \, yield} H_2SO_4(aq) + NO(g)$

What mass of sulphur is required to prepare 1960 gm H_2SO_4 ?

A. 640gm

B. 1450 gm

C. 1600gm

D. 1280gm

Answer: C

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Percentage yield and percentage purity

1. In the formation reaction of NH_3 from N_2 and H_2 140g of N_2 and 40g H_2 were mixed. Select the option which is correct.

A. Maximum mass of NH_3 which can be formed is 180gm

B. If % yield of reaction is 80%, then H_2 consumed will be 32gm.

C. Some $N_2(g)$ will be left after the reaction.

D. If NH_3 formed is 85gm then % yield will be 50%.

Answer: D

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2. In a cartain operation 358 g of $TiCl_4$ is reacted with 96 g of Mg. Calculate % yield of Ti if 32 g of Ti is actually obtained [At. Wt. Ti=48, Mg=24][Hint: $\frac{358}{190} = 1.88$]

A. 0.3546

B. 0.666

C. 1

D. 0.6

Answer: A

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3. How many kg of $CaCo_3$ [Mol. Wt = 100g $mole^{-1}$] is needed to produce 336 kg of CaO [Mol wt = 56g mol^{-1}] if % yield of the reaction given is 60%.

$CaCO_3(s) \rightarrow CaO(s) + CO_2(g)$

A. 10^3

B. 10^2

C. 900

D. 800

Answer: A

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4. A given initial mass of $KClO_3$ on 50% decompostion produces 67.2 litre oxygen gas at $0^{\circ} C$ and 1 atm. The other product of decompostion is KCl. The initial mass of $KClO_3$ (in gm) taken is:

A. 245

B. 122.5

C. 490

D. none of these

Answer: C

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5. An sample of NaCl with 50% purity is added into aqueous solution havinig excess $AgNO_3$. AgCl precipitate is filtered, washed and dired weighing 2.87gm. If the reaction yeild is 20%, then find the amount of sample.

A. 23.4gm

B. 11.7gm

C. 20gm

D. 12.8gm

Answer: B

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6. 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.

$$N_2 + \frac{3}{2}O_2 \rightarrow N_2O_3$$

A. 4.5×10^{23}

B. 3.6×10^{23}

C. 1.8 xx 10^(23)`

D. 7.2×10^{23}

Answer: B

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7. Methyl benzoate is prepared by the reaction between benzoic acid and methanol, according to the equation

$C_6H_5COOH + CH_3OH \rightarrow C_6H_5COOCH_3 + H_2O$

In an experiment 24.4gm of benzoic acid were reacted with 70.0mL of CH_3OH. The density of CH_3OH is 0.79 g mL^{-1}. The methyl benzoate produced had a mass of 21.6g. What is the percentage yeild of product?

A. 0.917

B. 0.794

C. 0.715

D. 0.217

Answer: B

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8. Calcualte the volume of Cl_2 gas (in ml) liberated at 1 atm 273 K when 1.74 gm MnO_2 reacts with 2.19 gm HCl according to the following with % yeild 40.

$MnO_2 + 4HCl \rightarrow MnCl_2 + Cl_2 + 2H_2O$

A. 336ml

B. 112ml

C. 134.4ml

D. 44.8ml

Answer: C

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9. Ammonia is produced in accordance with this equation .

$N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$

In a particular experiment, 0.25mol of NH_3 is formed when 0.5 mol of N_2 is reacted with 0.5 mol of H_2. What is the percent yield?

A. 0.75

B. 0.5

C. 0.33

D. 0.25

Answer: A

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10. Diborane, B_2H_6, canbe prepared by the reaction:

$3NaBH_4 + 4BF_3 \rightarrow 3NaBF_4 + 2B_2H_6$

In this reaction has a 70 percent yield, how many moles of $NaBH_4$ should be used with excess BH_3 in order to obtain 0.200 mol of B_2H_6?

A. 0.200 mol

B. 0.210mol

C. 0.300 mol

D. 0.429mol

Answer: D

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11. $C_6H_6 + Br_2 \rightarrow C_6H_5Br + HBr$

In an experiment, to prepare bromobenzene according to the equation, a student reacted 20.0g of C_6H_6 with 0.310 mol of bromine. If 28.0 g of C_6H_5Br was obtained, what was the percentage yield?

A. 31.5

B. 40.3

C. 57.6

D. 69.7

Answer: D

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12. For the reaction : 2X + 3Y rightarrow 3Z, the combination of 2.00 moles of X with 2.00 moles of Y produces 1.75 moles of Z. What is the percent yeild of this reaction ?

A. 0.438

B. 0.583

C. 0.667

D. 0.875

Answer: D

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13. Magnetite, Fe_3O_4 can be reduced to iron by heating with carbon monoxide according to the equation :

$Fe_3O_4 + 4CO \rightarrow 3Fe + 4CO_2$

Molar mass $\left(gmol^{-1}\right)$

Fe_3O_4 232

What mass of Fe_3O_4 is required in order to obtain 5.0kg of iron if the process is 88% efficient?

A. 6.1kg

B. 6.9kg

C. 7.9kg

D. 18kg

Answer: C

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14. Sulphur trioxide, SO_3 is made by oxidizing sulphur dioxide, SO_2, according to the equation,

$2SO_2 + O_2 \rightarrow 2SO_3$. If a 16.0 g sample of SO_2 yields 18.0g of SO_3. What is the percent yield?

A. 0.7

B. 0.8

C. 0.9

D. 1

Answer: C

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15. Fe_2O_3 reacts with excess CO at a high temperature according to the equation below:

$Fe_2O_3 + 3CO \rightarrow 2Fe + 3CO_2$

If 6.5-0g of Fe_2O_3 yields 3.85g of Fe, what is the percentage yield of the reaction ?

A. 0.592

B. 0.699

C. 0.763

D. 0.847

Answer: D

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16. Aluminium reacts with sulphur to form aluminium sulphide. If 31.9g of Al are reacted with 72.2 g of S, what is the theoretical yeild of aluminium sulphide in grams?

A. 88.6g

B. 69.7g

C. 57.2g

D. 113g

Answer: A

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17. Aspirin, $C_9H_8O_4$, is prepared by the acetylation of salicylic acid, $C_7H_6O_3$, according to the following equation :

$C_7H_6O_3 + (CH_3CO)_2O \rightarrow C_9H_8O_4 + CH_3COOH$

If the yeild of this reaction is 83%, What mass of salicylic acid would be required to prepare 1.0kg of aspirin?

A. 0.77kg

B. 0.62kg

C. 1.2kg

D. 1.3kg

Answer: B

Watch Video Solution

18. $C_7H_6O_3 + C_4H_6O_3 \rightarrow C_9H_8O_4O_2$

What is the percent yield if 0.85g of aspirin is formed in the reaction of

1.00g of salicylic acid with excess acetic anhydride ?

Substance	Molar Mass
$C_7H_6O_3$	$138.12g.\ mol^{-1}$
$C_4H_6O_3$	$102.09g.\ mol^{-1}$
$C_9H_8O_4$	$180.15g.\ mol^{-1}$
$C_2H_4O_2$	$60.05g.\ mol^{-1}$

A. 0.65

B. 0.77

C. 0.85

D. 0.91

Answer: A

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Sequential and Parallel Reactions

1. Sulphur trioxide may be prepared by the following two reactions:

$$S_8 + 8O_{2(g)} \rightarrow 8SO_{2(g)}$$

$2SO_{2(g)} + O_{2(g)} \rightarrow 2SO_{3(g)}$

How many grams of SO_3 will be produced from 1 mole of S_8?

A. 1280

B. 640

C. 960

D. 320

Answer: B

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2. If 240g of carbon is taken in a container to convert it completely to CO_2 but in industry it has taken found that 280g of CO was also formed along with CO_2. Find the percentage yeild of CO_2. The reactions occuring are: $C + O_2 \rightarrow CO_2, C + \left(\frac{1}{2}\right)O_2 \rightarrow CO$

A. 0.25

B. 0.5

C. 0.75

D. 1

Answer: B

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3. What weight of $CaCO_3$ must be decomposed to produce the sufficient quantity of carbon dioxide to convert 21.2 kf of Na_2CO_3 completely in $NaHCO_3$. [Atomic mass Na=23, Ca=40]

$CaCO_3 \rightarrow CaO + CO_2$

$Na_2CO_3 + CO_2 + H_2O \rightarrow 2NaHCO_3$

A. 100Kg

B. 20kg

C. 120Kg

D. 30Kg

Answer: B

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4. For a sequential reaction.

$NH_3 \rightarrow N_2 + H_2$

$H_2 + O_2 \rightarrow H_2O$

What will be the amount of water which will be obtained if 5 moles of NH_3 is mixed with 3 moles of O_2 and % yield of 1^{st} and 2^{nd} reaction is 50% and 80% respectively ?

A. 3 moles

B. 2.5 mole

C. 2 mole

D. 2.4 mole

Answer: A

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5. For a sequential reaction :

A rightarrow B + C

2B rightarrow C + 2D

If % yeild of (i) and (ii) reactions are 90% and 80% respectively, then the overall % yield is expected to be:

A. 0.9

B. 0.8

C. 0.72

D. 0.1

Answer: C

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6. NX is produced by the following step of reactions

$M + X_2 \rightarrow MX_2$

$3MX_2 + X_2 \rightarrow M_3X_8$

$M_3X_8 + N_2CO_3 \rightarrow NX + CO_2 + M_3O_4$

How much M (metal) is consumed to produce 206 gm of NX? (Take at. wt of M = 56, N=23, X = 80]

A. 42gm

B. 56gm

C. 14/3 gm

D. 7/4gm

Answer: A

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7. How many moles of CH_4 will produce 12.0 ethane according to the reaction:

$$CH_4 + Cl_2 \xrightarrow{80\%} CH_3Cl + HCl$$

$$2CH_3Cl + 2Na \xrightarrow{50\%} CH_3CH_3 + 2NaCl$$

A. 2

B. 0.8

C. 0.32

D. 1

Answer: A

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8. For the sequential reactions:

$$2A \xrightarrow{80\%} 3B + C$$

$$2B \xrightarrow{50\%} 5D + E$$

Moles of A needed for the formation of 1.5 moles of D is:

A. 0.6

B. 0.4

C. 1

D. 1.16

Answer: C

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9. Minimum amount of $Ag_2CO_3(s)$ required to produce sufficient oxygen for the complete combustion of C_2H_2 which produces 11.35 litre of CO_2 at STP after combustion is:

$$Ag_2CO_3(s) \rightarrow 2Ag(s) + CO_2(g) + \left(\frac{1}{2}\right)O_2(g),$$

$$C_2H_2 + \left(\frac{5}{2}\right)\left(O_2\right) \rightarrow 2CO_2 + H_2O$$

A. 276g

B. 345g

C. 690g

D. 1380g

Answer: B

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10. 120 g Mg was burnt in air to give a mixture of MgO and Mg_3N_2. The mixture is now dissolved in HCl to form $MgCl_2$ and NH_4Cl, if 107 gram NH_4Cl is produced. Then the moles of $MgCl_2$ formed is:

$Mg + \left(\frac{1}{2}\right)O_2 \rightarrow MgO$ ....(i)

$3Mg + N_2 \rightarrow Mg_3N_2$ ....(ii)

$MgO + 2HCl \rightarrow MgCl_2 + H_2O$ ....(iii)

$Mg_3N_2 + 8HCl \rightarrow 2NH_4Cl + 3MgCl_2$......................(iv)

A. 3 moles

B. 6 moles

C. 5 moles

D. 10 moles

Answer: C

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11. Ferric oxide can be obtained by oxidation of FeO:

$4FeO + O_2 \rightarrow 2Fe_2O_3$

The O_2 gas required can be prepared by the following reaction.

$2SO_3 \rightarrow 2SO_2 + O_2(g)$

What is the maximum amount of Fe_2O_3 that can be produced by 144 g FeO and 160g of SO_3?

[Atomic mass of Fe = 56]

A. 320g

B. 80g

C. 120g

D. 160g

Answer: D

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12. One commercial system removes SO_2 emission from smoke at $95\,^{\circ}C$ by the following set of reactions:

$SO_2(g) + Cl_2(g) \rightarrow SO_2Cl_2(g)$ ....(i)

$SO_2Cl_2 + 2H_2O \rightarrow H_2SO_4 + 2HCl$ ....(ii)

$H_2SO_4 + Ca(HO)_2 \rightarrow CaSO_4 + 2H_2O$...............(iii)

Assuming the process to be 95% efficient, how many moles of $CaSO_4$ may be produced from 128g SO_2? [Ca = 40, S=32, O=16]

A. 1.9 moles

B. 2 moles

C. 3.8moles

D. 0.95 moles

Answer: A

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13. Moles of ABC_3 produced in the following set tio reaction when 180gm of A, 180gm of B and 200gm of C are mixed in a container (given molar mas of A, B ,C and 20,30 and 10 respectively).

$2A + 3B + 5C \rightarrow A_2BC + B_2C_3$..................(i)

$B_2C_3 + 3C \rightarrow 2BC_3$...................(ii)

$BC_3 + A \rightarrow ABC_3$...............(iii)

A. 5

B. 4

C. 43741

D. 20/3

Answer: B

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14. The following sequences of reaction may be used to extract zinc from its sulphate are:

$Zns + O_2 \rightarrow ZnO + SO_2$

$ZnO + C \rightarrow Zn + CO$

How many tonnes of Zn can be obtained from 10 tonnes of Zns assuming that the yield is 75%? [Atomic weight of Zn = 65, S = 231]

A. 5

B. 10

C. 12

D. 15

Answer: A

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15. 5 moles of A, 6 molesof Z are mixed with suffifcient amount of C to finally produce F. Then find the maximum molesof F which can be produced. Assuming that the product formed can also be reused. Reactions are :

$A + 2Z \rightarrow B$

$B + C \rightarrow Z + F$

A. 3 moles

B. 4.5 moles

C. 5 moles

D. 6 moles

Answer: C

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16. Consider the following reactions:

$2Na + 2NH_3 \rightarrow 2NaNH_2 + H_2(g)$..................(i)

$2NaNH_2 + C \rightarrow Na_2CN_2 + 2H_2(g)$................(ii)

$Na_2CN_2 + C \rightarrow 2NaCN$...................(iii)

51 gm dry ammonia gas is passed over excess heated sodium to form sodamide $NaNH_2$ which is further reacted with carbon (excess) to finally form NaCN. Find the total volume of $H_2(g)$ evolved at 0.5 atm, 273 K.

A. 201.6 L

B. 100.8 L

C. 403.2 L

D. 50.4L

Answer: A

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17. Two pure substances of equal molar masses are α and β (where $\alpha = AHCO_3$ and $\left(\beta = BCO_3\right]$ and they decomposes as shown:

$2\alpha \overset{\Delta}{\rightarrow} H_2O + CO_2 + A_2CO_3$..................(i)

$\beta \overset{\Delta}{\rightarrow} BO + CO_2$ ....(ii)

6.2g of mixture of H_2O and CO_2 is obtained by 16.8g of α. Find out the molar mass of α and β and value of $\left(\frac{\alpha+\beta}{2}\right)^2$.

A. 84 each, 168.0

B. 57.9 each, 3360

C. 59.39 each, 3528

D. 84 each, 7056

Answer: D

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Empirical and molecular formula

1. Equal mass of $KClO_3$ undergoes different reactions in two different containers:

$2KClO_3(s) \xrightarrow{\Delta} 2KCl(s) + 3O_2(g)$ ....(i)

$4KClO_3(s) \xrightarrow{\Delta} KCl(s) + 3KClO_4(s)$....................(ii)

Mass ratio of KCl produced in respective reaction is $n:1$ then, value of n will be:

A. 4

B. 2

C. 74.5

D. 90

Answer: A

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2. The atomic weights of two alements A and B are 40 and 80 reapectively.

If x g of A contains y atoms, how many atoms are present in 2x g of B?

A. $\frac{y}{2}$

B. $\frac{y}{4}$

C. y

D. 2y

Answer: C

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3. The empirical formula of a compound of molecular mass 120 is CH_2O.

The molecular formula of the compound is :

(a). $C_2H_4O_2$

(b). $C_4H_8O_4$

(c). $C_3H_6O_3$

(d). all of these

A. $C_2H_4O_2$

B. $C_4H_8O_4$

C. $C_3H_6O_3$

D. all of these

Answer: B

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4. Calcualte the molecualr formula of compound which contains 20% Ca and 80% Br (by wt.) if molecualr weight of compound is 200. (Atomic wt. Ca= 40, Br=80)

A. $Ca_{\frac{1}{2}}Br$

B. $CaBr_2$

C. CaBr

D. Ca_2Br

Answer: B

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5. In an organic compound of molar mass greater than 100 containing only C, H and N, the percentage of C is 6 times the percentage of H while the sum of the percentage of C and H is 1.5 times the percentage of N. What is the least molar mass :

A. 175

B. 140

C. 105

D. 210

Answer: B

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6. The simplest formula of a compound containing 50% of an element X (atomic weight 10) and 50% of element Y (atomic weight 20) is:

A. XY

B. X_2Y_2

C. XY_2

D. X_2Y_3

Answer: B

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7. The oxides of a certain (hypothetical) element contain 27.28%, 42.86% and 52.94% oxygen. What is the ratio of the valencies of the element in the 3 oxides?

A. $2:3:4$

B. $1:3:4$

C. $1:2:4$

D. $1:2:3$

Answer: D

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8. A certain organic substance used as a solvent in many reactions contains carbon, hydrogen, oxygen and sulphur. Weight % of hydrogen in the compound is 7.7. The weight ratio $C:O:S = 3:2:4$. What is the least possible molar mas of the compound?

A. 86

B. 63

C. 94

D. 78

Answer: D

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9. In an organic compound of molar mass $108 gmmol^{-1} C, H$ and N atoms are presents in $9:1:3.5$ by mass. Molecular can be

A. $C_6H_8N_2$

B. $C_7H_{10}N$

C. $C_5H_6N_3$

D. $C_4H_{18}N_3$

Answer: A

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10. $64g$ of an organic compound contains $24g$ of carbon, $8gm$ of hydrogen and the rest oxygen. The empirical formula of the compound is

A. CH_4O

B. CH_2O

C. C_2H_4O

D. none

Answer: A

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11. X and Y are two elements which form X_2Y_3 and X_3Y_4. If 0.20 mol of X_2Y_3 weighs 32.0g and 0.4mol of X_3Y_4 weighs 92.8g, the atojic weights of X and are respectively:

A. 16.0 and 56.0

B. 8.0 and 28.0

C. 56.0 and 16.0

D. 28.0 and 8.0

Answer: C

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12. A compound has the molecular formula X_4O_6. If $10 g of X_4O_6$ has $5.72 g X$, atomic mass of X is:

A. 32amu

B. 37 amu

C. 42 amu

D. 98amu

Answer: A

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13. An unidentified bivalent metal M reacts with unidentified halogen X to form an unknown compound of halogen gas. When 1.12g of it is heated, 0.72g of MX is obtained along with 56 ml of halogen gas at 1atm and 273 K. Identify the metal.

A. Zn

B. Cu

C. Fe

D. Pb

Answer: B

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14. A 0.239g sample of a gas in a 100-ml flask exerts a pressure of 600mm Hg at $14^{\circ}C$. What is the gas?

A. Chlorine

B. Nitrogen

C. Krypton

D. Xenon

Answer: A

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15. A certain oxide of iron contains 2.5 grams of oxide for every 7.0grams of iron. If it is regarded as a mixture of FeO and Fe_2O_3 in the weight ratio a:b, what is a:b ? (atomic weight of iron = 56)

A. $9:10$

B. $9:20$

C. $14:5$

D. $1:1$

Answer: A

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16. Disilane, Si_2H_X is analysed and found to contain 90.32% silicon by mass. What is the value of X? [Si = 28]

A. 3

B. 4

C. 6

D. 8

Answer: C

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17. A gaseous hydrocarbon gives upon combustion, 0.72 g of water and 3.08 g of CO_2. The empirical formula of the hydrocarbon is

A. C_3H_4

B. C_6H_5

C. C_7H_8

D. C_2H_4

Answer: C

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18. Each 9.4gm of a compound contains 7.2gm carbon, 0.6gm hydrogen and rest oxygen. The empirical formula of the compound is:

A. C_3H_3O

B. C_6H_3O

C. C_6H_6O

D. $C_3H_6O_2$

Answer: C

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19. Three different oxides of nitrogen each contain 7.00 g of hydrogen and weigh 15.0 g, 23.0g and 19.0g, respectively. What are their empirical formulas?

A. NO, NO_2, N_2O_3

B. NO, N_2O_3, N_2O_5

C. $N_{92}\big)O, NO_2, N_2O_5$

D. NO_2, N_2O_3, N_2O_5

Answer: A

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20. A compound contains 69.5% oxygen and 30.5% nitrogen and its molecualr weight is 92. The molecualr formula of that compound is:

A. N_2O

B. NO_2

C. N_2O_4

D. N_2O_5

Answer: C

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21. 26.8g of $Na_2SO_4 . nH_2O$ contains 12.6 g of water. The value of n is:

A. 1

B. 10

C. 6

D. 7

Answer: D

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22. Which of the following series of compounds have same mass percentage of carbon?

A. CO_2, CO

B. CH_4, C_6H_6, C_2H_2

C. $C_2H_2, C_6H_6, C_{10}H_8$

D. $HCHO, CH_3COOH, C_6H_{12}O_6$

Answer: D

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23. 60 gm of an organic compound containing C,H and O atoms on complete combustion gave 88gm CO_2 and 36 gm H_2O. The empirical formula of the organic compound is:

A. C_2HO

B. CHO

C. CH_2O

D. CHO_2

Answer: C

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24. Aspartame an artificial sweetner contains 9.52% by weight of nitrogen. There are two nitrogen atoms per molecule, then the molecular weight of aspartame is:

A. 588

B. 266

C. 147

D. 294

Answer: D

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25. A compound contains 38.8% C, 16.0% H and 45.2% N. The empirical formular of the compound would be:

A. CH_3NH_2

B. CH_3CN

C. C_2H_5CN

D. $CH_2(NH)_2$

Answer: A

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26. A compound contains 5 gm sulphur and 5 gm oxygen atom. The empirical formula of compound is:

A. SO

B. SO_2

C. S_2O

D. SO_3

Answer: B

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27. To find formula of a compound composed of iron and carbon monoxide $Fe_x(CO)_y$,the compound is burned in pure oxygen and following reaction occurs:

$Fe_x(CO)_Y + O_2 \rightarrow Fe_2O_3 + CO_2$

If 19.6gm of $Fe_x(CO)_y$ is burnt and 8gm Fe_2O_3 is formed, then empirical formula of $Fe_x(CO)_y$ is:

A. $Fe_2(CO)_5$

B. $Fe(CO)_4$

C. $Fe(CO)_3$

D. $Fe(CO)_5$

Answer: D

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28. An oxide of element A was analysed and found to have mass ratio of A to oxygen equal to $7:3$. Then formular of oxide can be : [Atomic mass of A = 56]

A. A_2O_2

B. A_2O_3

C. AO

D. A_2O

Answer: B

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29. 32.2 gm of an organic compound containing C,H and O when completely combusted produces 61.6gm of CO_2 and 37.8 gm of H_2O. Select the correct option :

A. % of C in the organic compound is 40%.

B. % of H in the organic compound is 13.04%

C. % of O in the organic compound is 17.04 %

D. Data given is insufficient.

Answer: B

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30. An organic compound contains 20 atoms of carbon per molecule, the pecentage of carbon by weight being 70. The gram molecualr mass of the organic compound is approximately:

A. 465

B. 343

C. 415.0667.0

D.

Answer: B

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31. A drug marijuna owes its activity to tetrahydrocarbinol, which contains 70% as many C atoms as oxygen atoms. The number of mole of compound in a gm of it is 0.00318. the molecualr formular will be :

A. $C_{20}H_{30}O_2$

B. $C_{21}H_{30}O_2$

C. $C_{12}H_{20}O_2$

D. $C_{12}H_{20}O_3$

Answer: B

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32. Analysis of a compound known to contain only Mg, P, and O gives this analysis.

21.8% Mg, 27.7% P , 50.3% O by mass

What is its empirical formula?

A. $MgPO_2$

B. $MgPO_3$

C. $Mg_2P_2O_7$

D. $Mg_3P_2O_8$

Answer: C

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33. A chloride salt of Rhenium contains 63.6% Re by mass. What is its empirical formula? [Re = 186]

A. ReCl

B. $ReCl_2$

C. $ReCl_3$

D. $ReCl_5$

Answer: C

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34. An oxide of manganese contains 2.29g of manganese per gram of oxygen. What is the empirical formular of this compound?

A. MnO

B. MnO_2

C. Mn_2O_3

D. MnO_3

Answer: C

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35. Which expression gives the fraction by mass of nitrogen in ammonium dihydrogen phosphate?

A. $\left(\frac{11}{115}\right)$

B. $\left(\frac{28}{115}\right.$

C. $\left(\frac{28}{132}\right)$

D. $\left(\frac{28}{133}\right)$

Answer: A

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36. The percentage by mass of C, H, and Cl in a compound are C 52.2%, H 3.7% and Cl 44.1%. How many carbon atoms are in the simplest formular of the compound?

A. 3

B. 4

C. 6

D. 7

Answer: D

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37. Calcualte the mass percentage of nitrogen in hydrazinium Sulphate $\left(N_2H_5\right)_2SO_4$.

Molar mass $\left(gmol^{-1}\right)$

$\left(N_2H_5\right)_2SO_4$ 162.2

A. 10.8

B. 17.3

C. 34.5

D. 51.2

Answer: C

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38. A 200 mL sample of a gaseous hydrocarbons has a density of $2.52gL^{-1}$ at $55^{\circ}C$ and 720mm Hg. What Is its formula?

A. C_2H_6

B. C_4H_{10}

C. C_5H_{12}

D. C_6H_6

Answer: C

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39. For which compound are the empirical and molecualr formular the same?

A. C_6H_5COOH

B. $C_6H_4(COOH)_2$

C. HOOCCOOH

D. CH_3COOH

Answer: A

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40. An ionic compound contains 29.08% sodium, 40.56% sulphur and 30.36% oxygen by mass. What is the formular of the sulphur-containing anion in the compound?

A. S_2O_3^(2-)

B. $S_2O_4^{2-}$

C. $S_2O_5^{2-}$

D. $S_2O_6^{2-}$

Answer: A

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41. The mineral beryl contians 5/03% beryllium by mass and contains three beryllium atoms per formula unit. Determine the formula mass of beryl. [Be = 9]

A. $950 g/mol$

B. $537 g/mol$

C. $270 g/mol$

D. $179 g/mol$

Answer: B

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42. A compound with the formula X_2O_5 contains 34.8% oxygen by mass. Identify element X.

A. Arsenic

B. Carbon

C. Phosphorous

D. Samarium

Answer: A

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43. What is the percent by mass of nitrogen in ammonium carbonate, $\left(NH_2^4CO_3\right)$?

A. 0.1453

B. 0.2783

C. 0.2916

D. 0.3334

Answer: C

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44. Which compound contains the highest percentage of nitrogen by mass?

A. NH_2OH (M = 33)

B. NH_4NO_2 (M = 64.1)

C. N_2O_3 (M = 76.0)

D. $NH_4NH_2CO_2$ (M = 78.1)

Answer: B

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45. What is the mass of percent of oxygen in the compound $UO_2(C_2H_3O_2)_2NH_4C_2O_2.6H_2O$?

Formula Weight g

$UO_2(C_2H_3O_2).6H_2O = 573$

A. 0.0558

B. 0.168

C. 0.223

D. 0.391

Answer: D

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46. Reduce acid contains 52.63% carbon, 5.30% hydrogen and 42.07% oxygen. Its empirical formula is the same as its molecualr formula. What is the number of carbon atoms in a molecule of this acid?

A. 4

B. 5

C. 6

D. 8

Answer: B

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47. The percent composition of the high explosive HNS is:

C	H	N	O
37.35 %	1.34 %	18.67 %	42.65 %

The molar mass of HNS is 450.22. What is the molecular formular of HNS?

A. $C_{13}H_4N_7O_{12}$

B. $C_{14}H_6N_6O_{12}$

C. $C_{15}H_{10}N_6O_{11}$

D. $C_{16}H_{12}N_5O_{11}$

Answer: B

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48. Element E reacts with oxygen to produce EO_2. Identify element E if 16.5 g of it react with excess oxygen to form 26.1 g of EO_2

A. Manganese

B. Nickel

C. sulphur dioxide and sulphur trioxide

D. Titanium

Answer: A

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49. The mass percentage of O in a potassium salt, $K_2S_2O_x$, is 36.0%. What is the formular of the polyatomic ion?

A. $S_2O_3^{2-}$

B. $S_2O_5^{2-}$

C. $S_2O_7^{2-}$

D. $S_2O_8^{2-}$

Answer: B

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50. An 18.5 g sample of tin (M = 118.7) combines with 10.0g of sulphur (M=32.07) to form a compound. What is the empirical formular of this compound?

A. SnS

B. SnS_2

C. Sn_2S

D. Sn_2S_3

Answer: B

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51. A compound with 69.41% C, 4.16% H and 26.42%O has a molar mass of 23--250g mol^{-1}. What is its molecualr formula?

A. $C_{13}H_9O_4$

B. $C_{14}H_{10}O_4$

C. $C_{13}H_6O_4$

D. $C_{15}H_{14}O_3$

Answer: B

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52. Which compound contains the highest percentage of magnesium by mass?

A. $MgNH_4PO_4$

B. $Mg(HPO_4)_2$

C. $Mg_2P_4O_7$

D. $Mg_3(PO_4)_2$

Answer: D

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POAC Based Questions

1. 25.4g of iodine and 14.2g of chlorine are made to react completely to yield a mixture of ICI and ICI_3. Calcualte the number of moles of Icl and

Icl_3 formed.

A. 0.1 mole, 0.1 mole

B. 0.1 mole, 0.2 mole

C. 0.5 mole, 0.5 mole

D. 0.2 mole, 0.2 mole

Answer: A

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2. What weights of P^4O_6 and P_4O_{10} will be produced by the combusion of 31g of P_4 in 32g of oxygen leaving no P_4 and O_2 ?

A. 2.75g, 219.5g

B. 27.5g, 35.5g

C. 55g, 71g

D. 17.5g, 190.5g

Answer: B

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3. 0.05 mole of $LiAlH_4$ in ether solution was placed in a flask containing 74g (1 mole) of t-butyl alcohol. The product $LiAlHC_{12}H_{27}O_3$ weighed 12.6 g. If Li atoms are conserved, the percentage yield is:

[Li = 7, Al = 27, H=1, C=12, O=16]

A. 0.25

B. 0.75

C. 1

D. 0.15

Answer: C

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4. XeF_6 fluorinates I_2 to IF_7 and liberates Xenon(g). 210 mmol of XeF_6 can yield a maximum of.... Mmol of IF_7

A. 420

B. 180

C. 1

D. 0.15

Answer: B

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5. Human lungs can absorb 8gm O_2 per hour by respiration. If all oxyggen atoms are converted to carbohydrates $\left(C_6H_{12}O_6\right.$ how long will it take to produce 180 gm $C_6H_{12}O_6$?

A. 8 hours

B. 12 hours

C. 10 hours

D. 6 hours

Answer: B

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6. A mixture of magnesium chloride and magnesium sulphate is known to contain 0.6 moles of chloride ion and 0.2 moles of sulphate ions. For quantitative estimation of Mg, above mixture is treated with set of reagents to form $Mg_2P_2O_7$ produced is:

A. 0.5

B. 0.25

C. 0.8

D. 0.7

Answer: B

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7. A 1.50g sample of an ore containing silver was dissolved, and all of the Ag^{+} was converted to 0.124 g of Ag_2S. What was the percentage of silver in the ore?

A. 0.0641

B. 0.072

C. 0.0827

D. 0.108

Answer: B

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8. How many moles of P_4O_6 and P_4O_{10} will be produced by the combustion of 12.4gm of phosphorus in 12.8gm of O_2, leaving no P_4 or O_2 ? [Atomic wt. P=31]

A. 0.11 mol and 0.3 mol

B. 0.15mol and 0.25mol

C. 0.05 mol each

D. 0.1 mol each

Answer: C

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9. In an experiment, 2.847 g of pure $MOCl_3$ was allowed to undergo a set of reactions as a result of which all the Cl was converted to AgCl. The weight of AgCl was 7.2g. Find at. Wt of M.

A. 35.52

B. 47.72

C. 65.2

D. 80.42

Answer: B

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10. $8g$ of sulphur are burnt to form SO_2, which is oxidised by Cl_2 water. The solution is treated with $BaCl_2$ solution. The amount of $BaSO_4$ precipitated is:

A. 0.25 mol

B. 0.30mol

C. 0.50mol

D. 0.75ml

Answer: A

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11. 1.44 gram of Titanium (Ti) reacted with excess of O_2 and produced x gram of non-stoichiometric compound Ti $._{0.44}O$. The value of x will be :[Ti = 48]

A. 2.77g

B. 3.77g

C. 1.77g

D. 3.0g

Answer: C

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12. One mole mixture of FeO and Fe_3O_4 containing equal moles of each on reaction with excess O_2 gives n moles of Fe_2O_3. n is:

A. 1

B. 2

C. 43499

D. none of these

Answer: A

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13. A solution with a mass of 1.263g containing an unkown amount of potassium ions was treated with excess sodium tetraphenylborate to precipitate 1.003g of KB $\left(C_6H_5\right)_4$ (M = 358.33). What is the mass percentage of potassium in the original solution?

A. 0.0864

B. 0.0916

C. 0.109

D. 0.138

Answer: A

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14. A 10.00g sample of a soluble barium salt is treated with an excess of sodium sulphate to precipitate 11.21 g $BaSO_4$ (M = 233.4). Which barium salt is it?

A. $BaCl_2$ (M = 208.2)

B. $Ba(O_2CH)_2$ (M = 227.3)

C. $Ba(O_2CH)_2$ (M = 261.3)

D. $BaBr_2$ (M = 297.1)

Answer: A

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15. 21.6 g of silver coin is dissolved in HNO_3. When NaCl is added to this solution, all silver is precipitated as AgCl. The weight of AgCl is found to be 14.35g then % silver in coin is:

$$Ag + HNO_3 \xrightarrow{NaCl} AgCl$$

A. 0.5

B. 0.75

C. 1

D. 0.15

Answer: A

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16. To find formular of a compound composed of A and B which is given by A_xB_y, it is strongly heated in oxygen as per reaction:

$A_xB_y + O_2 \rightarrow AO +$ Oxide of B

If 2.5 gm of A_xB_y on oxidation gives 3gm oxide of A, Find empirical formular of A_xB_y

[Take atomic mass of A = 24 and B = 14]

A. A_3B_2

B. A_2B_3

C. AB_2

D. A_2B

Answer: A

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Experimental Methods

1. if 30gm sample of a chloroplatinate salt of diacidic organic Lewis base on ignition produce 5 gm of white residue, then what will be the molar mass of the base? [Pt = 195]

A. 760

B. 380

C. 1170

D. 410

Answer: A

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2. An organic base is tetraacidic. If from every 10gm of the chloroplatinate salt of the base 3.9 gm of the residue of platinum is obtained, then what will be the molecualr mass of the base? [Pt = 195]

A. 180

B. 360

C. 90

D. 270

Answer: A

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3. 6.0gm of silver of a tetrabasic acid gives 4.32 gm silver on strong heating. The molar mass of the acid is: (Ag = 108)

A. 168

B. 172

C. 84

D. 88

Answer: B

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4. In Kjeldahl's method, 1.4 gm of an organic compounds is strongly boiled with concetration NaOH. If the liberated ammonia gas is completely absorbed by 100 ml 0.1 M H_2SO_4 solution and no acid is remained , the mass percent of nitrogen in the compound is

A. 0.2

B. 0.1

C. 0.4

D. 0.8

Answer: A

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5. A trivalent metal has mass % of metal in its superoxide equal to 36%. Calcualte approximate specific heat capacity of metal.

A. $\left(\frac{6.4}{18}\right) Cal/gm^{\circ}C$

B. $\frac{6.4}{18} Cal/gm^{\circ}C$

C. $\left(\frac{18}{6.4}\right) Cal/gm^{\circ}C$

D. $\left(\frac{54}{6.4}\right) Cal/gm^{\circ}C$

Answer: B

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6. $NH_3(g)$ evolved from 1.4 mg of protein sample can be completely neutralized by 40 ml of 0.4 M HCl % (by mass) of nitrogen in the sample is:

A. 0.08

B. 0.16

C. 0.194

D. 0.24

Answer: B

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7. 76 gram of a silver salt of dibasic acid on heating left a residue of 54gram silver. Silver salt contains Ag, C and O only and C and O in mole ratio of $1:2$ then find the mass of CO_2 gas liberated during ignition of 76gm silver salt, (Ag = 108)

A. 22.4gm

B. 0.22gm

C. 44gm

D. 22gm

Answer: D

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8. The specific heats of several metals are given in the table. If the same number of Joules were applied to the same mass of each metal, which metal would show the greatest temperature change?

Specific Heat ($J\text{-}g^{-1}\,{}^{\circ}C^{-1}$)	
Al	0.900
Au	0.129
Cu	0.385
Hg	0.139

A. Al

B. Av

C. Cu

D. Hg

Answer: B

Watch Video Solution

9. Calculate the mass of ammonia that can be produced from the decomposition of a sample $\left(NH_4\right)_2PtCl_6$ containing 0.100g Pt.

Substance	Molar mass
$\left(NH_4\right)_2PtCl_6$	$443.9g.\,mol^{-1}$

A. 0.0811g

B. 0.0766g

C. 0.0175g

D. 0.00766g

Answer: C

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10. How many significant figures should be reported the answer to the calculation? (Assume all number are experimentally determined).

$$\frac{12.501 \times 3.52}{0.0042} + 6.044$$

A. 2

B. 3

C. 4

D. 5

Answer: A

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11. Which would produce the largest change in the H_2O level when added to water in a 25mL graduate cylinder?

A. 10.0g of Hg $\left(d = 13.6g.\,mL^{-1}\right)$

B. 7.42 g of Al $\left(d = 2.70g.\,mL^{-1}\right)$

C. 5.09 of iron pyrite (d = 4.9 g. mL^{-1})

D. 2.68 g of oak (d = 0.72 gmL^{-1})

Answer: B

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12. In an experiment to determine the percentage of water in a solid hydrate by heating, what is the best indication that all the water has been removed?

A. The solid melts

B. The solid changes colour.

C. Water vapour no longer appears.

D. Successive weighings give the same mass.

Answer: D

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13. Assertion : A mixture of plant pigments can be separated by chromatography.

Reason : Chromatography is used for the separation of colourd substances into individual components.

A. Calorimetry

B. Chromatography

C. Calorimetry

D. Gravimetry

Answer: B

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14. A student wishes to determine the thickness of a reactangualr piece of aluminuim foil but cannot measure it directly. She can measure its density (d), length (l), mass (m) and width (w). Which relationship will give the thickness?

A. $\frac{m}{d.l.w}$

B. $\frac{m.l.w}{d}$

C. $\frac{d.l.w}{m}$

D. $\frac{d.m}{l.w}$

Answer: A

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15. A student is asked to measure 30.0g of methanol (d = $0.7914 g/mL$) at $25^{\circ} C$) but has only a graduated cylinder with which to measure it. What volume of methanol should the student use to obtain the required 30.0g?

A. 23.7mL

B. 30.0mL

C. 32.4mL

D. 37.9mL

Answer: D

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16. The molar mass of an unkown organic liquid (M ~ 100) is determined by placing 5 mL of the liquid in a weighted 125mL conical flask with a piece of Al foil with a pin hole in it. The flask is heated in a Al foil with a pin hole in it. The flask is heated in a boiling water bath until the liquid evaporates to expel the air and fill the flsk with unknown vapour at atmospheric pressure. After cooling to vapour at atmospheric pressure. After cooling to room temperature the flask and its contents are room temperature the flask and its contents are reweighed. The uncertainty in which piece of apparatus causes the largest percentage error in the molar mass:

A. balance $(\pm 0.01g)$

B. barometer $(\pm 0.2mmHg)$

C. Flask$(\pm 1.0mL)$

D. thermometer $\left(\pm 0.2\,^{\circ}C\right)$

Answer: A

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17. A student determined the density of a solid to be 2.90, 2.91 and 2.93 $g.cm^{-3}$. If the actual density of this solid is 2.70 $g.cm^{-3}$, how should the student's resutls be described?

A. High accuracy and high precision

B. Low accuracy and high precision

C. High accuracy and low precision

D. Low accuracy and low precision

Answer: B

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18. In an experiment to verify the value of absolute zero, a student is instructed to measure the volume of He in a 10mL syrings at $10\ ^\circ C$. She is told to plot the volume versus temperature and to extrapolate this graph to zero volume and read the resulting temperature. Which modification of the experimental procedure will give the best value for absolute zero?

A. Correcting each measured volume to one atmosphere pressure before plotting.

B. Doubling the number of temperature-volume value between $0\ ^\circ C$ and $100\ ^\circ C$.

C. using a thermometer that can measure temperature to $\pm O^{\circ} C$ between $O^{\circ} C$ and $100^{\circ} C$.

D. Measuring the volume of He in the syringe at -$40^{\circ} C$ and $80^{\circ} C$.

Answer: D

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19. For the estimation of nitrogen, 1.4 g of an organic compound was digested by Kjeldahl's method and the evolved ammonia was absorbed in 60 mL of $M/10$ sulphuric acid. The unreacted acid required 20 mL of $M/10$ sodium hydroxide for complete neutralisation. The percentage of nitrogen in the compound is

A. 3

B. 5

C. 24

D. 10

Answer: D

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20. 29.5 mg of an organic compound containing nitrogen was digested according to Kjeldahl's method and the evolved ammonia was absorbed in 20mL of 0.1M HCL solution. The excess of the acid required 15 mL of 0.1 M NaOH solution for complete neutralization. The percentage of nitrogen in the compound is:

A. 59

B. 47.4

C. 23.7

D. 29.5

Answer: C

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21. Five successive determinations of the density of an alloy gave the following results:

$10.29g/mL, 9.95g/mL, 9.89g/mL, 10.18g/mL$

What value should be reported for the density of this alloy?

A. $10.074g/mL$

B. $10.07 \pm 0.16\frac{g}{m}L$

C. $10.1 \pm 0.2g/mL$

D. $1.0 \times 10g/mL$

Answer: B

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22. A student is asked to analyze a water sample from a stream for total solids (TS), dissolved solids (DS) and suspended solids (SS). She carries out the experiments below.

(P) A 25-mL portion of the water sample is evaporated to dryness in a pre-weighed evaporating dish to give mass 1.

(Q) A seperate 25-mL portion is filtred into a second pre-weighed evaporating dish and evaporated to dryness to give mass 2.

How are the values for TS, SS and DS (per 25 mL water) determined?

A. TS = mass 1, SS = mass 1 - mass 2, DS = mass 2

B. TS = mass 1, SS = mass 2, DS = mass 1 - mass 2

C. TS = mass 1 + mass 2, SS = mass 1 , DS = mass 2

D. TS = mass 1 + Mass 2, SS = Mass 2, DS = mass 1

Answer: A

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23. 2.43g of dry silver salt of mono carboxylic acid is ignited till complete decomposition occurs to give 1.08gm of residue. 3.09 gm of acid chloride of same acid is treated with excess NH_3 and amide formed is treated with sufficient Br_2 + KOH mixture at 343 K, giving 1° amine. What is the amine formed? [Ag = 108, Cl=35.5, N=14]

A. 1.07gm

B. 2.7gm

C. 2.14gm

D. 2.27gm

Answer: C

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24. Nitration of aniline by$HNO_3 + H_2SO_4$ mixture gives 51% para nitro derivate while 47% is meta nitro derivative and rest 2% ortho nitro derivative at $15\,^{\circ}C$. In order to obtain 276 gm of p-nitro aniline what minimum mass of aniline should be taken?

A. 514.2gm

B. 563.3gm

C. 364.7gm

D. 476.7gm

Answer: C

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Concentration Terms

1. If 500 ml of 1 M solution of glucose is mixed with 500ml of 1M solution of glucose final moalrity of solution will be:

A. 1M

B. 0.5M

C. 2M

D. 1.5M

Answer: A

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2. The volume of water that must be added to a mixture of 250ml of 0.6 M HCl and 750 ml of 0.2 M HCl to obtain 0.25 M solution of HCl is:

A. 750 ml

B. 100 ml

C. 200 ml

D. 300 ml

Answer: C

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3. What volume of 0.10 M H_2SO_4 must be added to 50 mL of a 0.10 NaOH solution to make a solution in which molarity of the H_2SO_4 is 0.050M?

A. 400 mL

B. 50 mL

C. 100 mL

D. 150 mL

Answer: C

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4. What approximate volume of 0.40 M $Ba(OH)_2$ must be added to 50.0 mL of 0.30 M NaOH to get a solution in which the molarity of the OH^- ions is 0.50 M?

A. 33 mL

B. 66 mL

C. 133 mL

D. 100 mL

Answer: A

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5. What volume of a 0.8 M solution contains 100 milli moles of the solute?

A. 100 mL

B. 125 mL

C. 500 mL

D. 62.5 mL

Answer: B

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6. $500mL$ of a glucose solution contains 6.02×10^{22} molecules. The concentration of the solution is :

A. 0.1mol

B. 1.0M

C. 0.2M

D. 2.0M

Answer: C

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7. 500 mL of 0.1 M KCl, 200 ml of 0.01 M $NaNO_3$ and 500 ml of 0.1 M $AgNO_3$ was mixed. The molarity of $K^+, Ag^+, Cl^-, Na^+, NO^{3-}$ in the solution would be:

A. $\left[K^+\right] = 0.04, \left[Ag^+\right] = 0.04, \left\{Na^+\right] = 0.002\left[Cl^-\right] = 0.04, \left[NO_{3^-} = 0.04\right.$

B. $\left[K^+\right] = 0.04, \left[Na^+\right] = 0.00166, \left[NO^{-3}\right] = 0.0433$

C. $\left[K^+\right] = 0.04, \left[Ag^+\right] = 0.05, \left[Na^+\right] = 0.0025, \left[Cl^-\right] = 0.05, \left[NO^{-3} = 0.0\right.$

D. $\left[K^+\right] = 0.05, \left[Na^+\right] = 0.0025\left[Cl^-\right] = 0.05, \left[NO^{-3} = 0.0525\right.$

Answer: B

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8. 75 ml of H_2SO_4 (specific gravity is 1.18) containing 49% H_2SO_4 by mass is diluted to 590 ml. Calculate molarity of the diluted solution , [S = 32]

A. 0.7M

B. 7.5M

C. 0.75M

D. 0.25m

Answer: C

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9. What volume of 0.2M $Ba(OH)_2$ must be added to 300 mL of 0.08 M HCl solution to get a solution in which the molarity of hydroxyl $\left(OH^-\right)$ ions is 0.8 M?

A. 375 mL

B. 300 mL

C. 225 mL

D. 150 mL

Answer: D

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10. 50 mL solution of $BaCl_2$ (20.8% w//v) and 100 mL solution of H_2SO_4 (9.8% w//v) are mixed (Ba = 137, Cl = 35.5, S=32)

$BaCl_2 + H_2SO_4 \rightarrow BaSO_4 \downarrow 2HCl$

Weight of $BaSO_4$ formed is:

A. 23.3g

B. 46.6g

C. 29.8g

D. 11.65g

Answer: D

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11. Which is limiting reagent in the above case in above question?

A. $BaCl_2$

B. H_2SO_4

C. Both (a) and (b)

D. none of these

Answer: A

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12. In what volume ratio can 0.1 M $Fe_2\left(SO_3\right)_4$ and 0.1 M $Al_2\left(SO_4\right)_3$ be mixed so that the ratio of total numebr the solution is 2:3? Consider Fe^{3+}, Al^{3+} and $\left(SO^{2-}\right)_4$ as only ions in the solution. Salts are completely dissociated and do not undergo any hydrolysis.

A. $1:1$

B. $4 : 7$

C. $3 : 16$

D. Any of these values

Answer: D

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13. Molarity of H_2SO_4 is 18 M. Its density is $1.8 g / cm^3$,hence molality is:

A. 18

B. 100

C. 36

D. 500

Answer: D

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14. Mole fraction of A in H_2O is 0.2. The molality of A in H_2O is:

A. 13.9

B. 15.5

C. 14.5

D. 16.8

Answer: A

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15. What is the molarity of H_2SO_4 solution that has a density of $1.84g/$ and contains 98% by mass of H_2SO_4?

A. 4.18 M

B. 8.14 M

C. 18.4 M

D. 18 M

Answer: C

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16. The molarity of the solution containing 2.8% (mass/volume) solution of KOH is : (Given atomic mass of K = 39)

A. 0.1 M

B. 0.5 M

C. 0.2 M

D. 1 M

Answer: B

View Text Solution

17. The molality of a sulphuric acid solution is 0.2. Calculate the total weight of the solution having 1000 gm of solvent.

A. 1000 g

B. 1098.6 g

C. 980.4 g

D. 1019.6 g

Answer: D

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18. 0.01 mole of a non-electrolyte is dissolved in 10 g of water. The molality of the solution is :

A. 0.1 m

B. 0.5 m

C. 1.0 m

D. 0.18 m

Answer: C

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19. 400 ml of 0.2 M-HCl is mixed with 600 ml of 0.1 M-NaOH solution. The maximum mass of NaCl fromed is :

A. 4.68 gm

B. 2.34 gm

C. 7.02 gm

D. 3.51 gm

Answer: D

Watch Video Solution

20. Which of the following concentration terms does not correctly represent concentration of aqueous solution of NH_3 having molarity 2 M and density $2.034 gm/ml$?

A. Molality = 1 m

B. $\% \, w/w = \frac{3400}{2034} \%$

C. Mole fraction of $NH_3 = \frac{36}{2036}$

D. $\% \, w/v = 1.7 \, \%$

Answer: D

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21. An aqueous solution is made by dissolving glucose $\left(C_6H_{12}O_6\right)$ and urea $\left(NH_2CONH_2\right)$ in water. The mole ratio of glucose and water is 1 : 10. If the masses of glucose and urea are in 3:1 ratio, the mole fraction of glucose in the solution is :

A. $\frac{1}{11}$

B. $\frac{1}{12}$

C. $\frac{1}{10}$

D. $\frac{3}{4}$

Answer: B

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22. Equal moles of H_2O and a solute (of negligible molar mass) are present in a solution. Hence, molarity of solution is :

A. 0.55

B. 55.5

C. 1.00

D. 0.18

Answer: B

Watch Video Solution

23. In which of the following cases, the final solution obtained will definitely be basic?

A. 100 ml 0.1 M NaOH solution is mixed with 200 ml 0.1 M H_2SO_4 solution.

B. 50 ml $40\%\ w/w$ NaOH solution is mixed with 1 litre of 0.5 M H_2SO_2 solution.

C. 200 ml of $40\%\ w/w$ NaOH solution is mixed with 1.5 litre of 1 M HCl solution.

D. 200 ml of 0.2 M NaOH solution is mixed with 100 ml of 0.2 M H_2SO_4 solution.

Answer: C

Watch Video Solution

24. How much of NaOH is required to neutralise 1500 cm^3 of 0.1 M HCl?

A. 40 g

B. 4 g

C. 6 g

D. 60 g

Answer: C

Watch Video Solution

25. The density of HCl equal to $1.17 g/mL$. The molarity of the solution will be :

A. 36.5

B. 18.25

C. 19.17

D. 4.65

Answer: C

Watch Video Solution

26. The NH_3 evolved from 2.8 gm sample of protein was absorbed in 45 ml of $0.2M\ HNO_3$. The excess acid required 20 ml of $0.05M\ NaOH$ $\%$ of N in the sample will be :

A. $16\ \%$

B. $4\ \%$

C. $\frac{17 \times 4}{7}\ \%$

D. $8\ \%$

Answer: B

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27. The molarity of a solution containing $5.0g$ of NaOH in 250 mL solution is :

A. 0.1

B. 0.5

C. 1.0

D. 2.0

Answer: B

Watch Video Solution

28. 10 g of glucose is dissolved in 150 g of water. The mass percentage of glucose is :

A. 2.50 %

B. 6.25 %

C. 8.75 %

D. 10 %

Answer: B

Watch Video Solution

29. $H_3PO_4\left(98gmol^{-1}\right)$ is 98% by mass of solution. If the density is 1.8 g/ml, the molarity is:

A. 18 M

B. 36 M

C. 54 M

D. 018 M

Answer: A

Watch Video Solution

30. 2 M of 100 ml Na_2SO_4 is mexed with 3 M of 100 ml NaCl solution and 1 M of 200 ml $CaCl_2$ solution. Then the ratio of the concentration of cation and anion.

A. $\frac{1}{2}$

B. 2

C. 1.5

D. 1

Answer: D

Watch Video Solution

31. The volume of water is required to make 0.20 M solution from 1 mL of 0.5 M solution is :

A. 40 mL

B. 16 mL

C. 50 mL

D. 24 mL

Answer: D

Watch Video Solution

32. An aqueous solution of NaOH has a molarity of 0.05 M. Select the option having incorrect representation of concentration of solution.

$\left[d_{\text{solution}} = 1.002gm/ml\right]$

A. $\% w/v = 0.2 \%$

B. X_{NaOH}(Mole fraction)=$\dfrac{0.05}{0.05 + 55056}$

C. $\% w/w = \dfrac{2}{10.02} \%$

D. ppm $= 5p \pm NaOH$"` solution

Answer: D

Watch Video Solution

33. The molarity of Cl^- in an aqueous solution which was $(w/v)2 \% NaCl, 4 \% CaCl_2$ and $6 \% NH_4Cl$ will be :

A. 0.342

B. 0.721

C. 1.12

D. 2.18

Answer: D

Watch Video Solution

34. On mixing 15.0 ml of ethyl alcohol of density 0.792g ml^{-1} with 15 ml of pure water at $4^\circ C$, the resulting solution is found to have a density of 0.924g ml^{-1}. The percentage contraction in volume is :

A. 8 %

B. 2 %

C. 3 %

D. 4 %

Answer: C

Watch Video Solution

35. 100 ml of $0.2M\ H_2SO_4$ solution is mixed with 400ml of $0.05M\ Ba_3(PO_4)_2$. Calculate the concentration of $[Ba^{+2}]$ ion in resulting solution.

A. 0.08 M

B. 0.04 M

C. 0.4 M

D. 0.8 M

Answer: A

Watch Video Solution

36. The molarity of a solution obtained by mixing 750 mL of 0.5 M HCl with 250 mL of 2 M HCl will be

A. 0.875 M

B. 1.75 M

C. 0.975 M

D. 1.0 M

Answer: A

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37. A solution of $FeCl_3$ is $\frac{M}{30}$. Its molarity for Cl^- ion will be :

A. $\frac{M}{90}$

B. $\frac{M}{30}$

C. $\frac{M}{10}$

D. $\frac{M}{5}$

Answer: C

Watch Video Solution

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

A. 2.70 M`

B. 1.40 M

C. 1.50 M

D. 1.20 M

Answer: D

Watch Video Solution

39. Density of $2.05M$ solution of acetic acid in water is $1.02g/mL$. The molality of same solution is:

A. $1.14molkg^{-1}$

B. 3.28mol kg^{-1}

C. 2.28mol kg^{-1}

D. 0.44mol kg^{-1}

Answer: C

Watch Video Solution

40. The density $\left(\text{in} gmL^{-1}\right)$ of a $3.60M$ sulphuric acid solution that is $29\% H_2SO_4$ (Molar mass $= 98gmol^{-1}$) by mass will be:

A. 1.22

B. 1.45

C. 1.64

D. 1.88

Answer: A

Watch Video Solution

41. The strength of 10^{-2}M Na_2CO_3 solution in terms of molality willl be (density of solution $=1.10 g mL^{-1}$). (Molecular weight of $Na_2CO_3 = 106 gmol$)

A. 9.00×10^{-3}

B. 1.5×10^{-2}

C. 5.1×10^{-3}

D. 11.2×10^{-3}

Answer: A

Watch Video Solution

42. A solution containing 0.1 mol of a metal chloride MCl_x requires 500ml of 0.8 M $AgNO_3$ solution for complete reaction $MCl_x + xAgNO_3 \rightarrow xAgCl + M(NO_3)_x$. Then the value of x is :

A. 1

B. 2

C. 4

D. 3

Answer: C

Watch Video Solution

43. 20 ml of $CaCl_2$ solution is mixed with 30 ml of $0.1MAlCl_3$ solution. If the resulting solution has chloride ion concentration equal is 0.34 M, the concentration of $CaCl_2$ solution added is :

A. 0.2 M

B. 0.7 M

C. 0.4 M

D. 0.1 M

Answer: A

Watch Video Solution

44. A mineral water sample was analysed and found to contain $1 \times 10^{-3}\%$ ammonia (w/w). The mole of dissolved ammonia gas in one litre water bottle is $\left(d_{\text{water}} \approx 1gm/ml\right)$:

A. $5.8 \times 10^{-4} mol$

B. $1 \times 10^{-2} mol$

C. $0.58 \times 10^{-2} mol$

D. same as w/w

Answer: A

Watch Video Solution

45. Which of the following conentration factor is affected by change in temperature?

A. Molarity

B. Molality

C. Mole fraction

D. Weight fraction

Answer: A

Watch Video Solution

46. Mole fraction of ethyl alcohol in aqueous ethyl alcohol solution is 0.25. Hence percentage of ethyl alcohol by weight is :

A. $54\ \%$

B. $25\ \%$

C. $75\ \%$

D. $46\ \%$

Answer: D

Watch Video Solution

47. Common salt obtained from sea water contains $95\%\ NaCl$ by mass. The appoximate number of molecules present in $10.0g$ of the salt is

A. 10^{21}

B. 10^{22}

C. 10^{23}

D. 10^{24}

Answer: C

Watch Video Solution

48. The relation between molarity (M) and molality (m) is given by : (p=density of solution (g/mL), M_1= molecular mass of solute)

A. $m = \dfrac{M}{d + MM_2} \times 1000$

B. $m = \dfrac{M}{1000d - MM_2} \times 1000$

C. $m = \dfrac{d + MM_2}{M} \times 1000$

D. $m = \dfrac{1000d - MM_2}{M} \times 1000$

Answer: B

Watch Video Solution

49. Density of a 3 molar aqueous solution of $Na_2S_2O_3$ is $1.482gm/ml$. Calculate mole fracrtion of $Na_2S_2O_3$ in solution.

A. 0.054

B. 0.06

C. 0.03

D. 0.072

Answer: A

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50. If 3 litre of 1 M Ag_2SO_4 is mixed with 4 litre of 1M NaCl solution, then what will be the sum of molarity of all ions?

A. 7 M

B. 1 M

C. 2.42 M

D. 1.28 M

Answer: D

View Text Solution

51. Suppose you want an acidic solution to carry out a chemical reaction with 2 moles of NaOH. Which sample of acid is the best choise for you? (Atomic weight : S = 32, Cl = 35.5)

A. 1 M H_2SO_4 (50 Rs. Per lt.)

B. 1 M H_2SO_4 (56 Rs. Per lt.)

C. `1 M HCl (30 Rs. Per lt.)

D. 1 M HCl (27 Rs. Per lt.)

Answer: A

Watch Video Solution

52. For a solution concentration can be expressed as $16\% w/w$ as well as $20\% w/v$. What will be density of solution?

A. $1.25gm/L$

B. $0.8gm/L$

C. $1.25gm/mL$

D. `0.8gm//mL

Answer: C

Watch Video Solution

53. 150 ml of a solution containing 5 millimoles of A (specific gravity = 1.2) is mixed with 250 ml of another solution containing 10 millimoles of A (specific gravity = 1.4). If on mixing the density of the solution becomes $\frac{5.3}{4.5} gm / ml$, then what will be molartiy of A in the final solution?

A. $\frac{1}{30} M$

B. $\frac{3}{80} M$

C. $\frac{1}{20} M$

D. $\frac{4}{85}$

Answer: A

Watch Video Solution

54. Which of the following concentration terms is temperature dependent?

A. % by mass

B. Mole fraction

C. Mass/volume ratio

D. Molality

Answer: C

Watch Video Solution

55. Volume (in ml) Of 0.7 M NaOH required for complete reaction with 350 ml of 0.3 M H_3PO_3 solution is :

A. 300 ml

B. 450 ml

C. 150 ml

D. 350 ml

Answer: A

Watch Video Solution

56. Which of the following solutions will have maximum amount of NaOH?

A. 4 L of 0.1 M NaOH solution

B. 2 L Of $5\% w/v$ NaOH solution

C. 540 gm of 2m NaOH solution

D. 300 gm of $20\% w/w$ NaOH solution

Answer: B

View Text Solution

57. How many $gofKCl$ would have to be dissolved in $60gH_2O$ to give 20% by weight of solution?

A. 15 g

B. 1.5 g

C. $11.5g$

D. 31.5 g

Answer: A

Watch Video Solution

58. 90 gm glucose is dissolved in 410 gm water to get a solution. The concentration of solution is

A. $\frac{900}{41}\%$

B. 1.8 % (w/w)

C. $\frac{50}{41}$

D. 1.0 m

Answer: C

Watch Video Solution

59. 6.02×10^{20} molecules of urea are present in 100 ml of its solution. The concentration of solution is :

A. 0.001 M

B. 0.01 M`

C. 0.02 M

D. 0.1 M

Answer: B

Watch Video Solution

60. How much $(NaN)_3$ must be weighed out to make 50 ml of an aqueous solution containing 70 mg of Na^+ per mL?

A. 12.394 g

B. 1.29 g

C. 10.934 g

D. 12.934 g

Answer: D

View Text Solution

61. A solution of stearic acid $\left(C_{18}H_{36}O_2, M = 284\right)$ in benzene contains 1.42 gm acid per L. When this solution (100 L) is dropped on surface, C_6H_6 gets eveporated and acid forms a unimolecular layer on the surface. If it covers an area 6020 cm^2 with unimolecular film, find the area covered by one molecule of acid.

A. $2 \times 10^{-20} cm^2$

B. $4 \times 10^{-20} cm^2$

C. $2 \times 10^{20} cm^2$

D. $4 \times 10^{20} cm^2$

Answer: A

Watch Video Solution

62. A 1800 gm mixture of anhydrous $CuSO_4(s)$ and its hydrated form $\left[CuSO_4.5H_2O(s)\right]$ undergoes 20% loss in mass on heating. Mole fractrion of $CuSO_4$ in mixture is (Atomic mass of Cu = 64) :

A. $\frac{3}{40}$

B. $\frac{4}{9}$

C. $\frac{5}{9}$

D. $\frac{1}{2}$

Answer: C

View Text Solution

63. 300 gm, 30% (w/w) NaOH solution is mixed with 500 gm 40% (w/w) NaOH solution. What is $\%$ (w/v) NaOH if density of final solution is 2 gm/mL?

A. 72.5

B. 65

C. 62.5

D. None of these

Answer: A

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64. 100 ml aqueous solution containing equimolar mixtrue of $Ca(OH)_2$ and $Al(OH)_3$ requires 0.5 litre of 4M HCl for complete neutralisation. Molarity of $Ca(OH)_2$, in the original solution is :

A. 2 M

B. 4 M

C. 8 M

D. 10 M

Answer: B

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65. Molarity and Molality of a solution of a liquid (molecular weight = 50) in aqueous solution is 9 and 18 respectively. What is the density of solution?

A. 1 g/cc

B. 0.95 g/cc

C. 1.05 g/cc

D. 0.66 g/cc

Answer: B

Watch Video Solution

66. 300 ml, 2 M H_2SO_4 solution is mixed with 200 ml, 2 M Ba$(OH)_2$) solution then find final molarity of sulphate ion in diluted to 4 times. ($BaSO_4$ formed is precipitated)

A. 0.2 M

B. 0.8 M

C. 0.3 M

D. 0.1 M

Answer: D

Watch Video Solution

67. What is the specific gravity of a liquid if 260 mL of the liquid has the same mass as 390 mL of water?

A. 0.66

B. 0.5

C. 1.5

D. 1.8

Answer: C

Watch Video Solution

68. Molality of pure liquid ethanol $\left(C_2H_5OH\right)$ if its density $d = 1.2g/ml$ is :

A. 0.83 m

B. 50 m

C. 0.78 m

D. 21.74 m

Answer: D

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69. 500 mL, $0.2\mathrm{M}\ \mathrm{NA}_2SO_4$ solution is mixed with 100 mL, $17.1\ \%\ (w/v)Al_2(SO_4)_3$ solution and resulting solution is diluted to 5 times. Find the molarity of SO_4^{-2} ions in the final solution.

[Atomic mass of Al = 27, S = 32, Na = 23]

A. $\frac{1}{12}M$

B. $\frac{5}{12}M$

C. $\frac{7}{5}M$

D. $\frac{12}{5}M$

Answer: A

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70. Equal volumes of 0.50 M of HCl, 0.25 M of NaOH and 0.75 M of NaCl are mixed. The molarity of the NaCl solution :

A. $\frac{3}{4}M$

B. $\frac{1}{3}M$

C. $\frac{1}{2}M$

D. 2.00 M

Answer: B

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71. A solution is made by dissolving $CaBr_2$ in water (solvent) such that mass fraction of solute and solvent is same in the solution. The molality of solution is :

A. 2.5 m

B. 55.55 m

C. 2 m

D. 5 m

Answer: D

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72. Molarity and molality of pure CH_3COOH are respectively : $\left(d_{CH_3COOH} = 1.5g/ml\right)$

A. 16.67, 25

B. 25, 16.67

C. 50, 33.3

D. 25 both

Answer: B

Watch Video Solution

73. 1.11 gm of $CaCl_2$ is added to water forming 500 ml solution. 20 ml of this solution is taken and diluted 10 folds. Find moles of Cl^- ions in 2 ml of diluted solution :

A. 8×10^{-6}

B. 4×10^{-6}

C. 12×10^{-8}

D. 5×10^{-6}

Answer: A

View Text Solution

74. Calculate molality of one litre of solution containing 200 gm $CaBr_2$. Given density of solution equal to 1.0 gm/ml. (Atomic mass of Ca = 40, Br = 80)

A. 1 m

B. 1.25 m

C. 0.8 m

D. 1.4 m

Answer: B

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75. A human patient suffering from a duodenal ulcer may show a hydrochloric of 0.080 mol/L in his gastric juice. It is possible to neutralize this acid with aluminum hydroxide, $Al(OH)_3$, which reacts with HCl according to the chemical reaction shown below :

$$Al(OH)_3 + HCL \rightarrow AlCl_3 + H_2O$$

Find wt. $Al(OH)_3$ which is required to neutralize 2 L HCl :

A. 2.08 g

B. 6.20 g

C. 0.693 g

D. 4.16 g

Answer: D

Watch Video Solution

76. A mixture containing equimolar amounts of $Ca(OH)_2$ and $Al(OH)_3$ requires 0.5 L of 4.0 M HCl to react with it completely. Moles of the mixture are :

A. 0.04

B. 0.4

C. 0.8

D. 0

Answer: C

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77. X mL of a 60% w/w alcohol by weight $(d = 0.6gm/mL)$ must be used to prepare 200 mL of 12% alcohol by weight $(d = 0.6gm/mL)$. Then the value of X will be :

A. 20

B. 40

C. 60

D. 80

Answer: C

Watch Video Solution

78. 100 ml aqueous solution $\left(\text{density}\frac{5}{3}gm/ml\right)$ contains 40% by weight NaOH. The number of molecules of NaOH dissolved in the above solution is :

$\left(\text{Use}N_A = 6 \times 10^{23}\right)$

A. 2×10^{22}

B. 3.33×10^{22}

C. 10^{24}

D. 3.33×10^{23}

Answer: C

Watch Video Solution

79. Molality of pure liquid benzene $\left(C_6H_6\right)$ if its density $d = 1.2g/ml$ is :

A. 0.83 m

B. 50 m

C. 0.78 m

D. 12.8 m

Answer: D

Watch Video Solution

80. Molality of pure water if its density is $0.936gm/ml$:

A. 50

B. 55.56

C. 57.56

D. 56.56

Answer: B

Watch Video Solution

81. Arrange in increasing order of molarity of solute in following solutions consdering water as solvent.

(P) 224 gm/L KOH

(Q) $11.2\ \%\ w/v$ KOH

(R) 5m KOH $(d = 0.64 gm/ml)$

A. $(Q) < (R) < (P)$

B. $(R) < (A) < (P)$

C. $(R) < (P) < (Q)$

D. $(P) < (Q) < (R)$

Answer: A

Watch Video Solution

82. Decreasing order (first having highest and then other following it) of mass of pure NaOH in each of the aqueous solution

(P) 50 gm of $40\ \%\ (w/w)$ NaOH

(Q) 50 gm of $50\ \%\ (w/w)$ NaOH $\left[d_{\text{soln.}} = 1.2gm/ml\right]$

(R) 50 gm of 20 M NaOH $\left[d_{\text{soln}^{.}} = 1gm/ml\right]$

A. (P), (Q), (R)

B. (R), (Q), (P)

C. (Q), (R), (P)

D. All contain same wt of NaOH

Answer: B

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83. If ratio of mole fraction of solute to solvent is unity, what would be % by weight? (concentration of solute))M solute=M molecular mass of solvent)

A. $\dfrac{\text{Msolute}}{\text{M solute} + \text{M solvent}} \times 100$

B. 50 %

C. 66.67 %

D. $\dfrac{\text{M solute}}{\text{M solvent}} \times 100$

Answer: A

Watch Video Solution

84. Molality(m) of a sulphuric acid solution in which the mol fraction of water is 0.85 is :

A. 4.9

B. 9.8

C. 19.6

D. cannot be determined

Answer: B

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85. 200 ml of an aqueous solution of glucose $\left(C_6H_{12}O_6\right)$ has molarity of $0.01M$. Which of the following operations can be done to this solution so as to increase molarity to 0.015 M?

A. Evaporate 50 ml water from this solution

B. Add 0.18 g glucose to solution without changing its volume

C. Add 50 ml water to this solution

D. None of the above

Answer: B

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86. Volume of dil. $HNO_3(D = 1.1gm/ml, 20\,\%\,3/3)$ that can be prepared by diluting 50 ml of concentrated $HNO_3(d = 1.4gm/ml, 70\,\%\,w/w)$ with water is nearest ot :

A. 150 ml

B. 223 ml

C. 178 ml

D. 333 ml

Answer: B

Watch Video Solution

87. If a pure compound is composed of X_2Y_3 molecules and consists of $60\,\%$ X by weight what is the atomic weight of Y in term of atomic weight of X (Atomic mass of $X = M_x$)?

A. $\frac{9}{4}M_x$

B. $\frac{4}{9}M_x$

C. $\frac{2}{3}M_x$

D. $\frac{3}{2}M_x$

Answer: B

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88. If 200 ml of 0.1 M Na_2SO_4 is mixed with 100 ml of 0.2 M NA_3PO_4 solution, molarity of Na^+ in the final solution, if final solution has density $1.2gm/ml$, will be :

A. 0.196 M

B. 0.33 M

C. 0.5 M

D. none of these

Answer: B

Watch Video Solution

89. 4 L of 0.02 M aqueous solution of NaCl was diluted by adding one litre of water.The molality of the resultant solution is :

A. 0.004

B. 0.008

C. 0.012

D. 0.016

Answer: D

View Text Solution

90. V_1 ml of NaOH of molarity X and V_2 ml of $Ba(OH)_2$ of molarity $\frac{y}{2}$ are mixed together. Mixture is completely neutralized by 100 ml $\frac{0.1}{2}\mathrm{M}\ \mathrm{H}_2SO_4$ /. If $\frac{V_1}{V_2} = \frac{1}{4}$ and $\frac{x}{y} = 4$, what fraction of acid is neutralized by $Ba(OH)_2$?

A. 0.5

B. 0.25

C. 0.33

D. 0.67

Answer: A

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91. A faculty of KOTA Institute who has five classes per day, after taking the fourth class and before going for next class, drinks 500 ml of $90\%\ (w/v)$ glucose solution. The number of glucose molecules taken by him is $= Q \times 10^{23}$. Find the value of Q.

$\left(N_A = 6.0 \times 10^{23}\right)$

A. 9

B. 6.5

C. 4.5

D. 1.5

Answer: D

Watch Video Solution

92. A bottle of H_3PO_4 solution contains $70\%(w/w)$ acid. If the density of the H_3PO_4 solution required to prepare 1 L of 1N solution is :

A. 90 mL

B. 45 mL

C. 30 mL

D. 23 mL

Answer: C

View Text Solution

93. When 1 L of 0.1 M sulphuric acid solution is allowed to react with 1 L of 0.1 M sodium hydroxide solution, the amount of sodium sulphate (anhydrous) that can be obtained from the solution fromed and the concentration of H^{+} in the solution respectively are :

A. $3.55g, 0.1M$

B. $7.10g, 0.025M$

C. $3.55g, 0.025M$

D. $7.10g, 0.05M$

Answer: D

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94. How many mL of 8.00 M HCl are needed to prepare 150 mL of a 1.60 M HCl solution?

A. 30.0 mL

B. 24.0 mL

C. 18.8 mL

D. 12.0 mL

Answer: A

Watch Video Solution

95. What mass of magnesium hydroxide is required to neutralize 125 mL of 0.136 M hydrochloric acid solution?

Substance	Molar Mass
$MG(OH)_2$	58.33 gmol^{-1}

A. $0.248g$

B. $0.496g$

C. $0.992g$

D. $1.98g$

Answer: B

Watch Video Solution

96. Concentrated hydrochloric acid is 12.0 M and is 36.0% hydrogen chloride by mass. What is its density?

A. 1.22g mL^{-1}

B. 1.10g mL^{-1}

C. 1.01g mL^{-1}

D. 0.820g mL^{-1}

Answer: A

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97. A jheterogeneous system is produced when 0.040 moles of solid NaCl is added to 0.10 L of 0.10 M $Pb(NO_3)_2$. Which ion is present in the aqueous phase at the highest concentration?

A. Cl^{-}

B. NO^{-}

C. Pb^{2+}

D. Na^{+}

Answer: D

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98. A solution of sulphuric acid in water that is $25\% h_2SO_4$ by mass has a density of $1.178 gmL^{-1}$. Which expression gives the molarity of this solution?

A. $0.25 \times 98 \times 1178$

B. $\dfrac{0.25 \times 1178}{98}$

C. $\dfrac{0.25}{98 \times 1178}$

D. $\dfrac{1178}{0.25 \times 98}$

Answer: B

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99. The mineral trona has the formula $Na_2CO_3. NaHCO_3.2H_2O$ and a formula mass of $226g. mol^{-1}$.How many mL of 0.125 M HCl are needed to convert all the carbonbate and bicarbonate in a 0.407 g sample of trone into carbon dioxide and water?

A. 43.3 mL

B. 28.8 mL

C. 21.6 mL

D. 14.4 mL

Answer: A

Watch Video Solution

100. Silver metal reacts with nitric acid according to the equation :

$3Ag(s) + 4HNO_3(aq) \rightarrow 3AgNO(aq) + NO(g) + 2h_2O(l)$

What volume of $1.15 \text{M HNO}_3(aq)$ is required to react with $0.784g$ of silver?

A. 4.74 mL

B. 6.32 mL

C. 8.43 mL

D. 25.3 mL

Answer: C

Watch Video Solution

101. What volume of 6.0 M H_2SO_4 to make 20 L pf 3.0 M H_2SO_4 upon dilution to volume?

A. 1.7 L

B. 5.0 L

C. 8.3 L

D. 10 L

Answer: C

Watch Video Solution

102. An aqueous solution that is 30.0% NaOH by mass has a density of $1.33gmL^{-1}$.What is the molarity of NaOH in this solution?

A. 8.25

B. 9.98

C. 16.0`

D. 33.2

Answer: B

Watch Video Solution

103. A solution of magnesium chloride that is 5.10% magnesium by mass has a density $1.17 g/mL$. How many moles of Cl^- ions are in 300 mL of the solution?

A. 0.377

B. 0.627

C. 0.737

D. 1.49

Answer: D

Watch Video Solution

104. What volume of 0.108 M H_2SO_4 is required to neutralize 25.0 mL of 0.145 M KOH?

A. 16.8 mL

B. 33.6 mL

C. 37.2 mL

D. 67.1 mL

Answer: A

Watch Video Solution

105. What is the molarity of KI in a solution that is 5.00% KI by mass and has a density of $1.038g.\ cn^{-3}$?

A. 0.0301 M

B. 0.313 M

C. 0.500 M

D. 0.625 M

Answer: B

Watch Video Solution

106. What is the concentration of the solution that results from mixing 40.0 mL of 0.200 M HCl with 60.0 mL of 0.100 M NaOH?(You may assume the volume are additive.)

A. 0.150 M NaCl

B. 0.0200 M NaCl and 0.0200 M HCl

C. 0.0200 M NaCl and 0.0600 M HCl

D. 0.0600 N NaCl and 0.0200 M HCl

Answer: D

Watch Video Solution

107. What volume, in mL, of concentrated sulphuric acid $\left(18.0\text{M } H_2SO_4\right)$ is needed to prepare $2.50L$ of a $1.00M$ solution?

A. 7.20

B. 14.4`

C. 69.4

D. 139

Answer: D

Watch Video Solution

108. The bromide impurity in a 2.00 g sample of a metal nitrate is precipitated as silver bromide. If 6.40 mL of $0.200 M\ AgNO_3$ solution is required, what is the mass percentage of bromide in the sample?

A. 1.28

B. 2.56

C. 5.11

D. 9.15

Answer: C

View Text Solution

109. A 100 mL portion of 0.250 M calcium nitrate solution. What is the final concentration of the nitrate ion?

A. 0.180 M

B. 0.130 M

C. 0.0800 M

D. 0.0500 M

Answer: A

Watch Video Solution

110. What is the molarity of a 0.500 molal aqueous solution of calcium nitrate that has a density of $1.045 gmL^{-1}$?

A. 0.483 M

B. 0.500 M

C. 0.522 M

D. 0.567 M

Answer: A

Watch Video Solution

111. What volume of 0.150 M H_2SO_4 would be required to completely neutralize a mixture of 20.0 mL of 0.200 M NaOH and 40.0 mL of 0.0500 M $Ca(OH)_2$?

A. 20.0 mL

B. 26.7 mL

C. 40.0 mL

D. 53.3 mL

Answer: B

Watch Video Solution

112. A saturated aqueous solution of sucrose, $C_{12}H_{22}O_{11}$, contains 525g of sucrose (molar mass 342) per 100g of water. What is the $C_{12}H_{22}O_{11}/H_2O$ molecular ratio in this solution?

A. $\frac{5.25}{1}$

B. $\frac{1.54}{1}$

C. $\frac{1}{1}$

D. $\frac{0.276}{1}$

Answer: D

Watch Video Solution

113. A 50.0 mL solution of 0.150 M HCl. Is mixed with 25.0 mL of 0.400 M HCl What is the HCI concentration in the final solution? (Assume volumes are additive.)

A. 0.0175

B. 0.233

C. 0.275

D. 0.550

Answer: B

Watch Video Solution

114. How many moles of ions are present in 250mL of a 4.4M solution of sodium sulphate?

A. 1.1

B. 2.2

C. 3.3

D. 13

Answer: C

Watch Video Solution

115. 40.0g of a solute is dissolved in 500mL of solvent to give a solution with a volume of 515 mL. The solvent has a density of 1.00 g/mL. Which statement about this solution is correct?

A. The molarity is greater than the molality.

B. The molarity is lower than the molality.

C. The molarity is the same as the molality.

D. The molarity and molality cannot be compared without knowing the solute.

Answer: B

Watch Video Solution

116. A 49.9g sample of barium hydroxide octahydrate, $Ba(OH)_2.8H_2O$ is dissolved in water and the solution is diluted to give a final volune of

2.50L. What is the concentration of the hydroxide ion in this solution?`

Molar mass ($g\ mol^{-1}$)	
$Ba(OH)_2 \cdot 8H_2O$	315

A. 0.0634M

B. 0.127M

C. 0.190M

D. 0.634M

Answer: B

Watch Video Solution

117. What is the maximum mass of PbI_2 that can be precipitated by mixing 25.0 mL of 0.100 M $Pb(NO_3)_2$ with 35.0 mL of 0.100 M NaI?

Molar mass ($g\ mol^{-1}$)	
PbI_2	461

A. 0.807g

B. 1.15g

C. 1.61g

D. $2.30g$

Answer: A

Watch Video Solution

118. Commercial vinegar is a 5.00% by mass aqueous solution of acetic acid, CH_3CO_2H (M=60.0). What is the molarity fo acetic acid in vinegar? [Density of vinega $= 1.00\frac{g}{mL}$]

A. 0.833 M

B. $1.00M$

C. 1.20M

D. 3.00M

Answer: A

Watch Video Solution

119. What is the molarity of Na^{+} ions in a solution made by dissolving 4.20g of $NaHCO_3$ (M=84.0) and 12.6g of Na_2CO_3 (M=126) in water and diluting to 1.00L?

A. 0.050M

B. 0.100M

C. 0.150M

D. 0.250M

Answer: D

Watch Video Solution

120. What is the molarity of a hydorchlric acid solution if 20.00 mL of it neutralizes 18.46 mL of a 0.0420M $Ba(OH)_2$ solution?

A. 0.0194M

B. 0.0388M

C. 0.0455M

D. 0.0775M

Answer: D

Watch Video Solution

121. A 65.25 g sample fo $CuSO_4.5H_2O$ (M=249.7) is dissolved in enough water to make 0.800 L of solution. What volume of this solution must be diluted with water to make 1.00 L of $0.100M\ CuSO_4$?

A. 3.27mL

B. 81.6mL

C. 209 mL

D. 306 mL

Answer: D

Watch Video Solution

122. How many moles of sulphate ions are in 100 mL of a solution of 0.0020 M $Fe_2(SO_4)_3$?

A. 2.0×10^{-4}

B. 6.0×10^{-4}

C. 2.0×10^{-1}

D. 6.0×10^{-1}

Answer: B

Watch Video Solution

123. What is the molality of a solution made by dissolving 36.0g of glucose ($C_6H_{12}O_6$, M=180.2) in 64.0g of H_2O ?

A. 0.0533

B. 0.200

C. 0.360

D. 3.12

Answer: D

Watch Video Solution

124. What is the final $[Na^+]$ in a solution prepared by mixing 70.0mL of 3.00 M Na_2SO_4 with 30.0 mL of 1.00 M NaCl?

A. 2.00 M

B. 2.40 M

C. 4.00 M

D. 4.50 M

Answer: D

Watch Video Solution

125. The active ingredient in commercial bleach is sodium hypochloride, $NaOCl$, which can be determined by iodometric analysis as indicated in these equations.

$OCI^{-} + 2H^{+} + 2I^{-} \rightarrow I_2 + Cl^{-} + H_2O$

$I_2 + 2S_2O_3^{2-} \rightarrow S_4O_6^{2-} + 2I^{-}$

If 1.356 g of a bleach sample requires 19.50 mL of 0.100 M $Na_2S_2O_3$ solution, what is the percentage by mass of $NaOCl$ in the bleach?

A. 2.68 %

B. 3.70 %

C. 5.35 %

D. 10.7 %

Answer: C

Watch Video Solution

126. What mass of $NaHCO_3$ (M=84.0) is required to completely neutralize 25.0 mL of 0.125 M H_2SO_4?

A. 0.131 g

B. 0.262g

C. 0.525g

D. 1.05g

Answer: C

Watch Video Solution

127. Which mixture of water and H_2SO_4 represents a soltion with a concentration that is closest to 30% by mass H_2SO_4?

A. 30g $H_2SO_4 + 100gH_2O$

B. 1 mol $H_2SO_4 + 200gH_2O$

C. 30 mol $H_2SO_4 + 0.70kgH_2O$

D. 0.30 mol $H_2SO_4 + 0.70molH_2O$

Answer: B

View Text Solution

128. What is the mole fraction of CH_3OH in an aqueous solution that is 12.0m in CH_3OH?

A. 0.178

B. 0.216

C. 0.400

D. 0.667

Answer: A

Watch Video Solution

129. A solution is prepared by mixing 25.0 mL of 6.0 M HCl with 45.0 mL of 3.0 M HNO_3. What is $\left[H^+\right]$ in the resulting solution?

A. 1.9M

B. 2.1M

C. 4.1M

D. 4.5M

Answer: C

Watch Video Solution

130. A 25.0 mL sample of 0.15 M silver nitrate, $AgNO_3$, is reacted with a 3.58g sample of calcium chloride, $CaCl_2$ (M=111.0). Which of the following statements is true?

A. Silver nitrate is the limting reactant and calcium nitrate precicpitates.

B. Silver nitrate is the limiting reactant and silver chloride precipitates.

C. Calcium chloride is the limiting reactant and calcium nitrate precipitates.

D. Calcium chloride is the limiting reactant and silver chloride precipitates.

Answer: B

Watch Video Solution

131. What volume of 95% H_2SO_4 by weight $\left(d = 1.85 gmL^{-1}\right)$ and what mass of water must be taken to prepare $100 mL$ of 15% solution of H_2SO_4 $\left(d = 1.10 gmL^{-1}\right)$

A. 9.4 ml

B. 18.8 ml

C. 28.2ml

D. 56.4ml

Answer: A

Watch Video Solution

132. Equal weight of $NaCl$ and KCl are dissolved separately in equal of solutions. Molarity of the two solutions will be:

A. equal

B. that of NaCl will be less than that of KCl solution.

C. that of NaCl will be more than that of KCl solution

D. that of NaCl will be half than that of KCI solution

Answer: C

Watch Video Solution

133. The strength of H_2SO_4 solution (in gm/litre), 12 ml of which neutralized by 15ml of $\frac{M}{10}$ NaOH solution :

A. 12.25

B. 3.06

C. 6.125

D. 5.00

Answer: C

Watch Video Solution

134. 120 gm of glucose is dissolved to make 1 litre solution having density 1.2g mL^{-1}. Which of following is correct about the solution?

A. Molarity of solution is 2M

B. Solution is 10% w/w

C. Solution is 10% w/v

D. Molarity of solution is 1.85 molal.

Answer: B

Watch Video Solution

135. Equal volume of liquid A (d=0.8 gm/ml) and liquid B (d=1.2 gm/ml) are mixed to form a solution. Calculate mole fraction of A in solution. [$M_A = 16, M_B = 32$]

A. $\frac{3}{8}$

B. $\frac{2}{3}$

C. $\frac{4}{7}$

D. $\frac{3}{4}$

Answer: C

Watch Video Solution

136. A solution is made by dissolving $CaBr_2$ in water (solvent) such that mass fraction of solute and solvent is same in the solution. The molality of solution is :[Atomic mass of $Br = 80, Ca = 40$]

A. 2.5m

B. 55.55m

C. 2m

D. 5m

Answer: D

Watch Video Solution

137. 500 ml, 1 M $NaCl(aq)$ solution is mixed with 1000 ml, 1 M $AgNO_3$(aq) solution. Which of the following option is correct for resultant solution?

A. $\left[Na^{+}\right] = \frac{1}{3}M$

B. $\left[Ag^{+}\right] = \frac{2}{3}M$

C. $\left[NO_3^{-} = \frac{4}{3}M\right.$

D. $\left[Cl^{-}\right] = \frac{1}{3}M$

Answer: A

Watch Video Solution

138. A 12.0 M acid solution that contains 75.0% acid by mass has a density of $1.57g/mL$. What is the identity of the acid?

A. HCl(M=36.5)

B. $CH_3CO_2H(M = 60.0)$

C. Hbr(M=80.9)

D. $H_3PO_4(M = 98.0)$

Answer: D

Watch Video Solution

Percentage labelling of Oleum sample, volume strength of hyrogen Peroxide, ppm

1. A 50 gm sample which may contain either $\left(H_2S\right)_4$ or SO_3 or any combination of the two is mixed with 9 gm of water. The maximum oleum labelling possible of the sample formed can be:

A. $118\ \%$

B. $109\ \%$

C. $105\ \%$

D. $103.8\ \%$

Answer: D

Watch Video Solution

2. An aqueous solution of H_2O is labelled as 28.375V H_2O_2 and the density of solution is 1.25 gm/ml. Then the correct option will be :

A. Molality will be 2 m

B. Molarity will be 5M

C. Molality of solution is 2.15 m

D. Molarity of H_2O_2 is 1.25 M

Answer: C

Watch Video Solution

3. 35 mL sample lof hydrogen peroxide gives off 494 mL of O_2 at 27° C and 1 atm pressure. Volume strength of H_2O_2 sample will be :

A. 10 V

B. 13 V

C. 11 V

D. 12 V

Answer: B

View Text Solution

4. The volume strength of 0.75 M H_2O_2 solution is : (Assume 1 mole of an ideal gas occupies 22.4L at STP)

A. 4.8 V

B. 8.4 V

C. 3 V

D. 8 V

Answer: B

Watch Video Solution

5. A fresh H_2O_2 solution is labelled $11.2V$. This solution has the same concentration as a solution which is

A. 3.4% (w/w)

B. 3.4% (v/v)

C. 3.4% (w/v)

D. none of these

Answer: C

Watch Video Solution

6. Bottle (A) contains 320 mL of H_2O_2 solution and labelled with 10 V H_2O_2 and bottle (B) contains 80 mL H_2O_2 having molarity 2.5 M. Content of bottle (A) and bottle (B) are mixed and solution is filled in bottle (C).

Select the correct label for bottle (C) in terms of volume strength and g/litre. (Assume 1 mole of an ideal gas occupies 22.4 L at STP)

A. 13.6 V and 41.276 g/L

B. 11.2 V and 0.68 g/L

C. 5.6 V and 0.68 g/L

D. 5.6 V and 41.286 g/L

Answer: A

Watch Video Solution

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

$2H_2O_2(aq) \rightarrow 2H_2O(l) + O_2(g)$

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

A. 2.5

B. 1

C. 0.5

D. 0.25

Answer: A

Watch Video Solution

8. which of the following options temperature-dependent concentration term?

A. ppm

B. % w/w

C. Volume strength of H_2O_2

D. % labelling of oleum

Answer: A::C

View Text Solution

9. 60 gm of oleum (labelled as 118 %) is mixed with 11.8 gm of water. What will be the composition of final mixture?

A. Only H_2SO_4, having mass 71.8 gm

B. 118 gm of H_2SO_4

C. 70.8 gm H_2SO_4 and 1 gm water

D. 32 gm SO_3 and 39.8 gm H_2SO_4

Answer: C

View Text Solution

10. The molality of a H_2O_2 solution of density 1.068` gm/ml is 2m. The only incorrect concentration of the same solution is :

A. molarity =2M

B. volume strength =22.7 vol at STP

C. 6.8 % (w/w)

D. 6.8 % (w/w)

Answer: D

Watch Video Solution

11. A sample of oleum is labelled as 112 % . In 200gm of this sample, 18 gm water is added. The resulting solution will contain:

A. 218 gm pure H_2So_4

B. 218 gm H_2SO_4 and 6 gm free SO_3

C. 212 gm H_2SO_4 and 6 gm free SO_3

D. 191.33 gm H_2SO_4 and 26.67 gm free SO_3

Answer: D

Watch Video Solution

12. A sample of oleum is labelled as 118 %. Moles of NaOH needed for complete neutralisation of 100 gm oleum is :

A. 2.0

B. $\frac{20}{49}$

C. $\frac{118}{49}$

D. $\frac{59}{49}$

Answer: C

Watch Video Solution

13. An oleum sample is labelled as 113.5 %. Identity the incorrect statement

A. The amount of free SO_2 in 50g oleum sample is 30 g

B. The amount of H_2SO_4 in 50g oleum sample is 30g

C. The new labelling of oleum sample when 8 g water is added in 100 g original oleum sample is $\left(100 + \frac{137.5}{27}\right)\%$

D. In the original 50g oleum sample when 6.75 g is added then 56.75g H_2SO_4 is produced.

Answer: B

Watch Video Solution

14. 200 gm of an oelum sample (labelled as 109 %) is mixed with 400 gm of another oleum sample (labelled as 118 %). The labelling of the new sample formed will be :

A. 115 %

B. 112 %

C. 122 %

D. 116 %

Answer: A

Watch Video Solution

15. The legal limit for human exposure to CO in the work place is 35 ppm. Assuming that the density of air is 1.3 g/L, how many grams of CO are in 1.0 L of air at the maximum allowable concentration?

A. 4.55×10^{-5} gm

B. 3.5×10^{-5} gm

C. 2.69×10^{-5} gm

D. 7.2×10^{-5} gm

Answer: A

Watch Video Solution

16. If all hydrogen atoms are present in its isotopic form of deuterium $\left(._1H^2\right)$ in an oleum sample. Calculate percentage by mass of sulphur in 118 % of one such oleum sample $\left(SO_3 + D_2SO_4\right)$.

A. 32 %

B. 64 %

C. 46.8 %

D. 38.4 %

Answer: D

Watch Video Solution

17. Which of the following is/are incorrect for 17 g/L of H_2O_2 solution ?

A. Volume strength is 5.675

B. Molarity of solution is 0.5M.

C. 1ml of this solution gives 2.8 ml at 273 K and 2 atm

D. The molarity of solution is 2M

Answer: D

Watch Video Solution

18. 56V,500mlH_2O_2 solution is kept in an open contaier due to which some H_2O_2 is decomposed and evolves 8gm O_2. Simultaneously some H_2O also vapouries. Due to all these changes ,final volume is reduced by 20% . Find final volume strength of $H_2O_2(aq)$.

Assume 1 mole of an ideal gas occupies 22.4 L at STP)

A. 56 V

B. 44.8 V

C. 11.2 V

D. 33.6 V

Answer: A

Watch Video Solution

19. Label an oelum sample sample which has mass friction of SO_3 equal to 0.6:

A. 1.15

B. 1.09

C. 1.045

D. 1.135

Answer: D

Watch Video Solution

20. The volume strength (at STP) of 100 ml H_2O_2 solution which produce 5.6 litre of oxygen gas at 1 atm and 0^C is :

A. 28

B. 56

C. 112

D. 56.75

Answer: D

Watch Video Solution

21. Accoridng to EPA guidelines the permissible level for lead in drinking water is 15 parts per billion (ppb). What is the maximum allowable mass of lead that could be present in 1.00L of H_2?

A. 0.015 ng

B. $0.015 \mu g$

C. 0.015mg

D. 0.015 g

Answer: C

Watch Video Solution

22. Relationship between volume strength of H_2O_2 aqueous solution and molarity depeds on pressre and temperature of O_2 (g) collected

Example :

At1 atm ,273K,Volume strength =11.2xxM

At STP, Volume strength =11.35 x M

[Note : By default STP is taken for volume strength and calculationl.

Find the relationship between volume strength and molarity at 300 K and 1 atm.

A. $12.308 \times$ Molarity

B. $24.63 \times$ Molarity

C. $11.35 \times$ Molarity

D. $22.7 \times$ Molarity

Answer: A

Watch Video Solution

23. Calculate the mass percent (w/w) of sulphuric acid in a solution prepared by dissovles 4 g of sulphur trixoide in a 100ml of sulphuric acid solution containing 80 mass percent (w/w) of H_2SO_4 and having a density of 1.96 g/ml.

(Molecular weight of $H_2SO_4 = 98gm$) Taken reaction $SO_3 + H_2O \rightarrow H_2SO_4$

A. 0.8085

B. 0.84

C. 0.4165

D. None of these

Answer: A

Watch Video Solution

K. Eudiometry

1. The volume of CO_2 prodcued by the combination of 40 ml of gaseous acetone in excess of oxygen is :

A. 40 ml

B. 80 ml

C. 60 ml

D. 120 ml

Answer: D

Watch Video Solution

2. 500 ml of a hydrocarbon gas burnt in excess of oxygen yields 2500 ml of CO_2 and 3 litres of water vapours. All volume being measured at the same temperature and pressure. The formula of the hydrocarbon is :

A. C_5H_{10}

B. C_5H_{12}

C. C_4H_6

D. C_3H_6

Answer: B

Watch Video Solution

3. 7.5 ml of a gaseous hydrocarbon was exploded with 36 ml of O_2. On cooling the volume of gases was found to be 28.5 ml, 15 ml of which was absorbed by KOH and the rest was absorbed in a solution of alkaline pyrogallol. The formula of hydrocarbon is:

A. C_3H_4

B. C_2H_4

C. C_2H_6

D. C_3H_6

Answer: B

Watch Video Solution

4. A gaseous alkane is exploded with oxygen. The volume of O_2 for complete combination to CO_2 formed in the ratio $\frac{7}{4}$. The molecular of alkane is :

A. C_2H_4

B. C_2H_6

C. C_4

D. C_4H_{12}

Answer: B

Watch Video Solution

5. LPG is a mixture of n-butane and iso-butane. The volume of oxygen needed to burn 1 kg of LPG at STP would be :

A. 2240 L

B. 2544 L

C. 1000 L

D. 500 L

Answer: B

Watch Video Solution

6. Given the reaction :

$C(s) + H_2O(l) \rightarrow CO(g) + H_2(g)$

Calculate the volume of the gases prodcued at STP from 48.0 g of carbon.

A. 181.6 L

B. 179.2 L

C. 45.4 L

D. 22.7 L

Answer: A

Watch Video Solution

7. A chemist has sythesized a greenish yellow gaseous compound of chlorine and oxygen and oxygen and finds that its density is 7.71 g/L at $36\,^{\circ}C$ and 2.88 atm. Then the molcular formula of the compound will be :

A. CIO_3

B. CIO_2

C. CIO

D. CI_2O_2

Answer: B

Watch Video Solution

8. An amount of 1.00 g of a gaseous compound of boron and hydrogen occupies 0.820 L at 1.00 atm and at $3\,^{\circ}C$.The compound is : (R=0.0820 L atm $\text{mole}^{-1}K^{-1}$, at. Wt: H=1.0 ,B=10.8)

A. BH_3

B. B_4H_{10}

C. B_2H_6

D. B_3H_{12}

Answer: C

Watch Video Solution

9. Potassium hydroxide solutions are used to absorb CO_2.How many litres of CO_2 at 1.00 atm and $22^\circ C$ would be absorbed by an aqueous solution containing 15.0 g of KOH ?

(Take R=$\frac{1}{12}$ L atm/K/mole)

$KOH + CO_2 \rightarrow K_2CO_3 + H_2O$

A. 3.29 L

B. 1.65 L

C. 6.58 L

D. 0.329 L

Answer: A

Watch Video Solution

10. 1 ml of gaseous aliphatic compound $C_nH_{3n}O_m$ is completely burnt in an excess of O_2 . The contraction in volume is

A. $\left(1 + \frac{1}{2}n - \frac{3}{4}m\right)$

B. $\left(1 + \frac{3}{4}n - \frac{1}{4}m\right)$

C. $\left(1 + \frac{1}{2}n - \frac{3}{4}m\right)$

D. $\left(1 + \frac{3}{4}n - \frac{1}{2}m\right)$

Answer: D

Watch Video Solution

11. A hypothetical gaseous element having molecular formula M_x at 310 K.In this act volume of the gas is contracted from 12 ml to a volume of 8 ml.The simplest possible molecular formula of the two allotropes is :

A. M_5 and M_3

B. M_3 and M_5

C. M_1 and M_2

D. M_2 and M_3

Answer: D

Watch Video Solution

12. what volume of hydrogen gas , at 273 K and 1 atm pressure will be consumed in obtaining 21.6 g of elemental boron (atomic mass=10.8) from the reduction of boron trichloride by hydrogen ?

A. 89.6 L

B. 67.2 L

C. 44.8 L

D. 22.4 L

Answer: B

Watch Video Solution

13. If 30 ml of H_2 and 20 ml of O_2 react to form water, what is left at the end of the reaction ?

A. 10 ml of H_2

B. 5 ml of H_2

C. 10 ml of O_2

D. 5 ml of O_2

Answer: D

Watch Video Solution

14. what volume of CO_2 will be liberated at STP if 12 g of carbon is burnt in excess of oxygen ?

A. 11.35 L

B. 22.7 L

C. 2.27 L

D. 1.135 L

Answer: B

Watch Video Solution

15. For the complete combustion of 4 litre ethane, how much oxygen is required ?

A. 14 litre

B. 4 litre

C. 8 litre

D. 12 litre

Answer: A

Watch Video Solution

16. The volume of oxygen necessary for the complete combustion of 20 litre of propane is :

A. 40 litre

B. 60 litre

C. 80 litre

D. 100 litre

Answer: D

Watch Video Solution

17. In Haber process 30 litre of dihydrogen and 30 litres of dinitrogen were taken for reaction which yielded only50% of the expected product. What will be the composition of gaseous mixture under the aforesaid condition in the end ?

A. 20 litres NH_3, 25 litres N_2, 20 litres H_2

B. 10 litres NH_3, 25 litres N_2, 15 litres H_2

C. 20 litres NH_3, 10 litres N_2, 30 litres H_2

D. 20 litres NH_3, 25 litres N_2, 15 litres H_2

Answer: B

Watch Video Solution

18. 27 g C and 48 g O_2 are allowed to react completely to form CO and CO_2.The weight ratio of CO and CO_2 formed, is :

A. $7:11$

B. $3:4$

C. $14:11$

D. $9:8$

Answer: C

Watch Video Solution

19. What mass of octane should be taken in a total 100 gm mixture of octane and oxygen gas so as to obtain maximum $CO_2(g)$ on complete combustion ?

A. 100 gm

B. 50 gm

C. 23.54 gm

D. 22.17 gm

Answer: D

Watch Video Solution

20. One mole mixture of CH_4 and air (containing 80% N_2 20 % O_2 by volume) of a composition such that when underwent combustion gave maximum heat (assume combustion of only CH_4).Then which of the statements are correct , regarding composition of initial mixture ? (X presents mole fraction)

A. $X_{CH_4}=\frac{1}{11}, X_{O_2}=\frac{2}{11}, X_{N_2}=\frac{8}{11}$

B. $X_{CH_4}=\frac{3}{8}, X_{O_2}=\frac{1}{8}, X_{N_2}=\frac{1}{2}$

C. $X_{CH_4}=\frac{1}{6}, X_{O_2}=\frac{1}{6}, X_{N_2}=\frac{2}{3}$

D. Data insufficient

Answer: A

Watch Video Solution

21. 15 ml of gaseous butane is burnt with 105 ml of oxygen gas at room temperature and pressure . Contraction in volume observed will be :

A. expansion in volume will be observed

B. 60 ml

C. 52.5 ml

D. 65 ml

Answer: C

Watch Video Solution

22. The mass of graphite which should be burnt completely with 9.6 gm oxygen to produce CO and CO_2 gases in 4 :1 mole-ratio is :

A. 12.0 gm

B. 7.2 gm

C. 6.0 gm

D. 4.8 gm

Answer: C

Watch Video Solution

23. A gaseous mixture of ethene, ethane and methane having total volume 150 ml is subjected to combustion in excess of oxygen.If percentage of methane in the original mixture is 20 % , then calculate volume (in ml) of CO_2 which will be obtained at same temperature and pressure.

A. 150 ml

B. 30 ml

C. 240 ml

D. 270 ml

Answer: D

Watch Video Solution

24. 10 gm of a hydrocarbon exactly requires 40 gm oxygen for complete combustion. The product formed are CO_2 and water. When CO_2 gas formed is absorbed completely in lime water, the mass of solution increases by 27.5 gm What is the mass of water formed in combustion ?

A. 22.5 gm

B. 27.5 gm

C. 50 gm

D. 10 gm

Answer: A

Watch Video Solution

25. When $20ml$ of mixture of O_2 and O_3 is heated the volume becomes $29ml$ and disappears in alkaline pyragallol solution. What is the volume precent of O_2 in the originl mixture ? .

A. 90 %

B. 10 %

C. 80 %

D. 40 %

Answer: B

Watch Video Solution

26. 20 ml of a gaseous mixture of N_2 and H_2 gases is mixed with 8 ml O_2 and the mixture is fired.if the final volume becomes 13 ml the volume percent of N_2 in the original mixture is :

A. 20 %

B. 50 %

C. 80 %

D. 40 %

Answer: B

Watch Video Solution

27. 20 ml of a gaseous alkyne exactly requires 80 ml O_2 for complete combustion . The alkyne is :

A. C_3H_8

B. C_3H_6

C. C_3H_4

D. C_2H_2

Answer: C

Watch Video Solution

28. To an eudiometry tube 20 ml of $A_{(g)}$, 40ml of $B_{(g)}$, 30ml of $D_{(g)}$ and 60 ml of $C_{(g)}$ is introduced & subjected to sparking to cause following reation with 100% extent. Calculate the volume change involved due to sparking.

$2A_{(g)} + 4B_{(g)} \rightarrow 3P_{(g)} + Q_{(l)}$

$3C_{(g)} + D_{(g)} \rightarrow 2P_{(g)} + 4R_{(g)}$

A. 10 ml expansion

B. No volume change

C. 30 ml contraction

D. 50 ml expanion

Answer: A

Watch Video Solution

29. A mixture of C_3H_6, C_3H_8 and C_4H_{10} having total volume 90 ml is subjected to complete combustion liberating 320 ml of $CO_2(g)$ at same temperature and pressure. Calculate volume % of C_4H_{10}

A. 40 %

B. 50 %

C. 55.55 %

D. 45 %

Answer: C

Watch Video Solution

30. Volume of STP of 0.44 gm of CO_2 is the same as that

A. 0.02 gm of hydrogen gas

B. 0.085 gm of ammonia gas

C. 0.18 g of H_2O

D. both (a) and (c)

Answer: A

Watch Video Solution

31. The minimum mass of butane and oxygen which should be taken to obtain atleast 198 gm of each product CO_2 and H_2O

A. 396 gm

B. 350 gm

C. 299.25 gm

D. 585.2 gm

Answer: D

Watch Video Solution

32. When burnt in air, a 12.0 g mixture of carbon and sulphur yields a mixture of CO_2 and SO_2 , in which the number of moles of SO_2 is half that of CO_2.The mass of the carbon the mixture contains is : (At . Wt. S=32)

A. 4.08 g

B. 5.14 g

C. 8.74 g

D. 1.54 g

Answer: B

Watch Video Solution

33. 50 ml of gaseous mixture of acetylene and ethylene if taken in a ratio of a:b requires 700 ml of air containing 20 % by volume O_2 for complete combustion . Calculate the volume of air required for complete combustion of a mixture having ratio b:a.

A. 700 ml

B. 675 ml

C. 135 ml

D. 140 ml

Answer: B

Watch Video Solution

Watch Video Solution

34. 10 moles of a mixture of CO(g) and $CH_4(g)$ was mixed with 22 moles of O_2 gas and subjected to sparking.Moles of gas absorbed when the residual gases are passed through alc. KOH is given by :

A. 10 moles

B. 5 moles

C. 20 moles

D. 7.5 moles

Answer: A

Watch Video Solution

35. 40 gm of compound containing 4 nitrogen atoms per molecules on combustion gives 2.8 gm of N_2 gas.Molecular mass of compound is :

A. 200

B. 400

C. 600

D. 800

Answer: D

Watch Video Solution

36. 24 gms of carbon reacts with 38.4 gms of oxygen gas such that no reactant remain.Calculate moles of carbon mono-oxide obtained in the reaction ?

A. 2 moles

B. 1.2 moles

C. 2.4 moles

D. 1.6 moles

Answer: D

Watch Video Solution

37. 20 ml of a mixture of CO_2 and C_2H_4 was mixed with excess of O_2 gas and was exploded.On bringing the solution back to the original room temperature a contraction of 12 ml was observed. What is the volume percentage of CO_2 in the original mixture ?

A. 6%

B. 14%

C. 70%

D. 30%

Answer: C

Watch Video Solution

38. In 20 ml of a gaseous mixture containing N_2 and H_2 gases , 5 ml O_2 gas is added and the mixture is exploded. If the final volume becomes

13ml, then the only incorrect statement is :

(All the volumes are measured at the same pressure and temperature)

A. The initial mixture contains 10 ml N_2 gas

B. The initial mixture contains 8 ml H_2 gas

C. The final mixture contains 1 ml O_2 gas

D. The final mixture contains 12 ml N_2 gas.

Answer: A

Watch Video Solution

39. Maximum mass of sucrose $C_{12}H_{22}O_{11}$ produced by mixing 84 gm of carbon, 12 gm of hydrogen and 56 L O_2 at 1 atm and 273 K according to given reaction, is :

$C(s) + H_2(g) + O_2(g) \rightarrow C_{12}H_{22}O_{11}(s)$

A. 138.5

B. 155.5

C. 172.5

D. 199.5

Answer: B

Watch Video Solution

40. The ratio of the weight of one litre of a gas to the weight of 1.0 L of oxygen gas both measured at STP is 2.22. The molecular weight of the gas would be :

A. 14.002

B. 35.52

C. 71.04

D. 55.56

Answer: C

Watch Video Solution

41. In the reaction $2Al(s) + 6HCl(aq) \rightarrow 6Cl^{-}(aq) + 3H_2$

A. 6 L HCl (aq) is consumed for every 3 L H_2 produced

B. 33.6 L $H_2(g)$ is produced regardless temperature and pressure for every moles that reacts .

C. 67.2 L $H_2(g)$ at 1 atm , 273 K is produced for every mole Al that reacts .

D. 11.2 L H_2(g) at 1 atm, 273 K is produced for every mole HCl(aq) consumed

Answer: D

Watch Video Solution

42. When a mixture consisting of 10 moles of SO_2 and 16 moles of O_2 were passed over a catalyst , 8 mole of SO_3 were formed at equilibrium.The number of moles of SO_2 and O_2 which did not enter into reation were :

A. 2,12

B. 12,2

C. 3,10

D. 10,3

Answer: A

Watch Video Solution

43. $2KI + I_2 + 22HHNO_3 \rightarrow 2HIO_3 + 2KIO_3 + 22NO_2 + 10H_2O$

If 3 mole of KI and 2 moles I_2 are reacted with excess of HNO_3.Volume of NO_2 gas evolved at STP is :

A. 749.1 L

B. 1089.6 L

C. 45.4 L

D. 68.1 L

Answer: A

Watch Video Solution

44. The hourly energy requirement of an astronaut can be satisfied by the energy relesed when 34 g of sucrose $\left(C_{12}H_{22}O_{11}\right)$ are burnt in his body. How many g of oxygen would be needed to be carried in space capsule to meet his requirement for one day :

A. 916.2 gm

B. 91.62 gm

C. 8.162 gm

D. 9.162 gm

Answer: A

Watch Video Solution

45. 1 volumes of gaseous compound consistin C, H, O on complete combustion in presence of 2.5 volume of the formula of the compound if all measurements are made at STP ?

A. C_2H_4O

B. CH_3O

C. C_2H_2O

D. $C_2H_3O_2$

Answer: A

Watch Video Solution

46. 2 litres of a mixture of nitrous and nitric oxides at STP have a mean molecular weight of 39.8.What volume of nitrogen measured at STP could be obtained when the mixture has been passed over red hot copper ?

A. 1.7 L

B. 1.9 L

C. 1.5 L

D. 1.85 L

Answer: A

Watch Video Solution

47. 1 of NO_2 and $7/8L$ of O_2 at the same temperature and pressure were mixed together. What is the relation between the mases of the two gases in the mixture?

A. $M_{N_2} = 3M_{O_2}$

B. $M_{N_2} = 8M_{O_2}$

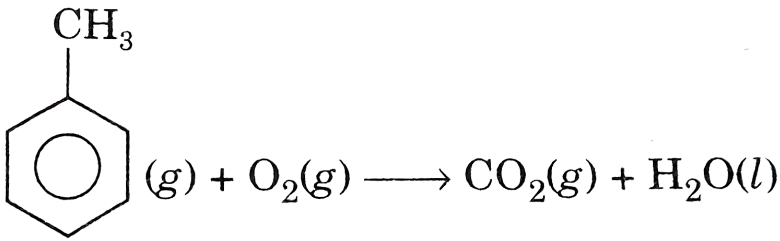
C. $M_{N_2} = M_{O_2}$

D. $M_{N_2} = 16M_{O_2}$

Answer: C

Watch Video Solution

48. Volume conctraction during complete combustion of 30 ml of tolene as per reaction



A. 30 ml

B. 90 ml

C. 60 ml

D. 150 ml

Answer: B

Watch Video Solution

49. In one experiment 100 ml of ozonised oxygen was reduced to 60 ml when treated with turpentine oil.What would be the increase in volume if the original sample was heated until no further change occurred [All volumes are measured under identical conditions]?

A. 10 ml

B. 20 ml

C. 30 ml

D. 40 ml

Answer: B

Watch Video Solution

50. 3 gm of carbon reacts completely with 5 gm of O_2 leaving none of reactant Mole fraction of CO in final mixture is :

A. 0

B. 0.75

C. 1

D. 0.25

Answer: C

Watch Video Solution

51. A mixture containing 3 moles each of C_4H_8 and C_6H_6 undergoes complete combustion with O_2 to form CO_2 and H_2O Calculate total mass of CO_2 produced :

A. 1320 gm

B. 610 gm

C. 528 gm

D. 792 gm

Answer: A

Watch Video Solution

52. The percentage by volume of C_3H_8 in a mixture of C_3H_8, CH_4 and CO is 36.5 . Calculate the volume of CO_2 produced when 100 ml of the mixture is burnt in excess of O_2.

A. 173 ml

B. 106.5 ml

C. 206.5 ml

D. 156.5 ml

Answer: A

Watch Video Solution

53. 1120 ml of ozonised oxygen $(O_2 + O_3)$ at 1 atm and passing the mixture through alkaline pyrogallol solution is :

A. 896 ml

B. 224 ml

C. 448 ml

D. 672 ml

Answer: A

View Text Solution

54. For which compound, volume of oxygen required is 1.5 times volume of carbon dioxide produced.

A. Alkane

B. Alkene

C. Alkyne

D. For all hydrocarbon

Answer: B

Watch Video Solution

55. How many litres of oxygen at 1 atm and 273 K will be required to burn completely 2.2 g of propane $\left(C_3H_8\right)$?

A. 11.2L

B. 22.4 L

C. 5.6 L

D. 44.8 L

Answer: C

Watch Video Solution

56. When a certain amount of octane, C_8H_{18} is burnt completely 7.04 gm CO_2 is fomed What is the weigh of H_2O formed, simultaneously ?

A. 1.62 gm

B. 6.48 gm

C. 3.24 gm

D. 2.28 gm

Answer: C

Watch Video Solution

57. An ideal gaseous mixture of ethane $\left(C_2H_6\right)$ and ethene $\left(C_2H_4\right)$ occupies 28 litre at $1atm \ 0^\circ C$. The mixture reacts completely with $128gmO_2$ to produce CO_2 and H_2O. Mole of fraction at C_2H_6 in the mixtture is-

A. 0.6

B. 0.4

C. 0.5

D. 0.8

Answer: B

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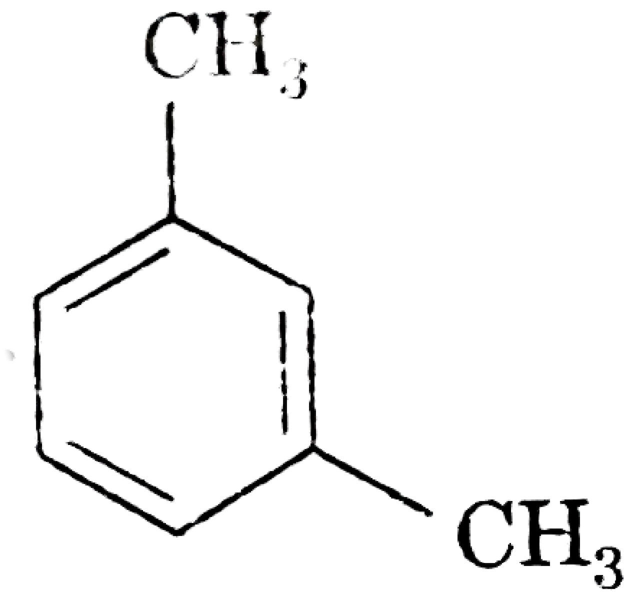

58.

combustion gives $CO_2(g)$ and $H_2O(g)$.Find ratio of number of atoms O to H in product formed.

A. $\frac{1}{2}$

B. $\frac{21}{10}$

C. $\frac{19}{6}$

D. $\frac{9}{2}$

Answer: B

Watch Video Solution

59. $C_6H_5OH(g) + O_2 \rightarrow CO_2(g) + H_2O(l)$

Magnitude of volume change if $30ml$ of $C_6H_5OH(g)$ is burnt with excess amount of oxgen, is

A. 30 ml

B. 60 ml

C. 20 ml

D. 10 ml

Answer: B

Watch Video Solution

60. Methyl-t-butel ether, $C_5H_{12}O$ is added to gasoline to promote cleaner burning How many moles of oxygen gas. O_2 are required to burn 1.0 mol of this compound completeley to form carbon dioxide and water ?

A. 4.5 mol

B. 6.0 mol

C. 7.5 mol

D. 8.0 mol

Answer: C

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61. The reaction of ethanol, C_2H_5OH , with oxygen is a popular classroom demonstration.Balance the equation to find the number of moles of gaseous products formed per mole of ethanol.

$\_ \ C\_2H\_5OH(g) + \_O\_2(g) \rightarrow \_CO\_2(g) + \_H\_2O(g)$

A. 2

B. 3

C. 4

D. 5

Answer: D

Watch Video Solution

62. The mass of $560 cm^3$ of a gas at $0^\circ C$ and 1 atm is 1.60 g. Which gas could it be ?

A. O_2

B. CO_2

C. SO_2

D. Cl_2

Answer: C

Watch Video Solution

63. Assume 0.10 L of N_2 and 0.18 L of H_2, both at 50 atm and $450\,^{\circ}C$, are reacted to form NH_3 Assuming the reation goes to completion , identify the reagent that is in excess and determine the volume of that remains at the same temperature and pressure.

A. H_2 0.02 L

B. H_2 0.08 L

C. N_2 0.01 L

D. N_2 0.04 L

Answer: D

Watch Video Solution

64. Ethanol burns in excess oxygen to form $CO_2(g)$ and $H_2O(g)$ according to this balanced equation.

$C_2H_5OH(g) + 3O_2(g) \rightarrow 2CO_2(g) + 3H_2O(g)$

What value is closest to the volume of $CO_2(g)$, measured at 200 K and 1 atm produced from the combustion of 0.25 mol of $C_2H_5OH(g)$?

A. 5 L

B. 8 L

C. 10 L

D. 15 L

Answer: B

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65. Acetylene, C_2H_2 reacts with oxygen according to the unbalanced equation :

$C_2H_2(g) + O_2(g) \rightarrow CO_2(g) + H_2O(g)$

What is the O_2/C_2H_2 ratio when this equation is correctly balanced ?

A. $\frac{2}{1}$

B. $\frac{3}{1}$

C. $\frac{4}{1}$

D. $\frac{5}{2}$

Answer: D

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66. Which combustion prouduct is produced THE LEAST by gasoline-powered vehicles ?

A. CO_2

B. H_2O

C. NO_2

D. SO_2

Answer: D

Watch Video Solution

67. A 12 gm sample of CH_4 and C_2H_4 on complete oxidation with O_2 forms 35.2gmCO_2 . Find the mean molar mass of original sample:

A. 20

B. 22

C. 14.7

D. 23

Answer: A

Watch Video Solution

68. Toluence, C_7H_8 is added to gasoline to increase its octane rating. What is the volume ratio of air to tolane vapour to burn completely to from CO_2 and H_2O? (Assume air is 20% O_2 by volume.)

A. $\frac{9}{1}$

B. $\frac{11}{1}$

C. $\frac{28}{1}$

D. $\frac{45}{1}$

Answer: D

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69. Which absorbs gaseous carbon dioxide most effectively?

A. Solid KOH

B. Solid SiO_2

C. Aqueous HCl

D. Aqueous NaF

Answer: A

Watch Video Solution

70. Methylamine, CH_3NH_2, reacts with O_2 (in moles) is required to react completely with 1.00 mol of CH_3NH_2?

A. 2.25

B. 2.50

C. 3.00

D. 4.50

Answer: A

Watch Video Solution

71. 100 L of carbon dioxide measured at 740 mm Hg and $50^{\circ}C$ is produced the complete combination of a sample of pentane.

$2C_5H_{12} + 16O_2 \rightarrow 10CO_2 + 12H_2O$

What mass of pentane reacted ?

A. 342g

B. 265g

C. 64.4g

D. 53.0g

Answer: D

Watch Video Solution

72. A 10.0 g sample of an oxide of copper forms metallic copper and 1.26 g of water when heated in a stream of hydrogen. What is the mass percent of copper in this oxide?

A. 11.2 %

B. 66.6 %

C. 79.9 %

D. 88.8 %

Answer: D

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73. A 10.00g sample of a compound containing C,H,and O is burned completely to produce $14.67g$ of CO_2 and $6.000g$of H_2O`. What is the empirical formula of this compound ?

A. CHO

B. CH_2O

C. CH_2O_2

D. C_2H_4O

Answer: B

Watch Video Solution

74. How many moles of water are produced by the complete comustion of 14.4 "g of" C_5H_{12}?

$C_5H_{12} + 8O_2 \rightarrow 5CO_2 + 6H_2O$

A. 0.200

B. 0.600

C. 1.20

D. 2.40

Answer: C

Watch Video Solution

Reasoning type

1. Assertion: Both $12g.$ of carbon and $27g.$ of aluminium will have 6.02×10^{23} atoms.

Reason: Gram atomic mass of an element contains Avogadro's number of atoms.

A. Statement-1 : is True, Statement-2 : is True, Statement-2 : is a correct explanation for Statement-1 :

B. Statement-1 : is True, Statement-2 : is True, Statement-2 : is NOT a correct explanation for Statement-1 .

C. Statement-1 : is Ture, Statement-2 : is False.

D. Statement-1 : is False, Statement-2 : is True.

Answer: A

Watch Video Solution

2. Statement-1: Limiting reagent is the reactant that gets completed (or consumed) in a chemical reaction.

Statement-2: Limiting reagent always has either least mass or the least moles among all the reactant available for a chemical reaction.

A. Statement-1 : is True, Statement-2 : is True, Statement-2 : is a correct explanation for Statement-1 :

B. Statement-1 : is True, Statement-2 : is True, Statement-2 : is NOT a correct explanation for Statement-1 .

C. Statement-1 : is Ture, Statement-2 : is False.

D. Statement-1 : is False, Statement-2 : is True.

Answer: C

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3. Statement-1 :$3.4g$ of $NH_3(g)$ on complete decomposition into N_2 and $H_2(g)$ produces 0.6g of $H_2(g)$.

Statement- 2 : Law of conservartion of mass is followed by the chemical reaction.

A. Statement-1 : is True, Statement-2 : is True, Statement-2 : is a correct explanation for Statement-1 :

B. Statement-1 : is True, Statement-2 : is True, Statement-2 : is NOT a correct explanation for Statement-1 .

C. Statement-1 : is True, Statement-2 : is False.

D. Statement-1 : is False, Statement-2 : is True.

Answer: A

Watch Video Solution

4. Statement-1 : Both solutions have equal moles of CI^- ions in given volume.

Statement-2 : 2M,500ml of NaCl solution and 1 M, 500 ml of $CaCI_2$ solution has equal number of CI^- ions.

A. Statement-1 : is True, Statement-2 : is True, Statement-2 : is a correct explanation for Statement-1 :

B. Statement-1 : is True, Statement-2 : is True, Statement-2 : is NOT a correct explanation for Statement-1 .

C. Statement-1 : is Ture, Statement-2 : is False.

D. Statement-1 : is False, Statement-2 : is True.

Answer: A

Watch Video Solution

5. Statement-1 : For $10\% w/w$ NaOH solution value of molarity is more than it's molarity. Statement-2 : Density of this solutions is more than water.

A. Statement-1 : is True, Statement-2 : is True, Statement-2 : is a correct explanation for Statement-1 :

B. Statement-1 : is True, Statement-2 : is True, Statement-2 : is NOT a correct explanation for Statement-1 .

C. Statement-1 : is Ture, Statement-2 : is False.

D. Statement-1 : is False, Statement-2 : is True.

Answer: D

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6. Statement-1 : Average molar mass of a gaseous mixture of O_2 and CH_4 gas will be 24 g/mole.

Statement-2 : Average molar mass depends upon composition of the mixture.

A. Statement-1 : is True, Statement-2 : is True, Statement-2 : is a correct explanation for Statement-1 :

B. Statement-1 : is True, Statement-2 : is True, Statement-2 : is NOT a correct explanation for Statement-1 .

C. Statement-1 : is Ture, Statement-2 : is False.

D. Statement-1 : is False, Statement-2 : is True.

Answer: D

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7. Statement-1 : When 40 gm of NaOH is mixed with 49gm H_2SO_4 and mixed with water then 89gm of $NaSO_4$ is obtained assuming 100% yield.

Statement-2 : For producing maximum amount of Na_2SO_4 with 100% yield NaOH and H_2SO_4 should be present in a molar ratio of $2:1$.

A. Statement-1 : is True, Statement-2 : is True, Statement-2 : is a correct explanation for Statement-1 :

B. Statement-1 : is True, Statement-2 : is True, Statement-2 : is NOT a correct explanation for Statement-1 .

C. Statement-1 : is True, Statement-2 : is False.

D. Statement-1 : is False, Statement-2 : is True.

Answer: D

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8. Assertion: The weight percentage of a compound A in a solution is given by

$$\% \, of A = \frac{\text{Mass A}}{\text{Total mass of solution}} \times 100$$

Reason: The mole fraction of a component A is given by, Mole fraction of A

$$= \frac{\text{No. of moles of A}}{\text{Total no. of moles of all components}}$$

A. Statement-1 : is True, Statement-2 : is True, Statement-2 : is a correct explanation for Statement-1 :

B. Statement-1 : is True, Statement-2 : is True, Statement-2 : is NOT a correct explanation for Statement-1 .

C. Statement-1 : is Ture, Statement-2 : is False.

D. Statement-1 : is False, Statement-2 : is True.

Answer: B

Watch Video Solution

9. Assertion: A one mola solution prepared at 20°C will retain the same molality at 100°C, provided there is no loss of solute or solvent on heating.

Reason: Molality is independent of temperature.

A. Statement-1 : is True, Statement-2 : is True, Statement-2 : is a correct explanation for Statement-1 :

B. Statement-1 : is True, Statement-2 : is True, Statement-2 : is NOT a correct explanation for Statement-1 .

C. Statement-1 : is Ture, Statement-2 : is False.

D. Statement-1 : is False, Statement-2 : is True.

Answer: A

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10. Assertion: Laboratory reagents are usually made up to a specific molarity rather than a given molality.

Reason: The volume of a liquid is more easily measured than its mass.

A. Statement-1 : is True, Statement-2 : is True, Statement-2 : is a correct explanation for Statement-1 :

B. Statement-1 : is True, Statement-2 : is True, Statement-2 : is NOT a correct explanation for Statement-1 .

C. Statement-1 : is Ture, Statement-2 : is False.

D. Statement-1 : is False, Statement-2 : is True.

Answer: A

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11. Assertion: Molality and mole fraction concentration units do not change with temperature.

Reason: These units are not defined in terms of any volume.

A. Statement-1 : is True, Statement-2 : is True, Statement-2 : is a correct explanation for Statement-1 :

B. Statement-1 : is True, Statement-2 : is True, Statement-2 : is NOT a correct explanation for Statement-1 .

C. Statement-1 : is Ture, Statement-2 : is False.

D. Statement-1 : is False, Statement-2 : is True.

Answer: A

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12. Assertion: The molality and molarity of very dilute aqueous solutions differ very little.

Reason: The density of water is about $1.0 gcm^{-3}$ at room temperature.

A. Statement-1 : is True, Statement-2 : is True, Statement-2 : is a correct explanation for Statement-1 :

B. Statement-1 : is True, Statement-2 : is True, Statement-2 : is NOT a correct explanation for Statement-1 .

C. Statement-1 : is Ture, Statement-2 : is False.

D. Statement-1 : is False, Statement-2 : is True.

Answer: C

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13. Assertion: For calculating the molality or the mole fraction of solute, if the molarity is known, it is necessary to know the density of the solution.

Reason: Molality, molarity and the mole fraction of solute can be calculated from the weight percentage and the density of the solution.

A. Statement-1 : is True, Statement-2 : is True, Statement-2 : is a correct explanation for Statement-1 :

B. Statement-1 : is True, Statement-2 : is True, Statement-2 : is NOT a correct explanation for Statement-1 .

C. Statement-1 : is Ture, Statement-2 : is False.

D. Statement-1 : is False, Statement-2 : is True.

Answer: B

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14. Assertion: The ratio of the mass of 100 billion atoms of magnesium to the mass of 100 billion atoms of lead can be expressed as $\frac{27}{207}$.

Reason: Atomic weight are relative masses.

A. Statement-1 : is True, Statement-2 : is True, Statement-2 : is a correct explanation for Statement-1 :

B. Statement-1 : is True, Statement-2 : is True, Statement-2 : is NOT a correct explanation for Statement-1 .

C. Statement-1 : is Ture, Statement-2 : is False.

D. Statement-1 : is False, Statement-2 : is True.

Answer: A

Watch Video Solution

15. Assertion: The average mass of one Mg atom is $24.305a\mu$, which is not actual mass of one Mg atom.

Reason: Three isotopes, $24Mg, 25Mg$ and $26Mg$, of Mg are found in nature.

A. Statement-1 : is True, Statement-2 : is True, Statement-2 : is a correct explanation for Statement-1 :

B. Statement-1 : is True, Statement-2 : is True, Statement-2 : is NOT a correct explanation for Statement-1 .

C. Statement-1 : is Ture, Statement-2 : is False.

D. Statement-1 : is False, Statement-2 : is True.

Answer: A

Watch Video Solution

16. Assertion: A molecule of butane, C_4H_{10} has a mass of $58.12a\mu$.

Reason: One mole of butane contains 6.022×10^{23} molecules and has a mass of $58.12g$.

A. Statement-1 : is True, Statement-2 : is True, Statement-2 : is a correct explanation for Statement-1 :

B. Statement-1 : is True, Statement-2 : is True, Statement-2 : is NOT a correct explanation for Statement-1 .

C. Statement-1 : is Ture, Statement-2 : is False.

D. Statement-1 : is False, Statement-2 : is True.

Answer: A

Watch Video Solution

17. Statement-1 : Boron has relative atomic mass 10.81.

Statement-2 : Boron has two isotopes $._{5}^{10}B$ and $._{5}^{11}B$ and their relative abundance is 19% and 81%.

A. Statement-1 : is True, Statement-2 : is True, Statement-2 : is a correct explanation for Statement-1 :

B. Statement-1 : is True, Statement-2 : is True, Statement-2 : is NOT a correct explanation for Statement-1 .

C. Statement-1 : is Ture, Statement-2 : is False.

D. Statement-1 : is False, Statement-2 : is True.

Answer: A

Watch Video Solution

18. Statement-1 : The percentage of nitrogen in area is approximately 46.6%.

Statement-2 : Urea is an ionic compound.

A. Statement-1 : is True, Statement-2 : is True, Statement-2 : is a correct explanation for Statement-1 :

B. Statement-1 : is True, Statement-2 : is True, Statement-2 : is NOT a correct explanation for Statement-1 .

C. Statement-1 : is Ture, Statement-2 : is False.

D. Statement-1 : is False, Statement-2 : is True.

Answer: C

Watch Video Solution

19. Statement-1 : Molarity of a solution and molality of a solution both change with density.

Statement-2 : Density of the solution changes when percentage by mass of solution changes.

A. Statement-1 : is True, Statement-2 : is True, Statement-2 : is a correct explanation for Statement-1 :

B. Statement-1 : is True, Statement-2 : is True, Statement-2 : is NOT a correct explanation for Statement-1 .

C. Statement-1 : is Ture, Statement-2 : is False.

D. Statement-1 : is False, Statement-2 : is True.

Answer: A

Watch Video Solution

20. Statement-1 : During a chemical reaction total moles remains constant.

Statement-2 : During a chemical reaction total mass remains constant.

A. Statement-1 : is True, Statement-2 : is True, Statement-2 : is a correct explanation for Statement-1 :

B. Statement-1 : is True, Statement-2 : is True, Statement-2 : is NOT a correct explanation for Statement-1 .

C. Statement-1 : is Ture, Statement-2 : is False.

D. Statement-1 : is False, Statement-2 : is True.

Answer: D

Watch Video Solution

21. Statement-1 : Approximate mass of 1 atom of O^{16} in gms is $\left(\frac{16}{N_A}\right)$.

Statement-2 : 1 atom of O^{16} weighhs 16 a.m.u and 1 a.m.u $\left(\frac{1}{N_A}\right)$gm.

A. Statement-1 : is True, Statement-2 : is True, Statement-2 : is a correct explanation for Statement-1 :

B. Statement-1 : is True, Statement-2 : is True, Statement-2 : is NOT a correct explanation for Statement-1 .

C. Statement-1 : is Ture, Statement-2 : is False.

D. Statement-1 : is False, Statement-2 : is True.

Answer: A

Watch Video Solution

22. Statement-1 : For the reaction producing Fe and CO_2 by the raction of Fe_2O_3 and C the ratio of stoichiometric coeffecients of Fe_2O_3: "Fe is" $1:2$. Statement-2 : During a chemical reaction atoms can neither be created nor be destroyed.

A. Statement-1 : is True, Statement-2 : is True, Statement-2 : is a correct explanation for Statement-1 :

B. Statement-1 : is True, Statement-2 : is True, Statement-2 : is NOT a correct explanation for Statement-1 .

C. Statement-1 : is Ture, Statement-2 : is False.

D. Statement-1 : is False, Statement-2 : is True.

Answer: A

Watch Video Solution

23. Statement-1 : For reaction $2A(g) + 3B(g) \rightarrow 4C(g) + D(g)$ vapour density remains constant throughout the course of reaction.

Statement-2 : In all gaseous chemical reactions vapour density reamain constant.

A. Statement-1 : is True, Statement-2 : is True, Statement-2 : is a correct explanation for Statement-1 :

B. Statement-1 : is True, Statement-2 : is True, Statement-2 : is NOT a correct explanation for Statement-1 .

C. Statement-1 : is Ture, Statement-2 : is False.

D. Statement-1 : is False, Statement-2 : is True.

Answer: C

Watch Video Solution

24. Statement-1 : When 1 mole of NH_3 and 1 mole of $O\_(2)$ are made to react, all the NH_3 may be consumed, if reactions is : $NH_3(g) + O_2(g) \rightarrow NO(g) + H_2O(l)$

Statement-2 : Oxygen is limiting reagent.

A. Statement-1 : is True, Statement-2 : is True, Statement-2 : is a correct explanation for Statement-1 :

B. Statement-1 : is True, Statement-2 : is True, Statement-2 : is NOT a correct explanation for Statement-1 .

C. Statement-1 : is Ture, Statement-2 : is False.

D. Statement-1 : is False, Statement-2 : is True.

Answer: A

Watch Video Solution

Multiple objective type

1. 124 u of P_4 will contains :

A. 4 N_A atoms of phosphorus

B. 4 atoms of phosphorus

C. 1 molecule of phosphorus

D. N_A molecules of phosphorus

Answer: B::C

Watch Video Solution

2. Lithium metal reacts with nitrogen gas to produce a white solid Lithium nitride $\left(Li_N\right)$ according to the reaction :

$6Li(s) + N_2(s) \rightarrow 2Li_3N(s)$ if 8.4 g of Li is taken initially with excess of $N_2(g)$, then (Atomic weight of Li=7)

A. Volume of nitrogen gas consumed at STP is 4.54 L

B. Total mass of the product obtained is 14 g

C. Total number of atoms obtained in the prouduct is $1.6N_A$

D. Lithium and nitrogen combine in ratio 3:2 : by mass.

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

Watch Video Solution

3. Equal weight of Aluminium and Oxygen are allowed to combine with each other to produce Al_2O_3.Identify the correct statement.

$\left(4Al + 3O_2 \rightarrow 2Al_2O_3\right)$(At. Wt. of Al=27, O=16)

A. Aluminium metal is the limiting reagent

B. The fraction of excess reagent left unreacted is $\frac{1}{9}$

C. The mass of Al_2O_3 produced is $\frac{51}{27}$ times the mass of oxygen taken initially.

D. The mass of aluminium and oxygen is left unreacted and the mass of Al_2O_3 produced is double the mass of aluminium taken initially.

Answer: A::B::C

Watch Video Solution

4. In which of the following pairs do 1 g 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

Watch Video Solution

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

A. concentration of solution remains same

B. volume of solution become 200 ml

C. mass of H_2SO_4 in the solution is 98 gm

D. mass of H_2SO_4 in the solution is 19.6 gm

Answer: A::B::D

Watch Video Solution

6. Which of the following contain same number of entities ?

A. Number atoms in 1 mole $CuSO_4 . 5H_2O$

B. Number of neutrons in 3.5 mole of CH_4

C. Number of atoms in 2 mole of $FeCr_2O_4$

D. Number of electrons in 2.1 mole of NH_4^+

Answer: A::B::D

Watch Video Solution

7. For the following reaction if equal mass of A and B are taken :

A+2B $\rightarrow$ C

Which of the following is/are correct ? (M_A and M_B are molar mass of A and B respectively)

A. If $M_A = 2M_B$, then none of the reactant will be left.

B. if $M_B < \frac{M_A}{2}$, then A will be limiting reagent

C. If $M_A = M_B$, then A will be limiting reagent

D. If $M_B < \frac{M_A}{2}$, then A will be limiting reagent.

Answer: A::B

View Text Solution

8. Identify the correct statement.

A. 1 gm atom of oxygen and ozone each, contain same number of atoms.

B. 1 mole of $Na_2SO_4 . 10H_2O$ contain 7 gm molecule of oxygen

C. 12 gm carbon and 24 gm Mg contain same number of atoms.

D. Vapour density of air is 14.4.(Air contain : 80% N_2 and 20% O_2 by volume.)

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

Watch Video Solution

9. Which of the following options represent concentration terms which are independent of temperature ?

A. % (w/w), mole fraction , molality

B. Volume strength of H_2O_2, Mole percent , ppm

C. Molality , mass fraction , % labelling

D. Molarity, %(w/v) , mole fraction

Answer: A::C

Watch Video Solution

10. A solution of H_2O_2 is labelled as 45.4 V. Which of the following concentration terms representing the solution will also be correct ($d_{soln.}$ =2.136 gm/ml)

A. 4 molar

B. 2 molar

C. 13.6 % (w/v)

D. $X_{H_2O_2} = \frac{4}{\frac{1000}{18}} + 4$

Answer: A::B::C

Watch Video Solution

11. Which of the following molarity of $KMnO_4$ solution can prouduce atleast 1 gm each of CO_2 and water when 2 litre of $KMnO_4$ reacts with excess of oxalic acid, according to the equation :

$$2KMnO_4 + 5H_2C_2O_4 + 3H_2SO_4 \rightarrow 2MnSO_4 + K_2SO_4 + 10CO_2 + 8H_2O$$

A. $\frac{1}{18}M$

B. $\frac{1}{160}M$

C. $\frac{1}{80}M$

D. $\frac{1}{96}M$

Answer: A::C::D

View Text Solution

12. A 200 ml mixture of CO and CO_2 is passed through excess of red hot charcoal causing the following reaction.

$$CO_2(g) + C(s) \rightarrow 2CO(g)$$

After passing the gas through charcoal , volume increased to 270 ml. Select the correct statement.

A. Volume percentage of CO in the original mixture is 65%

B. If original mixture was passed through KOH solution volume would have reduced to 70 ml

C. Mole fraction of CO_2 in the original mixture will be 0.25.

D. Minimum moles of red hot charcoal required for complete conversion of CO_2 should be 70 millimoles.

Answer: A::C

Watch Video Solution

13. A sample of oxygen contains O^{16} and O^{18} isotopes only with percentage abundance respectively as 90% and 10% . Identify the correct options

A. Average atomic mass of sample is 16.2

B. Average number of protons per atom is 8

C. Average number of neutrons per atom is 8.2

D. Molecular mass of oxygen gas which can be formed from the sample can vary from 32 to 36

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

Watch Video Solution

14. A sample of NH_3 occupies 5.6 litres at 2 atm and $273\,^{\circ}C$ Which of the following options are correct ?

A. sample contains $\frac{3}{4}$ gm atoms of hydrogen

B. Sample contains 10.5 gm of nitrogen

C. Volume of the sample at STP will be same as volume occupied by 12 gm of ozone gas at STP

D. Density of the above gaseous sample at 3 atm pressure and 300 K is equal to 2.07 gm/ml

Answer: A::C::D

Watch Video Solution

15. A particular element X can be found in three gaseous forms-mono-atomic, di-atomic and tri-atomic.If density of one of its forms at a pressure of 8.21 atm at 400 K is 18gm/L, then what would be atomic mass of the element ?

A. 72

B. 24

C. 36

D. 144

Answer: A::B::C

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Watch Video Solution

16. An aqueous solution of ammonia has molarity equal to 2 M. If density of the solution is 1.534 gm/ml, then identify the options in which correct concentration terms are mentioned.

A. Molality $=\frac{4}{3}$ m

B. % (w/w)= $\frac{34}{15.34}$

C. % (w/v) =6.8

D. Mole fraction of $NH_3 = \frac{3}{128}$

Answer: A::B::D

Watch Video Solution

17. The number of hydrogen atoms in 0.9 gm glucose, $C_6H_{12}O_6$ is same as:

A. 0.48 gm hydrazine , N_2H_4

B. 0.17 gm ammonia, NH_3

C. 0.30 gm ethane, C_2H_6

D. 0.03 gm hydrogen , H_2

Answer: A::C

Watch Video Solution

18. The density of 2m-aqueous H_2O_2 solution is 1.068 gm/ml Which of the followin is/are correct concentrations of this solution , in different units ?

A. Molarity = 2 M

B. volume strength =22.7 V

C. %(w/v)=6.8

D. Mole fraction of water $=\frac{250}{259}$

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

Watch Video Solution

19. 90 gm glucose is dissolved in 410 gm water to get a solution. The concentration of solution is :

A. $\frac{900}{41}$ % (w/w)

B. 18% (w/w)

C. $\frac{50}{41}$ m

D. 1.0 m

Answer: B::C

Watch Video Solution

20. Which of the following is the incorrect conclusion regarding the reaction :

$2H_2(g) + O_2(g) \rightarrow 2H_2O(l)$

A. 2 mole of $H_2(g)$ will produce 2 moles of H_2O (l)

B. 16 gm of O_2 (g) will produce 18 gm of $H_2O(l)$

C. 2 litre of O_2(g) at $25^\circ C$ and 1 atm will produce 4 litre of $H_2O(l)$ at $25^\circ C$ and 1 atm

D. 2 molecules of $H_2O(l)$ is obtained from every 3 molecules of gaseous mixture of H_2 and O_2.

Answer: C::D

Watch Video Solution

21. A definite volume of pure ammonia $\left(NH_3\right)$ gas is passed through a series of electric sparks by which the volume becomes 90 ml. The increase in volume is due to formation of nitrogen $\left(N_2\right)$ and hydrogen $\left(H_2\right)$ gases.All the gases finally present are washed with dilute sulphuric acid solution, by which the volume of gases becomes 80 ml. All the volumes are measured at the same temperature and pressure.Which of the following statement is are correct regarding the original ammonia sample ?

A. The volume of NH_3 gas taken was 40 ml

B. The volume of NH_3 gas taken was 50 ml

C. Only 80% of NH_3 gas decomposed into N_2 and H_2 gases.

D. Only 20% of NH_3 gas decomposed into N_2 and H_2 gases.

Answer: B::C

Watch Video Solution

22. Which is/are correct statement about 1.7 gm of NH_3 ?

A. It contains 0.3 mol H-atom

B. It contains 2.408×10^{23} atoms

C. Mass % hydrogen is 17.65%

D. Vapour density of NH_3 is 17

Answer: A::B::C

Watch Video Solution

23. $A + B \rightarrow A_3B_2$(unbalanced)

$A_3B_2 + C \rightarrow A_3B_2C_2$ (unbalanced)

Above two reactions are carried out by taking 3 moles each of A and B and one mole of C.Then which option is/are correct ?

A. 1 mole of $A_3B_2C_2$ is formed

B. $\frac{1}{2}$ mole of $A_3B_2C_2$ is formed

C. 1 mole of A_3B_2 is formed from first reaction

D. $\frac{1}{2}$ mole of A_3B_2 is left finally.

Answer: B::C::D

Watch Video Solution

Multiply Objective type

1. A sample of a mixture of $CaCl_2$ and NaCl weighing 4.44 gm was treated to precipatate all the Ca as $CaCo_3$, which was then heated and quantitatively converted to 1.12 g of CaO. Choose the correct statements. (Atomic weight :Ca=40=23, Cl =35.5)

A. Mixture contains 50% NaCl

B. Mixture contains 60% $CaCl_2$

C. Mass of $CaCl_2$ is 2.22 g

D. Mass of $CaCl_2$ 1.11 g

Answer: A::C

Watch Video Solution

2. The density of 3 M sodium thiosulphate is 1.25 g/ml . Identify the correct statements among the following.

A. % by weight fo sodium thiosulphate is 37.92.

B. The mole fraction of sodium thiosulphate is 0.065.

C. The molarity of Na^+ is 2.53 and $S_2O_3^{2-}$ is 1.25.

D. $S_2O_3^{2-}$ contains S-O-S linkage.

Answer: A::B

View Text Solution

3. A 5 L vessel contains 2.8 g of N_2 only, when heated to 1800 K 30% molecules are dissociated into atoms.

A. Total no, of moles N in the container will be 0.12

B. Total no. of molecules in the container will be close to 0.421×10^{23}

C. Total no. of moles in the container will be 0.098

D. Pressure in the container decreased

Answer: A::B

View Text Solution

4. The density of air of 0.001293 g/cm^3 at 1 atm and 273 K. Identify which of the following statement is correct?

A. Vapour density is 14.48.

B. Molecular weight is 28.96.

C. Vapour density is 0.001293 g/cm^3

D. Vapour density and molecular weight cannot be determined.

Answer: A::B

Watch Video Solution

5. Which of the following has same mass?

A. 1.0 mole of O_2

B. 3.01×10^{23} molecular of SO_2

C. 0.5 moles of CO_2

D. 1 g atom of sulphur

Answer: A::B::D

Watch Video Solution

6. The mole fraction of NaCl in aqueous soluition is 0.2 . The solution is :

A. 13.9 m

B. mole fraction of H_2O is 0.8

C. acidic in nature

D. neutral

Answer: A::B::D

Watch Video Solution

7. 100 mL of 0.06 M$Ca(NO_3)_2$ is added to 50 mL of 0.06 M $Na_2C_2O_4$. After the reaction is complete.

A. 0.003 moles of calcium oxalate will get precipatated

B. 0.003 M of Ca^{2+} will remain in excess

C. $Na_2C_2O_4$ is limited reagent

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

Answer: A::C::D

Watch Video Solution

8. Silver metal in ore is dissolved by potassium cyanide solution in the presence of air by the reaction

$4Ag + 8KCN + O_2 + 2H_2O \rightarrow 4K[Ag(CN)_2] + 4KOH$

A. The amount of KCN required to dissolved 100 g of pure Ag is 120 g

B. The amount of oxygen used in this process is 0.742 g (for 100 gm pure Ag).

C. The amount of oxygen used in this process is 7.40 g (for 100 gm pure Ag).

D. The volume of oxygen used to STP is 5.25 litres.

Answer: A::C::D

Watch Video Solution

9. Equal masses of SO_2 and O_2 are placed in a flask at STP . Choose the correct statement .

A. The number of molecules of O_2 are more than SO_2 .

B. Volume occupied at STP is more for O_2 than SO_2

C. The ratio of number of atoms of SO_2 and O_2 is 3:4.

D. Moles of SO_2 is greater than the moles of O_2

Answer: A::B::C

Watch Video Solution

10. For the reaction $2P + Q \rightarrow R$, 12 mol of P and 8 mol of Q are taken then:

A. 3 mol of R is produced

B. 6 mol of R is produced

C. 25% of Q is left behind

D. 25% of Q has reacted

Answer: B::C

Watch Video Solution

11. If H_2SO_4 is formed from it's elements by taking 6.023×10^{23} atom of O, 5.6 litre of H_2 gas at 1 atm and 273 K and 8 gm S , then:

A. 0.125 moles of H_2SO_4 are formed

B. 0.25 moles of H_2SO_4 are formed

C. no moles of S are left

D. $\frac{1}{4}$ moles of O_2 is left

Answer: B::C

Watch Video Solution

12. Equal volume of 0.1 M NaCl and 0.1 M $FeCl_2$ are mixed with no change in volume due to0 mixing . Which of the following will be true for the final solution? (No precipation occurs) . Assume complete dissociated of salts and neglect any hydrolysis.

A. $\left[Na^+\right] = 0.05M$

B. $\left[Fe^{2+}\right] = 0.05M$

C. $\left[Cl^-\right] = 0.3M$

D. $\left[Cl^-\right] = 0.15M$

Answer: A::B::D

Watch Video Solution

13. 0.28 g of a gas occupies 227 ml at STP. The gas could be:

A. N_2

B. CO

C. C_2H_4

D. N_2O_4

Answer: A::B::C

Watch Video Solution

14. Choose the incorrect statement(s).

A. 1 gm molecules always contains same number of atoms

B. Weight of one molecules in gm is equal to its molar mass

C. Number of atoms in 2 gm of hydroden is greater than 11.35 litre hydegen at STP

D. Volume of 16 gm oxygen gas at 2 atm , 300 K is greater than volume of 2 gm hydrogen gas at 1 atm 300 K

Answer: A::B::D

Watch Video Solution

15. In 2.6 gm of $FeSO_4.6H_2O$ (At wt of fe =56):

A. No. of atoms of O are $100 \times N_A$

B. Moles of H atoms are $120 \times N_A$

C. Molecules of water are $60 \times N_A$

D. Moles of e^- present in SO_4^{2-} are 500

Answer: A::C::D

Watch Video Solution

16. For reaction

$MnO_2 + 4HCl \rightarrow MnCl_2 + 2H_2O + Cl_2(g)$ 261 gm MnO_2 is mixed with 448 litres of HCl gas at 273° C and 1 atm pressure to produce product $\left[N_A = 6 \times 10^{23}\right.$, Atomic mass of Mn =55 , Cl =35.5]

Select correct statement(s)

A. MnO_2 is limited reagent

B. Chlorine gas produced contains 15×10^{23} molecules.

C. Moles of excess reactant left is 0.5 moles

D. If % yield of reaction is 50% , then mass of $MnCl_2$ obtained will be 315.

Answer: B::C

Watch Video Solution

17. 10 moles of A_2B_3 contains 100 gm A atom and 60 gm B atoms. Choose the correct statements.

A. Molecules weight of A_2B_3 is equal to 16

B. Atomic weight of A is equal to 16

C. Weight of one atom of B is equal to 2

D. Atomic weight of B is equal to 6

Answer: A::B

Watch Video Solution

18. Consider the following chemical reaction $Pb(NO_3)_2 + Na_2SO_4 \rightarrow PbSO_4 + 2NaNO_3$.

If a series of experiments are run maintaining sum of the weights of two reactant constant but varying the weights of reactants , which of the following statements is (are) true?

$$\left[M_{Pb(NO_3)_2} = 394, M_{Na_2SO_4} = 142\right]$$

A. Maximum weight of the ppt $(PbSO_4)$ will be formed if equal weights of reactant are taken.

B. Maximum weight fo the ppt $(PbSO_4)$ will be formed if equal moles of reactants are taken

C. In the experiments , as the weight of $Pb(SO_4)$ increase , weight of ppt$(PbSO_4)$ increases.

D. In the experiment , as the weight of $Pb(NO_3)_2$ increases, weight of ppt $(PbSO_4)$ increases and than decreases.

Answer: B::D

Watch Video Solution

19. 400 ml 0.1 M $BaCL_2$ is mixed with 600 ml 0.1 M H_2SO_4 to form products according to following reaction:

$BaCl_2 + H_2SO_4 \rightarrow BaSO_4 + 2HCl$

Select the correct option(s) after reaction is completed.

A. Molarity of Ba^{+2} ions in final solution is 0.04 M

B. Molarity of SO_4^{2-} ions in solution is 0.02 M

C. Molarity of H^+ ions do not change on mixing

D. Final molarity of H^+ ions in solution is 0.12 M

Answer: B::D

Watch Video Solution

20. Aqueous solution containing 30 gm CH_3COOH are:

A. 250 ml of 2M CH_3COOH solution

B. 600 gm of 5% (by wt.) CH_3COOH solution

C. 111 gm of solution in which mole fraction of CH_3COOH is 0.1

D. 500 gm of 7m CH_3COOH solution

Answer: A::B::C

Watch Video Solution

21. 50 ml of CO is mixed with 20 ml of oxygen and sparked. After reaction, the mixture is treated with an aqueous KOH solution . Choose the correct option:

A. The volume of the CO that reacts is 40 ml.

B. The volume of the CO_2 formed is 40 ml

C. The volume of CO that remains after treatment with KOH is 20 ml

D. The volume of mixture obtained after reaction when treated with KOH solvent remains 10 ml

Answer: A::B::D

Watch Video Solution

22. Which of the follewing aqueous solutions of H_2SO_4 has 4.9 g of H_2SO_4 ?

A. 500 mL of 0.1 M $H_2SO_4\left(d = 1.5gmL^{-1}\right)$

B. 250 mL solution of density 2 g mL^{-1} which is 49% (w/w)

C. 10 g solution which is 49% (w/w)

D. Solution having 500g water with molality 0.1 mol kg^{-1}

Answer: A::C::D

Watch Video Solution

23. Select the correct statement(s)

A. Ratio of gm/litres and % (w/v) of a solution is independent fo solute substance

B. Ratio of % (w/v) and molarity of a solution depends on solute substance

C. Ratio of % (w/v) and molarity of a solution depends on solvent substance

D. Ration of % (w/v) and ppm for any solution same

Answer: A::B

Watch Video Solution

24. Atomic mass of elements are defined with respect to $\frac{1}{12}$ th of mass of single atom of C-12 [present scale]. If reference is changed to $\frac{1}{24}$ th of mass of single atom of C-12 [new scale] , then select the correct statement(s).

Given : Atomic mass of Fe on present scale is 56 Mass of $\frac{1}{12}$ the of mass of single atom of C-12=1 amu New mass of $\frac{1}{24}$ th of mass single atom fo C-12 =1 amu

A. Atomic mass of elements will change.

B. Mass of an atom (in gm) of an elements remains same on both scale.

C. Mass of an atom of Fe will be 112 amu on new scale.

D. Atomic mass of Fe on new scale will be 112.

Answer: A::B::D

Watch Video Solution

25. 100 gm mixture of Co and CO_2 is mixed with 30 mL of O_2 and sparked in eudiometer tube. The residual gas after treatment with aq. KOH has a volume of 10 mL which remains unchanged when treated with alkline pyrogallol . If all the volume are under the same conditions, point out the correct option(s)

A. The volume of CO that reacts is 60 mL

B. The volume of CO that remains unreacted is 10 mL

C. The volume of O_2 that remains unreacted is 10 mL

D. The volume of CO_2 that gets absorbed y aqueous KOH is 90 mL.

Answer: A::B::D

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26. 20 mL of a gaseous hydrocarbon was exploded with 120 mL of oxygen . A contraction of 60 mL was observed and a further contraction of 60 mL took place when KOH was added. What is the formula of the hydrocarbon?

A. C_3H_6

B. C_3H_8

C. C_2H_6

D. C_4H_{10}

Answer: B

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27. 100 ml of mixture of $CH_4(g), O_2(g)\text{and}CO_2(g)$ was sparked. There was contraction of 70 ml volume when the mixture was passed through aqueous KOH. The composition of initial gas mixture in (ml) will be in order of CH_4O_2, CO_2:

A. 10,30,60,

B. 15,30,55

C. 20,30,50,

D. 20,20,60

Answer: A::B::D

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28. An aqueous solution is made by dissolving glucose $\left(C_6H_{12}O_6\right)$ and urea $\left(NH_2CONH_2\right)$ in water. Mole ratio of glucose and water is 1:10 . If the masses of glucose and urea are in 3:1 ratio, then correct statement(s) regarding the solution is/are:

A. The mole fraction of glucose in the solution is $\frac{1}{11}$

B. The mole fraction of urea in the solution is $\frac{1}{12}$

C. Molality of glucose in the solution is $\frac{25}{6}$

D. Molality of urea in the solution is $\frac{50}{9}$

Answer: B::D

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29. 200 gm water is saturated with H_2Sgas to get a solution fo density 0.95 gm/ml and containing 20% H_2S ,by mass. Which of the following information(s) is/are correct regarding the solution formed?

A. Molality of solution is $\frac{100}{17}$ m

B. Volume of solution is $\frac{5000}{19}$ ml

C. Molality of solution is $\frac{950}{17}$ m

D. Mass of H_2S in solution is 50 gm

Answer: B::C::D

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30. An oleum sample has SO_3 and H_2SO_4 in 2:3 mass ratio. Select the correct statement(s).

A. % labelling of sample is 109%

B. % labelling of sample is 118%

C. If 9 gm H_2O is added to200 gm of above sample, new labelling would be 104.5%

D. If 9 gm H_2O is added to 200 gm of above sample, new labelling would be 104.3%

Answer: A::D

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31. A reacts by following two parallel reactions to give B and C. If half of A goes into reaction I and other half goes to reaction-II, then select the correct statement(s)

$$A + N \xrightarrow{I} B + L$$

$$A + N \xrightarrow{II} \frac{1}{2}B + \frac{1}{2}(C) + L$$

A. B will be always greater than C

B. If 2 moles of C are formed then total 2 moles of B are also formed

C. If 2 moles of C are formed then total 4 moles of B are also formed

D. If 2 moles of C are formed then total 6 moles of B are also formed

Answer: A::D

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32. 83.33 gm of 117.6 % oleum is added to 1 litre of 3M $K_4\left[Fe(CN)_6\right]$ and futher 2 litre of 33.6 volume strenght (at 1 atm, 273 K) H_2O is added to it reaction:

$$K_4\left[Fe(CN)_6\right] + H_2SO_4 + H_2O_2 \rightarrow K_3\left[Fe(CN)_6\right] + K_2SO_4 + H_2O$$

If final volume of solutin is 3 litre , then select the correct statement(s):

A. H_2SO_4 is limited reagent

B. 2 moles of $K_3Fe(CN)_6$ is formed

C. If 2 ml of resulting solution is heated then 37.3 ml of O_2 at 1 atm ,

273 K will be evoled from H_2O_2

D. If 3 ml of resulting solution is heated then 37.3 ml of O_2 at 1 atm ,

273 K will be evolved from H_2O_2

Answer: A::B::C

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33. In the formation rection of NH_3 from N_2 and H_2 140 g of N_2 and 40 g H_2 were mixed. Select the option which is/are incorrect?

A. Maximum mass of NH_3 which can be formed is 180 gm

B. If % yield of reaction is 80% consumed will be 32 gm.

C. Some $N_2(g)$ will be left after the reaction.

D. If NH_3 formed is 85 gm then % yield will be 50%

Answer: A::B::C

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34. Select the correct statement(s) about chemical reaction in a closed container.

A. Total mass remains conserved.

B. Total moles of molecules remains conserved.

C. Total mass of atoms remains conserved

D. Total mass of molecules may change.

Answer: A::C::D

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35. A Solution of C_2H_5OH and water contains 54% water by mass, then which option(s) are correct for the given solution: [Given density of solution =1 gm/ml]

A. Molality =18.52

B. %(w/w)=46

C. $X_{C_2H_5OH} = 0.25$

D. %(w/w) =46

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

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36. 50 gm of $CaCO_3$ is allowed to react with 68.6 gm of H_3PO_4 then select the correct option(s):

$$3CaCO_3 + 2H_3PO_4 \rightarrow Ca_3(PO_4)_2 + 3H_2O + 3CO_2$$

A. 51.67 gm salt is formed

B. Amount of unreacted reagent =35.93 gm

C. n_{Co_2} =0.5 moles

D. 0.7 moles of CO_2 is evoled

Answer: A::B::C

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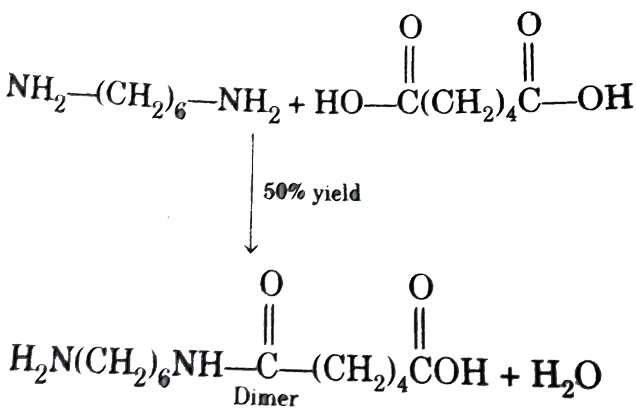
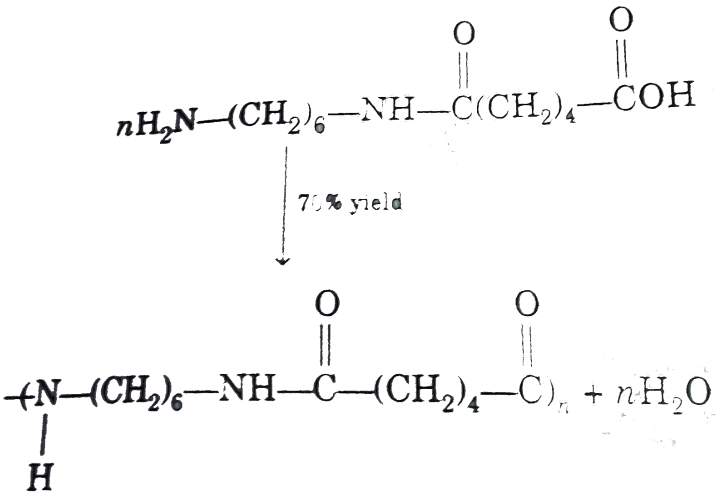
37. Hexamethylenediamine $\left[H_2N\left(CH_2\right)NH_2\right]$ reacts with adipic acid $\left[HO\overset{\overset{O}{||}}{C}-\left(CH_2\right)_4-\overset{\overset{O}{||}}{C}-OH\right]$ to form dimer as:

with adipic acid $[HO\overset{\overset{O}{||}}{C}-(CH_2)_4-\overset{\overset{O}{||}}{C}-OH]$ to form dimer as :



The dimer polymerises to form Nylon 6,6 as per the reaction



Select the correct statement:

A. 290 gm of Hexamethylenediamine is required to make 610 gm of dimer.

B. 730 gm of adipic acid is required to make 610 gm of dimer.

C. In order to obtain 1.03 kg of Nylon-6,6 at least 1220 gm of dimer is required.

D. In order to obtain 1.13 kg of Nylon-6,6 at least 1742.9 gm of dimer is required.

Answer: B::D

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38. Concentration term similar to "volume strenght of H_2O_2" is used for nitroglycerine $\left[C_3H_5N_3O_9\right]$ (MW=227) where volume strenght is defined as volume of gasses evolved at 1 atm and 273 K from 1 litre solution as per the reaction:

$4C_3H_5N_3O_9(aq) \rightarrow 6N_2(g) + 12CO_2(g) + O_2(g) + 10H_2O(l)(d = 1.1gm/ml)$

Select the correct option about Volume strenght of 212.8 V nitroglycerine solution.

A. Its 2 M nitroglycerine solution.

B. Its 454 gm/L nitroglycerine solution

C. Its 41.27% (w/w) nitoglycerine solution.

D.

Answer: A::B::C

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39. In order to remove Mg^{2+} and Ca^{+2} from H_2O, impure water is treated with sodium tripolyphosephate

$Na_5P_3O_{10} + Mg^{+2} \rightarrow Na_3MgP_3O_{10} + 2Na^+$

$Na_3MgP_3O_{10} + Ca^{+2} \rightarrow NaCaMgP_3O_{10} + 2Na^+$

Select the correc statement about treatment of 10 L H_2O having 48 ppm of Mg^{+2} and 40 ppm of Ca^{+2}

A. In order of remove all Mg^{+2} from H_2O at least 7.36 gm of $Na_5P_3O_{10}$ is required

B. In order of remove all Mg^{+2} from H_2O at least 3.68 gm of $Na_5P_3O_{10}$ is required

C. In order to remove all mg^{+2} and Ca^{+2} ,7.36 gm of $Na_5P_3O_{10}$ is required

D. In order to remove all Mg^{+2} and Ca^{+2} , at least 11.04 gm of $Na_5P_3O_{10}$ is required

Answer: A::C

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40. Which fo the following is heavier than 1 gm molecules oxygen?

A. 12 gm of O_3

B. 1 gm-molecules O_3

C. 4 gm-atom of hydrogen

D. 1.12 litre of H_2O at 40° C and 1 atm

Answer: B::D

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41. In which of the following mixtures summation of molarity of cation(s) in the resulting solution is less than 1?

A. $NHO_3(0.1M, 10mL) + NaOH(1M, 10mL)$

B. NHO_3 (0.1 M, 10mL)+$\left(NHO_3\right.$ (1.1 M, 10 mL)

C. NaOH (4%(w/w), 10 mL sp.gr.=1.2) + NaOH [4% (w/w) , 10mL, sp.gr.=12]

D. $AgNO_3$ (1M, 10 mL) + NaCl(2M, 10 mL)

Answer: A::B

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42. Which of the following option(s) is correctly matched for atomic /molecular weight determination method?

A. Ag-Dulong and pett's method

B. C_2H_5 - O - C_2H_5 (volatile)-Victor Meyer's method

C. $CH_3 - \left(CH_2\right)_n COOH$ - Chloroplatinate salt method

D. $Ch_3 - \left(CH_2\right)_n - NH_2$(base)-Silver salt method

Answer: A::B

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43. Two flask of equal capacity contain NH_3 and SO_2 gases respectively, are kept under similar conditions of temperature and pressure. Select the correct option on the basis of above information.

A. More moles are present in flask contain NH_3 .

B. Flask of SO_2 has more mass.

C. Flask of NH_3 has more number of atoms.

D. Both flask contain same number of molecules of NH_3 and SO_2 respectively

Answer: B::C::D

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44. In the reaction:

$A + B_2 \rightarrow AB_2$

Find out in which option(s) B_2 is limiting reagent. [Molar mass : $M_A = 10g\text{mole}^{-1}, M_B = 20g\text{mol}^{-1}$]

A. 300 atoms of A + 200 molecules of B_2

B. 2 mole A+3 gram-atom of B

C. 100 mole A atoms +100 mole B atoms

D. 5 gram-atom of A + 12.5 gram molecule of B_2

Answer: A::B::C

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45. 27g of Al will react completely with

A. 24 gm of O_2

B. 0.75 moles of O_2

C. 16.8 L of O_2 at 1 atm , 273 K

D. 0.75 N_A molecules of O_2

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

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46. 1.5 g of oxygen is produced by heating $KClO_3$. How much KCl is produced in the reaction?

$2KClO_3(s) \rightarrow 2KCl_s + 3O_2(g)$

A. 4.15×10^2 mol

B. 4.33 g

C. 3.12×10^{-2} mol

D. 2.33 g

Answer: C::D

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47. When $FeCl_3$ is ignited in an atmosphere of pure oxygen, this reaction takes place:

$4FeCl_3(s) \rightarrow 2Fe_2O_3 + 6Cl_2(g)$

If 3 moles of $FeCl_3$ are ignited in the presence of 2 moles of O_2 gas, which of the following statements regarding to the given reaction is/are correct?

A. 0.33 mole $FeCl_3$ remains unreacted

B. 0.67 mole $FeCl_3$ remains unreacted

C. 1.33 moles of Fe_2O_3 are formed

D. 0.50 moles O_2 remains unreacted

Answer: A::C

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48. For the following reaction

$N_2 + 3H_2 \rightarrow 2HN_3$

Identify the compostions which will produce same amount of NH_3

A. 140 gm N_2 and 35 g H_2

B. 18 g H_2 and 52 g N_2

C. Total 20 moles of mixture having N_2 and H_2 present in stoichiometric ratio (No limiting reagent)

D. 136 gm of mixture having mass friction of H_2 =6

Answer: A::C

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49. When $N_2(g) \text{and} H_2(g)$ are mixed $N_2H_4(g), NH_3(g)$ or both may form, depending upon the relative amount of N_2 and H_2 taken. If initial mols of N_2, H_2 are x,y and final moles of N_2H_4, NH_3 are z,v, then the correct options from the following in order of (x,y,z,v) is/are

A. (2,2,1,0)

B. (3,8,1,4)

C. (4,9,4,1)

D. (0,5,3,0,1)

Answer: A::B::D

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50. To a container containing 3 moles of C_2H_6 further of gram C_2H_6 is added and 2.4×10^{24} molecules of gas are then removed. The left ovr gas is burnt in the presence of excess oxygen . Then:

A. 60 gms of C_2H_6 are left for combustion

B. volume of CO_2 at STP produced is 45.4 litre

C. mass of liquid water produced is 54 gram

D. 30 gms of C_2H_6 are left for combustion

Answer: B::C::D

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51. A piece of plumber's solder weighting 3.0 gm was dissolved in dilute nitric acid, then treated with dilute H_2SO_4 . This precipatated the lead as $PbSO_4$ which after washing and drying weighted 2.98 gm. The solution was then neutralized to precipatate stannic acid, which was decomposed by heating, yielding 1.27 gm SnO_2 . What is the analysis of the solder? (Pb=207.2 amu, Sn=118.7 amu)

A. 66.7 % Pb, 33.3% Sn

B. 33.3% Pb, 1 gm Sn

C. 1 gm Pb, 2 gm Sn

D. 2 gm Pb, 1 gm Sn

Answer: A::D

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52. A mixture fo H_2 and O_2 having total volume 55 mL is sparked in an Eudiometry tube and contraction of 45 mL is observed after cooling.

What can be composition of reacting mixture?

A. 30 ml H_2 and 25 ml O_2

B. 10 ml H_2 and 45 ml O_2

C. 40 ml H_2 and 15 ml O_2

D. 35 ml H_2 and 20ml O_2

Answer: A::C

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53. A mixture of C_4H_8 and C_2H_4 was completely burnt in excess of oxygen yielding equal volumes of CO_2 and steam. Calculate the percentage (by volume) of the compounds in the original mixture:

A. 25% C_4H_8 and 75% C_2H_4

B. 30% C_4H_8 and 70% C_2H_4

C. 75% C_4H_8 and 25% C_2H_4

D. 50% C_4H_8 and 50% C_2H_4

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

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54. 1 mole of H_2SO_4 will exactly neutralise:

A. 2 mole of ammonia

B. 1 mole of $Ba(OH)_2$

C. 0.5 moles of $Ca(OH)_2$

D. 2 mole of KOH

Answer: A::B::D

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55. An oxide of nitrogen 30.43% nitrogen and its one molecules has mas of $\left(1.527 \times 10^{-22}g\right)$. Which of the following statement(s) regarding this oxide is/are true?

A. Its empirical formula is NO

B. Its empirical formula is NO_2

C. Its molecular formula is N_2O_4

D. Its molecular formula is N_2O_2

Answer: B::C

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56. If 27 of carbon is mixed with 88 g of oxygen and is allowed to burn to produce CO_2, then:

A. oxygen is the limiting reagent

B. volume of CO_2 gas produced at STP is 51.075 L

C. C and O combine in amss ratio 3:8

D. volume of unreacted O_2 at STP is 11.35 L

Answer: B::C::D

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57. 0.01 mol TNT was completely decomposed as,

$$\underset{TNT}{C_7H_5N_3O_6(s)} \rightarrow CO(g) + H_2(g) + N_2(g) + C(s)$$

The gases evolved occupied 2.24 L at constant pressure and 273 K in the eudiometer . Select the correct option on the basis of above information.

A. Partial pressure of CO is 0.6 atm in the evolved gas

B. If just sufficient O_2 si introduced in the container to combust CO and H_2 completely, then final volume fo gases would be 0.68 L at 1 atm and 273 K

C. If just sufficient O_2 is introduced in the container to combust CO and H_2 completely, then fianl volume of gases would be 0.896 L at 1 atm and 273 K

D. If after combustion the mixture of gases at 273 K is passes through KOH(aq) , contraction of 1.344 L would take place

Answer: A::B::D

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58. The oxygen needed for complete combustion of 4 gm CH_4 may be obtained from decomposition of :

A. $\frac{4}{3}$ moles of $KCIO_3$ with 25% yield $\left(KCIO_3 \rightarrow KCI + \frac{3}{2}O_2\right)$

B. 50 ml, 10 mH_2O_2 solution $\left(H_2O_2 \rightarrow H_2O + \frac{1}{2}O_2\right)$

C. 500 gm solution containing 17% (w/w) $NaNo_3$ $\left(NaNo_3 \rightarrow NaNO_2 + \frac{1}{2}\right)$

D. 410 gm impure sample of $Ca\left(NO_3\right)_2$ of 40% purity $\left(Ca\left(NO_3\right)_2 \rightarrow CaO + 2NO_2 + \frac{1}{2}O_2\right)$

Answer: A::C::D

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59. For the reaction , $MnO_2 + 4HCl \xrightarrow{100\%} MnCl_2 + Cl_2 + 2H_2O, 8.7 gm MnO_2$ is dissolved in 500 ml of HCl solution containing 7.3 gm HCl per litre (Mn=55)

A. HCl is the limiting reagent.

B. MnO_2 is the limiting reagent

C. 0.025 moles of $MnCl_2$ will form

D. 560 ml Cl_2 gas will liberate at 0° C and 1 atm.

Answer: A::C::D

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Comprehension#1

1. The concentrations of soluitons can be expressed in number of ways , viz : mass fraction of solute (or mass percent), Molar concentration (Molarity) and Molal concentration (molality). These terms are known as concentration terms and also they are related with each otehr i.e., knowing one concentration terms for the solution, we can find other concentration terms also. the definition of different cencentration terms are given below:

Molarity : It is number of moles of solute present in one litre of the solution.

Molality : It is the number of moles of solute present in one kg of the solvent.

Mole fraction $= \dfrac{\text{Mole of solute}}{\text{Moles of solute} + \text{Moles of solvent}}$

If molality of the solution is given as a, then mole fraction of the solute can be calculated by

Mole Fraction $= \dfrac{a}{a + \dfrac{100}{M_{\text{solvent}}}}, = \dfrac{a \times M_{\text{solvent}}}{\left(a \times M_{\text{solvent}} + 1000\right)0}$

where a=molality and M_{solvent} =Molar mass of solvent We can change :

Mole fraction ⇔ Molality ⇔ Molarity

120 gm of solution containing 40% by mass of NaCl are mixed with 200

gm of a solution containing 15% by mass NaCl. Determine the mass percent of sodium chloride in the final solutions.

A. 24.4 %

B. 75 %

C. 48.8 %

D. 19.68 %

Answer: A

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Comprehension#2

1. The concentrations of soluitons can be expressed in number of ways , viz : mass fraction of solute (or mass percent), Molar concentration (Molarity) and Molal concentration (molality). These terms are known as concentration terms and also they are related with each otehr i.e., knowing one concentration terms for the solution, we can find other concentration terms also. the definition of different cencentration terms are given below:

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Mole Fraction $= \dfrac{a}{a + \dfrac{100}{M_{\text{solvent}}}}, = \dfrac{a \times M_{\text{solvent}}}{\left(a \times M_{\text{solvent}} + 1000\right)0}$

where a=molality and M_{solvent} =Molar mass of solvent We can change :

Mole fraction ⇔ Molality ⇔ Molarity

What is the molality of the above solution?

A. 4.4 m

B. 5.5m

C. 24.4m

D. None of these

Answer: B

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Comprehension#3

1. The concentrations of soluitons can be expressed in number of ways, viz : mass fraction of solute (or mass percent), Molar concentration (Molarity) and Molal concentration (molality). These terms are known as concentration terms and also they are related with each otehr i.e., knowing one concentration terms for the solution, we can find other concentration terms also. the definition of different cencentration terms are given below:

Molarity : It is number of moles of solute present in one litre of the solution.

Molality : It is the number of moles of solute present in one kg of the solvent.

Mole fraction $= \dfrac{\text{Mole of solute}}{\text{Moles of solute + Moles of solvent}}$

If molality of the solution is given as a, then mole fraction of the solute can be calculated by

Mole Fraction $= \dfrac{a}{a + \dfrac{100}{M_{\text{solvent}}}}, = \dfrac{a \times M_{\text{solvent}}}{\left(a \times M_{\text{solvent}} + 1000\right)0}$

where a=molality and M_{solvent} =Molar mass of solvent We can change :

Mole fraction ⇔ Molality ⇔ Molarity

What is the mole fraction of the solute?

A. 0.18

B. 0.75

C. 0.09

D. 0.25

Answer: C

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Comprehension#4

1. The concentrations of soluitons can be expressed in number of ways , viz : mass fraction of solute (or mass percent), Molar concentration (Molarity) and Molal concentration (molality). These terms are known as concentration terms and also they are related with each otehr i.e., knowing one concentration terms for the solution, we can find other concentration terms also. the definition of different cencentration terms are given below:

Molarity : It is number of moles of solute present in one litre of the solution.

Molality : It is the number of moles of solute present in one kg of the solvent.

Mole fraction $= \dfrac{\text{Mole of solute}}{\text{Moles of solute + Moles of solvent}}$

If molality of the solution is given as a, then mole fraction of the solute can be calculated by

Mole Fraction $= \dfrac{a}{a + \dfrac{100}{M_{\text{solvent}}}}, = \dfrac{a \times M_{\text{solvent}}}{\left(a \times M_{\text{solvent}} + 1000\right)0}$

where a=molality and M_{solvent} =Molar mass of solvent We can change :

Mole fraction $\Leftrightarrow$ Molality $\Leftrightarrow$ Molarity

What is the molarity of solutions if density of solution in 1.6 gm/ml?

A. 5.5 M

B. 6.6M

C. 2.59M

D. None of these

Answer: B

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Comprehension#5

1. The concentrations of soluitons can be expressed in number of ways , viz : mass fraction of solute (or mass percent), Molar concentration (Molarity) and Molal concentration (molality). These terms are known as concentration terms and also they are related with each otehr i.e., knowing one concentration terms for the solution, we can find other concentration terms also. the definition of different cencentration terms are given below:

Molarity : It is number of moles of solute present in one litre of the solution.

Molality : It is the number of moles of solute present in one kg of the solvent.

Mole fraction $= \dfrac{\text{Mole of solute}}{\text{Moles of solute + Moles of solvent}}$

If molality of the solution is given as a, then mole fraction of the solute can be calculated by

Mole Fraction $= \dfrac{a}{a + \dfrac{100}{M_{\text{solvent}}}}, = \dfrac{a \times M_{\text{solvent}}}{\left(a \times M_{\text{solvent}} + 1000\right)0}$

where a=molality and M_{solvent} =Molar mass of solvent We can change :

Mole fraction $\Leftrightarrow$ Molality $\Leftrightarrow$ Molarity

Percentage (weight/vol) of NaCl persent in the solution is :

A. 24.4 %

B. 40 %

C. 39 %

D. 3.9 %

Answer: C

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Comprehension#6

1. Equals number of atoms are contained in one gram atomic weight of each element and the same number of molecules are found in one gram molecules weight of any compound . The terms gram atomic weight and gram molecular weight are used to refer to a fixed numer(Avogadro's number 6.022×10^{23}) of particle. the term 'mole' stands for the amount of material which contains these number of particles. If 12 g C^{12} has equal number of atoms as Avogadro's number , what mass of $._{2}He^{4}$ will contain same number of atoms?

A. 2 g

B. 4 g

C. 6 g

D. 3 g

Answer: B

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Comprehension#7

1. Equals number of atoms are contained in one gram atomic weight of each element and the same number of molecules are found in one gram molecules weight of any compound . The terms gram atomic weight and gram molecular weight are used to refer to a fixed numer(Avogadro's number $6.022 \times 10^{23}\big)$ of particle. the term 'mole' stands for the amount of material which contains these number of particles. What will be the gram atomic weight of Mg if 24 g of $._{24}Mg^{24}$ contains 6.022×10^{23} atoms?

A. 12 gm

B. 36 g

C. 24 g

D. 48 g

Answer: C

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Comprehension#8

1. Equals number of atoms are contained in one gram atomic weight of each element and the same number of molecules are found in one gram molecules weight of any compound . The terms gram atomic weight and gram molecular weight are used to refer to a fixed numer(Avogadro's number 6.022×10^{23}) of particle. the term 'mole' stands for the amount of material which contains these number of particles. Compute gram molecular weight of H_2 gas if 4 g of H_2 gas contains 24.09×10^{23}atoms.

A. 4 g

B. 3 g

C. 2 g

D. 1 g

Answer: C

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Comprehension#9

1. The number of carbon atoms in exactly 12 g C^{12} is called Avogadro's number , $N_A\left(6.022 \times 10^{23}\right)$. One mole is the amount of material which contains Avogradro's number of particle.

These definitions emphasize that the mole refers to a fixed number of NA^+ b Avogadro's number of atoms , electrons to refer to a mole of helium , a mole of electrons , or a mole of NA^+ by Avogadro's number of atoms, electrons or ions respectively. On the other hand, phrases like "one mole of hydrogen" can be ambiguous , and should be restated as "one mole of hydroden atoms" or " one mole fo hydrogen molecules." But it is a matter of common practice among chemists , however , to let the name of the element stand for its mos common form. Thus one mole of O_2 is frequently referred to as one mole of oxygen , whereas one moles of O is called one mole of oxygen atoms. Suppose if we take one mole molecules fo H_2SO_4 then it contain 2 moles of H atom 1 mole of S atom and 4 moles of O atom. It can also be said that moles of oxygen molecules is $\frac{4}{2}$ =2 mole.

According to common practise , if you have Avogadro number of hydrogen molecules, then its mass is equal to :

A. 1 gm

B. 2 g

C. 4 g

D. depends on temperature

Answer: B

Watch Video Solution

Comprehension#10

1. The number of carbon atoms in exactly 12 g C^{12} is called Avogadro's number , $N_A\left(6.022 \times 10^{23}\right)$. One mole is the amount of material which contains Avogradro's number of particle.

These definitions emphasize that the mole refers to a fixed number of NA^+ b Avogadro's number of atoms , electrons to refer to a mole of helium , a mole of electrons , or a mole of NA^+ by Avogadro's number of atoms, electrons or ions respectively. On the other hand, phrases like "one mole of hydrogen" can be ambiguous , and should be restated as "one mole of hydroden atoms" or " one mole fo hydrogen molecules." But it is a matter of common practice among chemists , however , to let the name of the element stand for its mos common form. Thus one mole of O_2 is frequently referred to as one mole of oxygen , whereas one moles of O is called one mole of oxygen atoms. Suppose if we take one mole molecules fo H_2SO_4 then it contain 2 moles of H atom 1 mole of S atom and 4 moles of O atom. It can also be said that moles of oxygen molecules is $\frac{4}{2}$ =2 mole.

From a container having 64 g Oxygen , 11 .35 L oxygen gas at STP and

6.022×10^{23} oxygen atoms are removed . Find the mass fo the oxygen gas left:

A. zero

B. 32 g

C. 16 g

D. none

Answer: B

Watch Video Solution

Comprehension#11

1. The number of carbon atoms in exactly 12 g C^{12} is called Avogadro's number , $N_A\left(6.022 \times 10^{23}\right)$. One mole is the amount of material which contains Avogradro's number of particle.

These definitions emphasize that the mole refers to a fixed number of

NA^+ b Avogadro's number of atoms , electrons to refer to a mole of helium , a mole of electrons , or a mole of NA^+ by Avogadro's number of atoms, electrons or ions respectively. On the other hand, phrases like "one mole of hydrogen" can be ambiguous , and should be restated as "one mole of hydroden atoms" or " one mole fo hydrogen molecules." But it is a matter of common practice among chemists , however , to let the name of the element stand for its mos common form. Thus one mole of O_2 is frequently referred to as one mole of oxygen , whereas one moles of O is called one mole of oxygen atoms. Suppose if we take one mole molecules fo H_2SO_4 then it contain 2 moles of H atom 1 mole of S atom and 4 moles of O atom. It can also be said that moles of oxygen molecules is $\frac{4}{2}$ =2 mole.

From a mixture of 4 moles $Ca_3(PO_4)_2$, 5 moles of p_4O_{10} and 6 moles of H_3PO_3 , all the phosphourus atoms are removed . Then moles of P_4 molecules formed from all these atoms are:

A. 8.5

B. 17

C. 34

D. 10

Answer: A

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Comprehension#12

1. The number of carbon atoms in exactly 12 g C^{12} is called Avogadro's number , $N_A\left(6.022\times10^{23}\right)$. One mole is the amount of material which contains Avogradro's number of particle.

These definitions emphasize that the mole refers to a fixed number of NA^{+} b Avogadro's number of atoms , electrons to refer to a mole of helium , a mole of electrons , or a mole of NA^{+} by Avogadro's number of atoms, electrons or ions respectively. On the other hand, phrases like "one mole of hydrogen" can be ambiguous , and should be restated as "one mole of hydroden atoms" or " one mole fo hydrogen molecules." But it is a matter of common practice among chemists , however , to let the name of the element stand for its mos common form. Thus one mole of O_2 is frequently referred to as one mole of oxygen , whereas one moles of O is called one mole of oxygen atoms. Suppose if we take one mole molecules fo H_2SO_4 then it contain 2 moles of H atom 1 mole of S atom and 4 moles of O atom. It can also be said that moles of oxygen molecules is $\frac{4}{2}$ =2 mole.

If a sample of $CuSO_4.5H_2O$ contains 3 moles of oxygen molecules , then fo H-atom present in the sample is :

A. 5

B. 9

C. $\frac{10}{3}$

D. $\frac{20}{3}$

Answer: D

Watch Video Solution

Comprehension#13

1. The number of carbon atoms in exactly 12 g C^{12} is called Avogadro's number , $N_A\left(6.022 \times 10^{23}\right)$. One mole is the amount of material which contains Avogradro's number of particle.

These definitions emphasize that the mole refers to a fixed number of NA^+ b Avogadro's number of atoms , electrons to refer to a mole of helium , a mole of electrons , or a mole of NA^+ by Avogadro's number of atoms, electrons or ions respectively. On the other hand, phrases like "one mole of hydrogen" can be ambiguous , and should be restated as "one mole of hydroden atoms" or " one mole fo hydrogen molecules." But it is a matter of common practice among chemists , however , to let the name of the element stand for its mos common form. Thus one mole of O_2 is frequently referred to as one mole of oxygen , whereas one moles of O is called one mole of oxygen atoms. Suppose if we take one mole molecules fo H_2SO_4 then it contain 2 moles of H atom 1 mole of S atom and 4 moles of O atom. It can also be said that moles of oxygen molecules is $\frac{4}{2}$ =2 mole.

Sulphur exists in different allotropic forms like S_2S_6' and S_8 etc. If equal weight of these three ar taken in separate containers , then the ratio of number of atoms present in them is :

A. $1:3:4$

B. $1:1:1$

C. $2:4:3$

D. $1:1:4$

Answer: B

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Comprehension#14

1. Large quantities of hydrogen are required these days in industry for various purposes. Water is found to be the industry raw material from which hydrogen can be obtained . One of the important methods for the commerical production of hyrogen in Lane's process in which steam is passes over hot iron. Iron decomposes steam with formation of magnetic oxide $\left(Fe_3O_4\right)$ and hydrogen.

	$3Fe$	+	$4H_2O$	$\rightarrow$	Fe_3O_4	+ $4H_2$
(i)			steam		magnetic oxide	

Iron is regenerated by reducing magnetic oxide with water gas (it is mixture of CO and H_2 in 1:1 mole ratio).

(ii) $Fe_3O_4 + 4CO \rightarrow 3Fe + 4CO_2 \uparrow$

(iii) $Fe_3O_4 + 4H_2 \rightarrow 3Fe + 3H_2O$

(Steam recovered)

[equal amount sof magnetic oxide react in steps (ii) and (iii)] Steam so produced is again used in the previous step in which magnitic oxide is produced :

[At . wt. ⇒ Fe=56]

How many grams of iron are needed in order to produce 11.35 litre fo H_2 gas at STP?

A. 56 gm

B. 21 gm

C. 42 gm

D. None of these

Answer: B

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Comprehension#15

1. Large quantities of hydrogen are required these days in industry for various purposes. Water is found to be the industry raw material from which hydrogen can be obtained . One of the important methods for the commerical production of hyrogen in Lane's process in which steam is passes over hot iron. Iron decomposes steam with formation of magnetic oxide $\left(Fe_3O_4\right)$ and hydrogen.

(i) $\underset{}{3Fe} + \underset{\text{steam}}{4H_2O} \rightarrow \underset{\text{magnetic oxide}}{Fe_3O_4} + 4H_2$

Iron is regenerated by reducing magnetic oxide with water gas (it is mixture of CO and H_2 in 1:1 mole ratio).

$$(ii) \quad Fe_3O_4 + 4CO \rightarrow 3Fe + 4CO_2 \uparrow$$

$$(iii) \quad Fe_3O_4 + 4H_2 \rightarrow 3Fe + \underset{\text{(Steam recovered)}}{3H_2O}$$

[equal amount sof magnetic oxide react in steps (ii) and (iii)] Steam so produced is again used in the previous step in which magnitic oxide is produced :

[At . wt. $\Rightarrow$ Fe=56]

How many gram water gas is needed in order to recover all the iron in previous problem?

A. 14 gm

B. 7.5 gm

C. 15 gm

D. None of these

Answer: B

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Comprehension#16

1. Large quantities of hydrogen are required these days in industry for various purposes. Water is found to be the industry raw material from which hydrogen can be obtained . One of the important methods for the commerical production of hyrogen in Lane's process in which steam is passes over hot iron. Iron decomposes steam with formation of magnetic oxide $\left(Fe_3O_4\right)$ and hydrogen.

	$3Fe$	+	$4H_2O$	$\rightarrow$	Fe_3O_4	+ $4H_2$
(i)			steam		magnetic oxide	

Iron is regenerated by reducing magnetic oxide with water gas (it is mixture of CO and H_2 in 1:1 mole ratio).

$$(ii)\quad Fe_3O_4 \; + \; 4CO \; \rightarrow \; 3Fe \; + \; 4CO_2 \uparrow$$

$$(iii)\quad Fe_3O_4 \; + \; 4H_2 \; \rightarrow \; 3Fe \; + \; 3H_2O$$

(Steam recovered)

[equal amount sof magnetic oxide react in steps (ii) and (iii)] Steam so produced is again used in the previous step in which magnitic oxide is produced :

[At . wt. ⇒ Fe=56]

How many grams of steam is consumed in order to produce 11.35 litres H_2 gas at STP?

A. 9 gm

B. 36 g

C. 18 gm

D. None of these

Answer: A

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Comprehension#17

1. Large quantities of hydrogen are required these days in industry for various purposes. Water is found to be the industry raw material from which hydrogen can be obtained . One of the important methods for the commerical production of hyrogen in Lane's process in which steam is passes over hot iron. Iron decomposes steam with formation of magnetic oxide $\left(Fe_3O_4\right)$ and hydrogen.

	$3Fe$	$+$	$4H_2O$	$\rightarrow$	Fe_3O_4	$+$ $4H_2$
(i)			steam		magnetic oxide	

Iron is regenerated by reducing magnetic oxide with water gas (it is mixture of CO and H_2 in 1:1 mole ratio).

(ii) $Fe_3O_4 \quad + \quad 4CO \quad \rightarrow \quad 3Fe \quad + \quad 4CO_2 \uparrow$

(iii) $Fe_3O_4 \quad + \quad 4H_2 \quad \rightarrow \quad 3Fe \quad + \quad 3H_2O$

(Steam recovered)

[equal amount sof magnetic oxide react in steps (ii) and (iii)] Steam so produced is again used in the previous step in which magnitic oxide is produced :

[At . wt. $\Rightarrow$ Fe=56]

if iron is recovered in (ii) an (iii) with 80% efficiency , then how many gram iron is recovered if initially 56 gm iron is taken?

A. 44.8 gm

B. 80 gm

C. 448 gm

D. 4.48 gm

Answer: A

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Comprehension#18

1. Large quantities of hydrogen are required these days in industry for various purposes. Water is found to be the industry raw material from which hydrogen can be obtained . One of the important methods for the commerical production of hyrogen in Lane's process in which steam is passes over hot iron. Iron decomposes steam with formation of magnetic oxide (Fe_3O_4) and hydrogen.

	$3Fe$	$+$	$4H_2O$	$\rightarrow$	Fe_3O_4	$+$	$4H_2$
(i)			steam		magnetic oxide		

Iron is regenerated by reducing magnetic oxide with water gas (it is mixture of CO and H_2 in 1:1 mole ratio).

$$(ii)\quad Fe_3O_4 + 4CO \rightarrow 3Fe + 4CO_2 \uparrow$$

$$(iii)\quad Fe_3O_4 + 4H_2 \rightarrow 3Fe + \underset{\text{(Steam recovered)}}{3H_2O}$$

[equal amount sof magnetic oxide react in steps (ii) and (iii)] Steam so produced is again used in the previous step in which magnitic oxide is produced :

[At . wt. $\Rightarrow$ Fe=56]

How many litre H_2 gas is produced in (i) at STP in the above problem?

A. 22.7 litre

B. 30.27 litre

C. 3.027 litre

D. 90.8 litre

Answer: B

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Comprehension#19

1. Nitric acid is the most important oxyacid formed y nitrogen .It is one of the major industial chemicl and is widely used. Nitric acid is manufactured by the catalytic oxidation of ammonia in what is known as OSTWALD PROCESS which can be represented by the sequenve of reactions shown below:

$$4NH_3(g) + 5O_2(g) \xrightarrow{Pt/Rh} \text{Catalyst} 4NO(g) + 6H_2O(g) \quad ...(i)$$

$$2NO(f) + O_2(g) \xrightarrow{1120K} 2NO_2(g) \quad ...(ii)$$

$$3NO_2(g) + H_2O(l) \rightarrow 2HNO_3(aq) + NO(g) \quad ...(iii)$$

The aqueous nitric acid obtained by this method can be concentrated by distillation to ~ 68.5 % by weight . Further concentrated to 98% acid can be achieved by dehyration with concentrated sulphuric acid.

85 kg of $NH_3(g)$ was heated with 320 kg oxygen in the first step and NHO_3 is prepared according to the above reactions . If the above reactions . If the final solution has volume 500 L ,then molarity of HNO_3 is :

[Assume NO formed finally is not reused]

A. 2 M

B. 8 M

C. 3.33 M

D. 6.66 M

Answer: D

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Comprehension#20

1. Nitric acid is the most important oxyacid formed y nitrogen .It is one of the major industial chemicl and is widely used. Nitric acid is manufactured by the catalytic oxidation of ammonia in what is known as OSTWALD PROCESS which can be represented by the sequenve of reactions shown below:

$$4NH_3(g) + 5O_2(g) \xrightarrow[1120K]{Pt/Rh} \text{Catalyst} 4NO(g) + 6H_2O(g) \quad ...(i)$$

$$2NO(f) + O_2(g) \rightarrow 2NO_2(g) \quad ...(ii)$$

$$3NO_2(g) + H_2O(l) \rightarrow 2HNO_3(aq) + NO(g) \quad ...(iii)$$

The aqueous nitric acid obtained by this method can be concentrated by distillation to ~ 68.5 % by weight . Further concentrated to 98% acid can be achieved by dehyration with concentrated sulphuric acid. If 180 litre of water completely reacts with NO_2 produced to form nitric acid according ot the above reactions then the volume of air at STP containing 20% of NH_3 is :($\rho_{H_2O} = 1gm/ml$)

A. $1.56 \times 10^6 L$

B. $6.81 \times 10^4 L$

C. $3.40 \times 10^6 L$

D. none of these

Answer: C

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Comprehension#21

1. Nitric acid is the most important oxyacid formed y nitrogen .It is one of the major industial chemicl and is widely used. Nitric acid is manufactured by the catalytic oxidation of ammonia in what is known as OSTWALD PROCESS which can be represented by the sequenve of reactions shown below:

$$4NH_3(g) + 5O_2(g) \xrightarrow{Pt/Rh} \text{Catalyst} 4NO(g) + 6H_2O(g) \quad ...(i)$$

$$2NO(f) + O_2(g) \xrightarrow{1120K} 2NO_2(g) \quad ...(ii)$$

$$3NO_2(g) + H_2O(l) \rightarrow 2HNO_3(aq) + NO(g) \quad ...(iii)$$

The aqueous nitric acid obtained by this method can be concentrated by distillation to ~ 68.5 % by weight . Further concentrated to 98% acid can be achieved by dehyration with concentrated sulphuric acid. If 170 kg of NH_3 is heated in excess of oxygen then the volume fo $H_2O(l)$ produced in 1st reaction at STP si , $\left(\rho_{H_2}O = 1gm/ml\right))$

A. $340 \times 10^3 L$

B. 270L

C. $227 \times 10^3 L$

D. 170L

Answer: B

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Comprehension#22

1. We know that balancing of a chemical equation is entirely bases on law of conservation of mass. However the concept of Principle of Atom Conservation (POAC) can also be related to law of consevation of mass in a chemical reaction. So, POAC can also act as a technique for balancing a chemical equation. For example, for a reaction:

$ABC_3 \rightarrow AB + C_2$

On applying POAC for A , B and C and related the equations , we get :

$$\frac{n_{ABC_3}}{2} = \frac{n_{AB}}{2} = \frac{n_{C_2}}{3}$$

(n_x : number of moles of X)

Thus , the cofficients of ABC_3 , AB and C_2 in the balanced chemical equation will be 2,2 and 3 respectively and the balanced chemical equation can be represented as ,

$2ABC_3 \rightarrow 2AB + 3C_2$ Which of the following statements jis correct balanced chemical equation,

$pA + qB_2 \rightarrow rA_2B_5$

A. 2p=r

B. q=1.25p

C. r=2q

D. q=0.8p

Answer: B

Watch Video Solution

Comprehension#23

1. We know that balancing of a chemical equation is entirely bases on law of conservation of mass. However the concept of Principle of Atom Conservation (POAC) can also be related to law of consevation of mass in a chemical reaction. So, POAC can also act as a technique for balancing a chemical equation. For example, for a reaction:

$ABC_3 \rightarrow AB + C_2$

On applying POAC for A , B and C and related the equations , we get :

$$\frac{n_{ABC_3}}{2} = \frac{n_{AB}}{2} = \frac{n_{C_2}}{3}$$

(n_x : number of moles of X)

Thus , the cofficients of ABC_3 , AB and C_2 in the balanced chemical equation will be 2,2 and 3 respectively and the balanced chemical equation can be represented as ,

$2ABC_3 \rightarrow 2AB + 3C_2$

For the unbalanced chemical equation given below, which of the following statement is correct?

$X + Y_2 \rightarrow XY_3$

A. $n_x = 1.5 n_{y_2}$

B. $n_{y_2} = n_{XY_3}$

C. $n_{y_2} = 1.5 n_x$

D. $n_x = 3 n_{XY_3}$

Answer: C

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Comprehension#24

1. We know that balancing of a chemical equation is entirely bases on law of conservation of mass. However the concept of Principle of Atom Conservation (POAC) can also be related to law of consevation of mass in a chemical reaction. So, POAC can also act as a technique for balancing a chemical equation. For example, for a reaction:

$ABC_3 \rightarrow AB + C_2$

On applying POAC for A , B and C and related the equations , we get :

$$\frac{n_{ABC_3}}{2} = \frac{n_{AB}}{2} = \frac{n_{C_2}}{3}$$

(n_x : number of moles of X)

Thus , the cofficients of ABC_3 , AB and C_2 in the balanced chemical equation will be 2,2 and 3 respectively and the balanced chemical equation can be represented as ,

$2ABC_3 \rightarrow 2AB + 3C_2$

If in the above question, the atomic masses of X and Y are 10 and 30 respectively, then the mass of XY_3 formed when 120 g of Y_2 reacts completely with X is:

A. 133.3 g

B. 200g

C. 266.6g

D. 400g

Answer: A

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Comprehension#25

1. A chemist decided to determine the molecular formula of an unknown compound. He collects following informations: (P) Compound contains 2:1 H to O atom (number fo atoms).

(Q) Compound has 40% C by mass

(R) Approximate molecular mass of the compound is 178 g.

(S) Compound contains C,H and O only.

What is the % by mass of oxygen in the compound?

A. 53.33%

B. 88.88%

C. 33.33%

D. None of these

Answer: A

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Comprehension#26

1. A chemist decided to determine the molecular formula of an unknown compound. He collects following informations: (P) Compound contains 2:1 H to O atom (number fo atoms).

(Q) Compound has 40% C by mass

(R) Approximate molecular mass of the compound is 178 g.

(S) Compound contains C,H and O only.

What is the empirical formula of the compound?

A. CH_3O

B. CH_2O

C. C_2H_2O

D. CH_3O_2

Answer: B

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Comprehension#27

1. A chemist decided to determine the molecular formula of an unknown compound. He collects following informations: (P) Compound contains 2:1 H to O atom (number fo atoms).

(Q) Compound has 40% C by mass

(R) Approximate molecular mass of the compound is 178 g.

(S) Compound contains C,H and O only.

Which of the following could be molecular formula of compound?

A. $C_6H_6O_6$

B. $C_6H_{14}O_6$

C. $C_6H_{14}O_{12}$

D. $C_6H_{14}O_6$

Answer: B

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Comprehension#28

1. Pure carbon was burnt in excess of oxygen . The gaseous products are $CO_2 = 60$ mole% CO=15 mole % , O_2 =25 mole%

Find average molar mass of mixture.

A. 38.6 gm/mole

B. 28 gm/mole

C. 46 gm/mole

D. 42 gm/mole

Answer: A

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Comprehension#29

1. Pure carbon was burnt in excess of oxygen . The gaseous products are

$CO_2 = 60$ mole% CO=15 mole % , O_2 =25 mole%

Calculate moles of O_2 taken if initially 30 mole of carbon are taken:

A. 27 mole

B. 37 mole

C. 30 mole

D. 47 mole

Answer: B

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Comprehension#30

1. Pure carbon was burnt in excess of oxygen . The gaseous products are

$CO_2 = 60$ mole% CO=15 mole % , O_2 =25 mole%

In the above gaseous mixture if SO_2 gas is introduced then which of the following will be correct?

A. Molar mass of mixture will increase

B. Gaseous mixture will become heavier

C. (a) and (b) both are correct.

D. Molar mass remains same for homogenous system

Answer: C

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Comprehension#31

1. 1300 gm of a solution of urea having molarity equal to 5 m is kept in a large bucket is kept under a tap through which a 1 m urea solution is flowing . Assuming a constant rate of flow of urea solution which is equal to 0.5 gm/sec answer the question that follow.

Total amount of solution (in gm) finally present in bucket when solution present in bucket have concentration of urea equal to 3 m.

A. 2360 gm

B. 2000 gm

C. 2200 gm

D. 2480 gm

Answer: A

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Comprehension#32

1. 1300 gm of a solution of urea having molarity equal to 5 m is kept in a large bucket is kept under a tap through which a 1 m urea solution is flowing . Assuming a constant rate of flow of urea solution which is equal to 0.5 gm/sec answer the question that follow.

Time taken (in seconds) for concentration in the bucket to reach 3 m.

A. 2000 sec

B. 2120 sec

C. 1980 sec

D. 400 sec

Answer: B

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Comprehension#33

1. 1300 gm of a solution of urea having molarity equal to 5 m is kept in a large bucket is kept under a tap through which a 1 m urea solution is flowing . Assuming a constant rate of flow of urea solution which is equal to 0.5 gm/sec answer the question that follow.

Calulate approximate amount of water present in the bucket at time t=2000 sec.

A. 2000 gm

B. 2200 gm

C. 2100 gm

D. 1943 gm

Answer: D

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Comprehension#34

1. Two different formulas are used in order to represent composition of any miolecule, empirical formula and molecular formula . While the fomer gives an idea of relative ratio of number of atoms, latter gives the exact number of atoms in the molecule.

4.6 gm of an organic compound on complete combustion gave 8.8 gm of $CO_2(g)$ and 5.4 gm of $H_2O(g)$ only and no other products . what will be the empirical formula of the hydrocarbon?

A. CH_3

B. C_2H_6O

C. CH_2O

D. CH_2

Answer: B

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Comprehension#35

1. Two different formulas are used in order to represent composition of any miolecule, empirical formula and molecular formula . While the fomer gives an idea of relative ratio of number of atoms, latter gives the exact number of atoms in the molecule.

An organic compound contains C N and O . The number of oxygen atom is same as that of nitogen atom which is one third of number of carbon atoms and number of hydrogen atoms is approximately 2.33 times of carbon atoms. If vapour density of the compound is 73 then molecular formula of the compound will be :

A. C_3H_7NO

B. C_2H_5NO

C. $C_6H_{14}N_2O_2$

D. $C_5H_{12}N_3O_2$

Answer: C

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Comprehension#36

1. Two different formulas are used in order to represent composition of any miolecule, empirical formula and molecular formula . While the fomer gives an idea of relative ratio of number of atoms, latter gives the exact number of atoms in the molecule.

A 62 gm sample of a substance consist of 2 gm hydrogen , 28 gm nitrogen and remaining oxygen . What will b its empirical formula?

A. NHO_2

B. NHO_4

C. NHO_3

D. NHO_4

Answer: B

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Comprehension#37

1. 6.0 gm of gaseous hydrogen produce 17.6 gm CO_2 on complete combustion.

The mass percent of carbon in the hydrogen is :

A. 40 %

B. 50%

C. 60%

D. 80%

Answer: D

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Comprehension#38

1. 6.0 gm of gaseous hydrogen produce 17.6 gm CO_2 on complete combustion.

The mass of water formed simultaneously is:

A. 10.8 gm

B. 5.4 gm

C. 21.6 gm

D. 17.6 gm

Answer: A

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Comprehension#39

1. 6.0 gm of gaseous hydrogen produce 17.6 gm CO_2 on complete combustion.

The volume occupied by 0.3 gm of the hydrocarbon is 224 ml at 2 atm and 273° C . The Hydrocarbon is :

A. CH_4

B. C_2H_6

C. C_3H_6

D. C_2H_6

Answer: B

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Comprehension#40

1. A mixture pf H_2, N_2 and O_2 occupying 100 ml underwent reaction so as to form $H_2O_2(l)$ and $N_2H_2(g)$ as the only products , causing the volume to contract by 60 ml. The remaining mixture was passed through pyrogallol causing a contraction of 10 ml . to the remaining mixture excess H_2 was added and the above reaction was repeaped , causing a reduction in volume of 10 ml .(No other products are formed)

What is the mole percent of N_2 in th initial mixture?

A. 30 ml

B. 40 ml

C. 60 ml

D. 80 ml

Answer: A

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Comprehension#41

1. A mixture pf H_2, N_2 and O_2 occupying 100 ml underwent reaction so as to form $H_2O_2(l)$ and $N_2H_2(g)$ as the only products , causing the volume to contract by 60 ml. The remaining mixture was passed through pyrogallol causing a contraction of 10 ml . to the remaining mixture excess H_2 was added and the above reaction was repeaped , causing a reduction in volume of 10 ml .(No other products are formed)

What is the volume percent of H_2 in the initial mixture?

A. 30 ml

B. 40 ml

C. 60 ml

D. 80 ml

Answer: B

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Comprehension#42

1. A mixture pf H_2, N_2 and O_2 occupying 100 ml underwent reaction so as to form $H_2O_2(l)$ and $N_2H_2(g)$ as the only products , causing the volume to contract by 60 ml. The remaining mixture was passed through pyrogallol causing a contraction of 10 ml . to the remaining mixture excess H_2 was added and the above reaction was repeaped , causing a reduction in volume of 10 ml .(No other products are formed)

What is the volume of $N_{20H_2(g)}$ formed in this reaction after adding excess of $H_2(g)$?

A. 20 ml

B. 30 ml

C. 10 ml

D. 40 ml

Answer: C

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Comprehension#43

1. According to the Avogadro's law , equal number of moles of gases occupy the same volume at identical conditions of temperature and pressure. Even if we have a mixture of non-reacting gases then Avogadro's law is still obeyed by assuming mixture as a new gas.

Now let us assume air to consist of 80% by volume of nitrogen $\left(N_2\right)$ and 20% by volume of oxygen $\left(O_2\right)$. If air is taken at STP , then its 1 mol would occupy 22.4 L . 1 mol of air would contain 0.8 mol of N_2 and 0.2 mol of O_2 hence the mole fraction of N_2 and O_2 are given by $X_{n_2} = 0.8, X_{o_2} = 0.2$

Volume occupied by air at STP containing exactly 11.2 gm f nitrogen:

A. 22.4 L

B. 8.96 L

C. 11.2 L

D. 2.24 L

Answer: C

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Comprehension#44

1. According to the Avogadro's law , equal number of moles of gases occupy the same volume at identical conditions of temperature and pressure. Even if we have a mixture of non-reacting gases then Avogadro's law is still obeyed by assuming mixture as a new gas.

Now let us assume air to consist of 80% by volume of nitrogen $\left(N_2\right)$ and 20% by volume of oxygen $\left(O_2\right)$. If air is taken at STP , then its 1 mol would occupy 22.4 L . 1 mol of air would contain 0.8 mol of N_2 and 0.2 mol of O_2 hence the mole fraction of N_2 and O_2 are given by $X_{n_2} = 0.8, X_{o_2} = 0.2$

If air is treated as a solution of O_2 and N_2 , then % w/w of oxygen is:

A. $\frac{10}{9}$

B. $\frac{200}{9}$

C. $\frac{700}{9}$

D. $\frac{350}{9}$

Answer: B

Watch Video Solution

Comprehension#45

1. According to the Avogadro's law , equal number of moles of gases occupy the same volume at identical conditions of temperature and pressure. Even if we have a mixture of non-reacting gases then Avogadro's law is still obeyed by assuming mixture as a new gas.

Now let us assume air to consist of 80% by volume of nitrogen $\left(N_2\right)$ and 20% by volume of oxygen $\left(O_2\right)$. If air is taken at STP , then its 1 mol would occupy 22.4 L . 1 mol of air would contain 0.8 mol of N_2 and 0.2 mol of O_2 hence the mole fraction of N_2 and O_2 are given by

$X_{n_2} = 0.8, X_{o_2} = 0.2$

Density of air at STP is:

A. 1 g/L

B. $\frac{9}{7}g/L$

C. $\frac{2}{7}g/L$

D. can't be determined

Answer: B

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Comprehension#46

1. Chemical reactions involve interation of atoms and molecules. A large number of atoms / molecules (approximately 6.023×10^{23}) are present in a few grams of any chemical compound varying with their atomic /

molecular masses. To handle such large numbers conveniently, the mole concept was introduced. This concept has implications in diverse areas such as analytical chemistry, biochemistry, electrochemistry, and radiochemistry. The following example illustrates a typical case, involving chemical / electrochemical reaction, which requires a clear understanding of the mole concept.

A $4.0M$ aqueous solution of $NaCl$ is prepared and $500mL$ of this solution is electrolyzed. This leads to the evolution of chlorine gas at one of the electrodes (atomic mass of Na is 23 and Hg is $200)(1F = 96500C)$.

The total number of moles of chlorine gas evolved is

A. 0.5

B. 1.0

C. 2.0

D. 3.0

Answer: B

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Comprehension#47

1. Chemical reactions involve interation of atoms and molecules. A large number of atoms / molecules (approximately 6.023×10^{23}) are present in a few grams of any chemical compound varying with their atomic / molecular masses. To handle such large numbers conveniently, the mole concept was introduced. This concept has implications in diverse areas such as analytical chemistry, biochemistry, electrochemistry, and radiochemistry. The following example illustrates a typical case, involving chemical / electrochemical reaction, which requires a clear understanding of the mole concept.

A $4.0M$ aqueous solution of $NaCl$ is prepared and $500mL$ of this solution is electrolyzed. This leads to the evolution of chlorine gas at one of the electrodes (atomic mass of Na is 23 and Hg is $200)(1F = 96500C)$.

If the cathode is an Hg electrode, the maximum weight ($\in g$) of amalgam formed from this solution is

A. 200

B. 225

C. 400

D. 446

Answer: D

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Comprehension#48

1. Chemical reactions involve interation of atoms and molecules. A large number of atoms / molecules (approximately 6.023×10^{23}) are present in a few grams of any chemical compound varying with their atomic / molecular masses. To handle such large numbers conveniently, the mole concept was introduced. This concept has implications in diverse areas such as analytical chemistry, biochemistry, electrochemistry, and radiochemistry. The following example illustrates a typical case, involving chemical / electrochemical reaction, which requires a clear understanding of the mole concept.

A $4.0M$ aqueous solution of $NaCl$ is prepared and $500 mL$ of this solution is electrolyzed. This leads to the evolution of chlorine gas at one of the electrodes (atomic mass of Na is 23 and Hg is $200)(1F = 96500C)$.

The total charge (coulomb) required for complete electrolysis is

A. 24125

B. 48250

C. 96500

D. 193000

Answer: D

Watch Video Solution

Comprehension#49

1. Molality : It is defined as the moles of the solute pressent in 1 kg of the solvent . It is denoted by m.

$$\text{Molality(m)} = \frac{\text{Number of moles of solute}}{\text{Number of kilograms of the solvent}}$$

let w_A grams of the solute of molecular mass m_A be present in w_B grams of the solvent, then:

$$\text{Molality(m)} = \frac{w_A}{m_A \times w_B} \times 1000$$

Relation between mole fraction and molality:

$$X_A = \frac{n}{N+n} \text{and} X_B = \frac{N}{N+n}$$

$$\frac{X_A}{X_B} = \frac{n}{N} = \frac{\text{Moles of solute}}{\text{Moles of solvent}} = \frac{w_A \times m_B}{w_B \times m_A}$$

$$\frac{X_A \times 1000}{X_B \times m_B} = \frac{w_A \times 1000}{w_B \times m_A} = m \text{ or } \frac{X_A \times 1000}{\left(1 - X_A\right) m_B} = m$$

The molality of 1 litre solution with y% by (w/v) pf $CaCO_3$ is 2 . The weight of the solvent present in the solution is 900g , then value of y is :

[Atomic weight : Ca=40, C=12 , O=16]

A. 9

B. 18

C. 27

D. 36

Answer: B

Watch Video Solution

Comprehension#50

1. Molality : It is defined as the moles of the solute pressent in 1 kg of the solvent . It is denoted by m.

Molality(m) $= \dfrac{\text{Number of moles of solute}}{\text{Number of kilograms of the solvent}}$

let w_A grams of the solute of molecular mass m_A be present in w_B grams of the solvent, then:

Molality(m) $= \dfrac{w_A}{m_A \times w_B} \times 1000$

Relation between mole fraction and molality:

$$X_A = \frac{n}{N+n} \text{ and } X_B = \frac{N}{N+n}$$

$$\frac{X_A}{X_B} = \frac{n}{N} = \frac{\text{Moles of solute}}{\text{Moles of solvent}} = \frac{w_A \times m_B}{w_B \times m_A}$$

$$\frac{X_A \times 1000}{X_B \times m_B} = \frac{w_A \times 1000}{w_B \times m_A} = m \text{ or } \frac{X_A \times 1000}{\left(1 - X_A\right)m_B} = m$$

If the mole fraction of a solute is changed from $\frac{1}{4}$ to $\frac{1}{2}$ in the 800 g of solvent then the ratio tof molality will be:

A. $1:3$

B. $3:1$

C. $4:3$

D. $1:2$

Answer: A

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Comprehension#51

1. Molality : It is defined as the moles of the solute pressent in 1 kg of the solvent . It is denoted by m.

Molality(m) $= \dfrac{\text{Number of moles of solute}}{\text{Number of kilograms of the solvent}}$

let w_A grams of the solute of molecular mass m_A be present in w_B grams of the solvent, then:

Molality(m) $= \dfrac{w_A}{m_A \times w_B} \times 1000$

Relation between mole fraction and molality:

$$X_A = \frac{n}{N+n} \text{and} X_B = \frac{N}{N+n}$$

$$\frac{X_A}{X_B} = \frac{n}{N} = \frac{\text{Moles of solute}}{\text{Moles of solvent}} = \frac{w_A \times m_B}{w_B \times m_A}$$

$$\frac{X_A \times 1000}{X_B \times m_B} = \frac{w_A \times 1000}{w_B \times m_A} = m \text{ or } \frac{X_A \times 1000}{\left(1 - X_A\right) m_B} = m$$

The mole fraction of the solute in the 12 molal solution of $CaCo_3$ is :

A. 0.822

B. 0.177

C. 1.77

D. 0.0177

Answer: B

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Comprehension#52

1. An aqueous solution of urea containing 18 g urea in 1500 cm^3 of solution has a density of 1.5 g/cm^3 . If the molecular weight of urea is 60. Then the molality of solution is:

A. 0.2

B. 0.134

C. 0.064

D. 1.2

Answer: B

Watch Video Solution

Comprehension#53

1. Molality : It is defined as the moles of the solute pressent in 1 kg of the solvent . It is denoted by m.

Molality(m) $= \dfrac{\text{Number of moles of solute}}{\text{Number of kilograms of the solvent}}$

let w_A grams of the solute of molecular mass m_A be present in w_B grams of the solvent, then:

$$\text{Molality(m)} = \frac{w_A}{m_A \times w_B} \times 1000$$

Relation between mole fraction and molality:

$$X_A = \frac{n}{N+n} \text{and} X_B = \frac{N}{N+n}$$

$$\frac{X_A}{X_B} = \frac{n}{N} = \frac{\text{Moles of solute}}{\text{Moles of solvent}} = \frac{w_A \times m_B}{w_B \times m_A}$$

$$\frac{X_A \times 1000}{X_B \times m_B} = \frac{w_A \times 1000}{w_B \times m_A} = m \text{ or } \frac{X_A \times 1000}{\left(1 - X_A\right)m_B} = m$$

What is the quantity of water that should be added to 16 g methonal to make the mole fraction of methonal as 0.25?

A. 27 g

B. 12 g

C. 18 g

D. 36 g

Answer: A

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Comprehension#54

1. The following sequence of reaction occurs in commical production of aqueous nitric acid.

$NH_3(g) + O_2(g) \rightarrow NO(g) + H_2O(l)$

$NO(g) + O_2(g) \rightarrow NO_2(g)$

$NO_2(g) + H_2O(l) \rightarrow HNO_3(aq) + NO(g)$

In an industry , 378 kg of HNO_3 was required to be produced.

If % yield of all reactions is 100% , then mass(kg) of NH_3 required is :[NO produced in reaction -(iii) is not re-used in reaction-(ii)]

A. 306

B. 170

C. 126

D. 153

Answer: D

Watch Video Solution

Comprehension#55

1. The following sequence of reaction occurs in commical production of aqueous nitric acid.

$NH_3(g) + O_2(g) \rightarrow NO(g) + H_2O(l)$

$NO(g) + O_2(g) \rightarrow NO_2(g)$

$NO_2(g) + H_2O(l) \rightarrow HNO_3(aq) + NO(g)$

In an industry , 378 kg of HNO_3 was required to be produced. If % yield of reaction(i),(ii) and (iii) is 85% , 60% and 50% respectively , then mass (kg) of NH_3 required is : [NO produced in reaction(iii) is not re-used in reaction-(ii)]

A. 30

B. 600

C. 6000

D. 300

Answer: B

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Watch Video Solution

Comprehension#56

1. The following sequence of reaction occurs in commical production of aqueous nitric acid.

$NH_3(g) + O_2(g) \rightarrow NO(g) + H_2O(l)$

$NO(g) + O_2(g) \rightarrow NO_2(g)$

$NO_2(g) + H_2O(l) \rightarrow HNO_3(aq) + NO(g)$

In an industry , 378 kg of HNO_3 was required to be produced. If % yield of all reactions is 100% , then mass (kg) of NH_3 , required is :[NO produced is reactionp-(iii) re-used in reaction-(ii)]

A. 153

B. 126

C. 102

D. can't be determined

Answer: C

Watch Video Solution

Comprehension#57

1. An unknown compound A $\left(Mn_xO_y\right)$ composed of manganese and oxygen , has 36.7% oxygen by weight. When 8.7 g of A is heated with HCl it liberates Cl_2 gas as per the following reaction:

$Mn_xO_y + HCl \rightarrow MnCl_2 + Cl_2 + H_2O$ (unbalanced)

The simplest formula of A is:

A. MnO

B. MnO_2

C. Mn_2O_3

D. Mn_3O_4

Answer: B

Watch Video Solution

Comprehension#58

1. An unknown compound A $\left(Mn_xO_y\right)$ composed of manganese and oxygen , has 36.7% oxygen by weight. When 8.7 g of A is heated with HCl it liberates Cl_2 gas as per the following reaction:

$Mn_xO_y + HCl \rightarrow MnCl_2 + Cl_2 + H_2O$ (unbalanced)

The volume of Cl_2 gas at STP obtained when 8.7 gm of compound A is heated with excess of HCl , (assume molecular formula and , empirical formula to be same):

A. 1.135 L

B. 2.27 L

C. 4.54 L

D. 0.567 L

Answer: B

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Comprehension#59

1. 632 g of sodium thiosulphate $\left(a_2S_2O_3\right)$ reacts with copper sulphate to form cuproc thiosulphate which is reduced by sodium thiosulphate to give cuprous compound which is dissolved in excess of sodium thiosulphate to form a complex compound sodium cuprothisosulphate $\left(Na_4\left[Cu_6\left(S_2O_3\right)_5\right]\right)$, (MW=1033)

$CuSO_4 + Na_2S_2O_3 \rightarrow CuS_2O_3 + Na_2SO_4$ [very fast]

$2CuSO_4 + Na_2S_2O_3 + Na_2S_2O_3 \rightarrow Cu_2S_2O_3 + Na_2S_4O_6$

$3Cu_2S_2O_3 + 2Na_2S_2O_3 \rightarrow Na_4\left[Cu_6\left(S_2O_3\right)_5\right]$

(Sodium cuprothisoulphate)

In this process , 0.2 mole of sodium cuprothiosulphate is formed .(O=16 , Na=23 , S=32)

Moles of sodium thiosulophate reacted and unreacted after the reaction are respectively,

A. 3 and 2

B. 2 and 3

C. 2.2 and 1.8

D. 1.8 and 2.2

Answer: C

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Comprehension#60

1. 632 g of sodium thiosulphate $\left(a_2S_2O_3\right)$ reacts with copper sulphate to form cuproc thiosulphate which is reduced by sodium thiosulphate to give cuprous compound which is dissolved in excess of sodium thiosulphate to form a complex compound sodium cuprothisosulphate $\left(Na_4\left[Cu_6\left(S_2O_3\right)_5\right]\right)$, (MW=1033)

$CuSO_4 + Na_2S_2O_3 \rightarrow CuS_2O_3 + Na_2SO_4$ [very fast]

$2CuSO_4 + Na_2S_2O_3 + Na_2S_2O_3 \rightarrow Cu_2S_2O_3 + Na_2S_4O_6$

$3Cu_2S_2O_3 + 2Na_2S_2O_3 \rightarrow Na_4\left[Cu_6\left(S_2O_3\right)_5\right]$

(Sodium cuprothisoulphate)

In this process , 0.2 mole of sodium cuprothiosulphate is formed .(O=16 , Na=23 , S=32)

It instead of given amount of sodium thiosulphate, 2 moles of sodium thiosulphate along with 3 moles of $CuSO_4$ were taken initially . Then, moles of sodiu cuprothiosulphate formed is:

A. 0

B. 1

C. 1.5

D. 2

Answer: A

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Comprehension#61

1. 81 gm mixture of $mgCO_3(s)$ and $NH_3CO_3(s)$ is heated to constant mass. If vapour density of gaseous mixture evolved was found to be $\frac{61}{4}$ then

Given that:

$MgCo_3(s) \rightarrow MgO_s + CO_2(g)$

$NH_2COONH_4(s) \rightarrow 2NH_3(g) + CO_2(g)$

Mole % of $MgCo_3$ in original sample:

A. 0.5

B. 0.6

C. 0.75

D. None of these

Answer: A

Watch Video Solution

Comprehension#62

1. 81 gm mixture of $mgCO_3(s)$ and $NH_3CO_3(s)$ is heated to constant mass.

If vapour density of gaseous mixture evolved was found to be $\frac{61}{4}$ then

Given that:

$MgCo_3(s) \rightarrow MgO_s + CO_2(g)$

$NH_2COONH_4(s) \rightarrow 2NH_3(g) + CO_2(g)$ ltBrgt Volume (in litre0 of the total gases produced at 1 atm and 273 K:

A. 22.4

B. 44.8

C. 179.2

D. 896

Answer: B

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Comprehension#63

1. If above gaseous mixture at 273K is passed through KOH solution, contraction in volume (in litre) will be (assume KOH solution absorb CO_2 gas completely):

A. 11.2

B. 22.4

C. 44.8

D. 89.6

Answer: B

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Comprehension#64

1. Air sample from an industrial town, heavily polluted by CO_2 was collected and analyzed . In one anaylsis , 56L of air measured at 1 atm and 273 K was passed through a 250 mL of 0.025 M NaOH solution , where

$CO_2(g)$ was absorbed completely . 25 mL of the above solution was then treated with excess of $BaCl_2$ solution where all the carbonate was precipitated as $BaCo_3(s)$. The solution was filtered off and the filtrate required 25 mL of a 0.005 MHCl solution for neutralization.

ppm strenght of $CO_2(g)$, volume by volume i.e. , mL of CO_2 per 10^6 mL of air was :

A. 560

B. 5600

C. 100

D. 1000

Answer: D

Watch Video Solution

Comprehension#65

1. Air sample from an industrial town, heavily polluted by CO_2 was collected and analyzed . In one anaylsis , 56L of air measured at 1 atm and 273 K was passed through a 250 mL of 0.025 M NaOH solution , where $CO_2(g)$ was absorbed completely . 25 mL of the above solution was then treated with excess of $BaCl_2$ solution where all the carbonate was precipitated as $BaCo_3(s)$. The solution was filtered off and the filtrate required 25 mL of a 0.005 MHCl solution for neutralization.

Weight (in milligrams) of precipitate $BaCO_3(s)$ obtained from the 25 ml of test solution was:

[Atomic weight :Ba =137, C=12, O=16]

A. 27.58

B. 275.8

C. 492.5

D. 49.25

Answer: D

Watch Video Solution

Comprehension#66

1. Air sample from an industrial town, heavily polluted by CO_2 was collected and analyzed . In one anaylsis , 56L of air measured at 1 atm and 273 K was passed through a 250 mL of 0.025 M NaOH solution , where $CO_2(g)$ was absorbed completely . 25 mL of the above solution was then treated with excess of $BaCl_2$ solution where all the carbonate was precipitated as $BaCo_3(s)$. The solution was filtered off and the filtrate required 25 mL of a 0.005 MHCl solution for neutralization.

Fraction of original NaOH (by mole) that reached with CO_2 was:

A. 0.2

B. 0.4

C. 0.6

D. 0.8

Answer: D

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Comprehension#67

1. H_2O_2 solution of 45.4 V at STP . In a hospital of Kota, patient under artifical respiration take s200ml O_2 per min at 1 atm and 273 K and a cylinder last for 2.8 hours . After that it cannot be used for respiration though it still contains H_2O_2 .

[Assume volume of solution and rate of decomposition remain constant]

Initial moles of H_2O_2 in a cylinder are:

A. 12

B. 16

C. 8

D. 24

Answer: A

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Comprehension#68

1. H_2O_2 solution of 45.4 V at STP . In a hospital of Kota, patient under artifical respiration take s200ml O_2 per min at 1 atm and 273 K and a cylinder last for 2.8 hours . After that it cannot be used for respiration though it still contains H_2O_2 .

[Assume volume of solution and rate of decomposition remain constant]

Volume of oxygen used for respiration is :

A. 11.2 L

B. 22.4 L

C. 33.6 L

D. 5.6 L

Answer: C

Watch Video Solution

Comprehension#69

1. H_2O_2 solution of 45.4 V at STP . In a hospital of Kota, patient under artifical respiration take s200ml O_2 per min at 1 atm and 273 K and a cylinder last for 2.8 hours . After that it cannot be used for respiration though it still contains H_2O_2 .

[Assume volume of solution and rate of decomposition remain constant]

Volume strenght of H_2O_2 left in solution is:

A. 11.35 V

B. 22.7 V

C. 5.67 V

D. 34.05 V

Answer: D

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Comprehension#70

1. For the given series of reaction,

$4NH_3(g) + 5O_2(g) \rightarrow 4NO(g) + 6H_2O(l)$

$2NO(g) + O_2(g) \rightarrow 2NO(g) + O_2(g) \rightarrow 2NO_2(g)$ If 20 ml of NH_3 is mixed with 100 ml of O_2 .Volume contraction at the completion of above reaction is:

A. 20 ml

B. 85 ml

C. 35 ml

D. 100 ml

Answer: C

Watch Video Solution

Comprehension#71

1. For the given series of reaction,

$$4NH_3(g) + 5O_2(g) \rightarrow 4NO(g) + 6H_2O(l)$$

$$2NO(g) + O_2(g) \rightarrow 2NO(g) + O_2(g) \rightarrow 2NO_2(g)$$

To obtain maximum mass of NO_2 from a given mass of a mixture of NH_3 and O_2 the ratio of mass of NH_3 ot O_2 should be:

A. $\frac{4}{7}$

B. $\frac{17}{56}$

C. $\frac{17}{40}$

D. none of these

Answer: B

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Comprehension#72

1. For the given series of reaction,

$4NH_3(g) + 5O_2(g) \rightarrow 4NO(g) + 6H_2O(l)$

$2NO(g) + O_2(g) \rightarrow 2NO(g) + O_2(g) \rightarrow 2NO_2(g)$

Total volume of O_2 used if 20 ml NH_3 is mixed with 100 ml O_2 is :

A. 40

B. 60

C. 35

D. none of these

Answer: C

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Comprehension#73

1. Similar to % labelling of oleum ,a mixture of H_3PO_3 and P_4O_6 is labelled as (100 +x)% where x is maximum mass of water which can reacts with P_4O_6 present in 100 gm mixture of H_3PO_3 and P_4O_6

$P_4O_6 + H_2O \rightarrow H_3PO_3$

If such a mixture is labelled as 127 % , then mass of free P_4O_6 in given 100 g mixture is :

A. 45 gm

B. 55 gm

C. 71 gm

D. 58 gm

Answer: B

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Comprehension#74

1. Similar to % labelling of oleum ,a mixture of H_3PO_3 and P_4O_6 is labelled as (100 +x)% where x is maximum mass of water which can reacts with P_4O_6 present in 100 gm mixture of H_3PO_3 and P_4O_6

$P_4O_6 + H_2O \rightarrow H_3PO_3$

For such a mixture of P_4O_6 and H_3PO_3 labelled as (100 +x)% . Value of x can lie in range of (maximum and minimum) :

A. $0 < x < 22.5$

B. $0 < x < 49.09$

C. $0 < x < 59.65$

D. $0 < x < 34.66$

Answer: B

Watch Video Solution

Comprehension#75

1. Similar to % labelling of oleum ,a mixture of H_3PO_3 and P_4O_6 is labelled as (100 +x)% where x is maximum mass of water which can reacts with P_4O_6 present in 100 gm mixture of H_3PO_3 and P_4O_6

$P_4O_6 + H_2O \rightarrow H_3PO_3$

$\frac{100}{3}$ gm mixture of H_3PO_3 and P_4O_6 (labelled as 123%) is mixed with 50 L of H_2O and resulting solution (assuming volume change) is mixed with 2 M NaOH solution . Volume of NaOH required for complete neutralisationn is:

A. 250 ml

B. 750 ml

C. 200 ml

D. 500 ml

Answer: D

Watch Video Solution

Comprehension#76

1. Two substance $A_2(g)$ and $B_2(g)$ are allowed to react to form either of $A_2B_2(l), A_2B_4(g)$ or both depending on relative amount.

Answer the following the following question, if 75 g A_2 and $200gB_2$ are mixed and no reactant is left.

[Given :At mass of A =25 , B=50]

What is the volume of all the gases present in the mixture after completion of reaction at 760 mm of Hg and 273° C?

A. 67.2 L

B. 44.8 L

C. 22.4 L

D. 11.2 L

Answer: C

Watch Video Solution

Comprehension#77

1. Two substance $A_2(g)$ and $B_2(g)$ are allowed to react to form either of $A_2B_2(l), A_2B_4(g)$ or both depending on relative amount.

Answer the following the following question, if 75 g A_2 and $200gB_2$ are mixed and no reactant is left.

[Given :At mass of A =25 , B=50]

Now A_2B_4 is transferred to another container completey . At high temperature it is completely dissociated in its gaseous elements A_2 and B_2 . Find average molecular weight of gaseous mixture:

A. $\frac{125}{3}$

B. $\frac{250}{3}$

C. 125

D. 250

Answer: B

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Comprehension#78

1. 24 gm pure sample of magnesium is burnt in air to form magnesium oxide and magnesium nitride. When products are treated with excess of H_2O , 3.4 gm of gaseous NH_3 is generated according to given reactions.

$Mg + O_2 \rightarrow MgO$

$Mg + N_2 \rightarrow Mg_3N_2$

$Mg_3N_2 + 6H_2O \rightarrow 2Mg(OH)_2 + 2NH_3$

Calculate the amount of magnesium oxide (in gm) in products.

A. 28

B. 20

C. 16.8

D. 32

Answer: A

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Comprehension#79

1. 24 gm pure sample of magnesium is burnt in air to form magnesium oxide and magnesium nitride. When products are treated with excess of H_2O, 3.4 gm of gaseous NH_3 is generated according to given reactions.

$Mg + O_2 \rightarrow MgO$

$Mg + N_2 \rightarrow Mg_3N_2$

$Mg_3N_2 + 6H_2O \rightarrow 2Mg(OH)_2 + 2NH_3$

Calculate the amount of $Mg(OH)_2$ (in gm) produced in above reaction.

A. 11.6

B. 17.4

C. 23.2

D. 15.8

Answer: B

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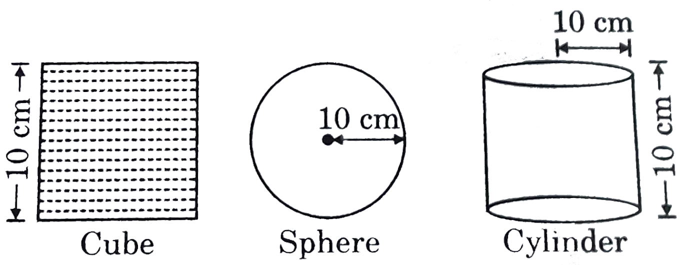
Comprehension#80

1. Consider following vessel of given dimensions



Cubical vessel is filled completely with $2MH_2SO_4$ solution , whereas spherical and cylindrical vessels are empty (Tale π=3) (Atomic mass of Br =80)

Total centent of cubical vessel is placed in cylindrical vessel and it is further filled completely with 1 M $BaCl_2$ solution. Molarity of SO_4^{2-} ions in aqueous solution will be :

A. 1 M

B. 0 M

C. 0.66 M

D. 0.33 M

Answer: B

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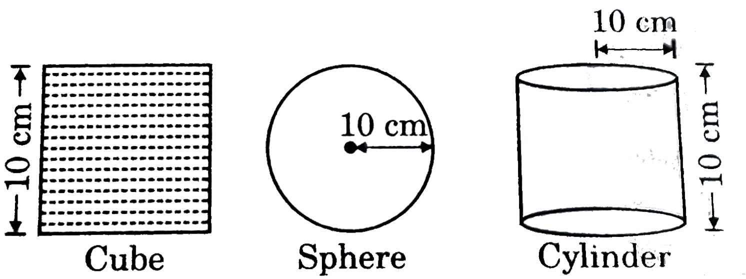
Comprehension#81

1. Consider following vessel of given dimensions



Cubical vessel is filled completely with $2MH_2SO_4$ solution , whereas spherical and cylindrical vessels are empty (Tale π=3) (Atomic mass of Br =80)

The acid left in cylindrical container and its molarity will be :

A. $H_2SO_4, 2M$

B. $H_2SO_4, \frac{2M}{3}$

C. $HCl, \frac{2M}{3}$

D. $HCl, \frac{4}{3}M$

Answer: D

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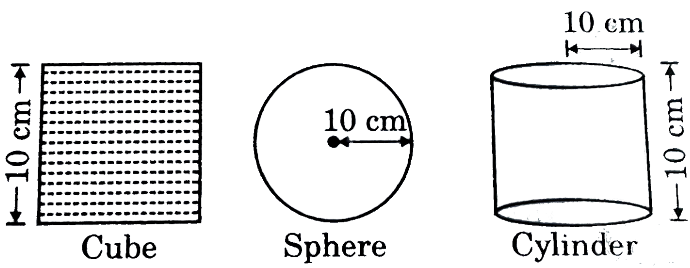
Comprehension#82

1. Consider following vessel of given dimensions



Cubical vessel is filled completely with $2MH_2SO_4$ solution , whereas spherical and cylindrical vessels are empty (Tale π=3) (Atomic mass of Br =80)

Now total content of cuylindrical container is placed in a spherical container and if it is further filled completely with 32.4 % w/v HBr solution. Molarity of H^+ in final solution will be:

A. $\frac{7}{4}$ M

B. 2M

C. $\frac{3}{2}$ M

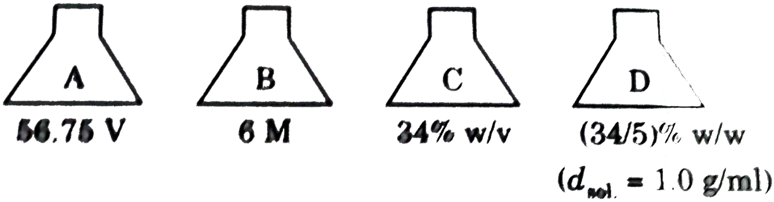
D. $\frac{5}{2}$M

Answer: B

View Text Solution

Comprehension#83

1. Mr. Rao owns a famous beauty parlour . For bleaching of hair, renowned actress katrina kaif enters parlour but, she was astonished to find a trainee hair dresser. She realised that hair dresser is inefficient in his job and unsure which amound the four bottles is to be used for bleaching .She was shown four bottles containing 500 ml of H_2O_2 solution each.



Katrina was further told that:

(a) H_2O_2 solution are used for bleaching of hair.

(b) only one complete bottle to be used per person.

(c) requirement of oxygen for a good bleach is 10% by mass of hair.

Knowing mass of her hair to be 480 gm, help Katrina to find which bottle will be just sufficient for her?

A. Bottle B

B. Bottle A

C. Bottle D

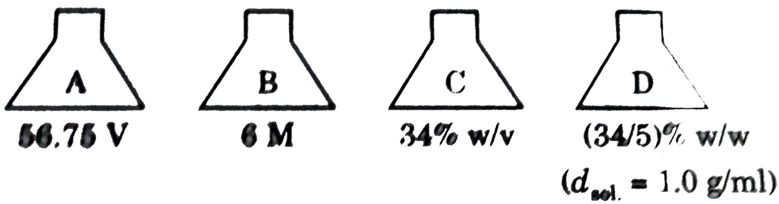
D. Bottle C

Answer: A

View Text Solution

Comprehension#84

1. Mr. Rao owns a famous beauty parlour . For bleaching of hair, renowned actress katrina kaif enters parlour but, she was astonished to find a trainee hair dresser. She realised that hair dresser is inefficient in his job and unsure which amound the four bottles is to be used for bleaching .She was shown four bottles containing 500 ml of H_2O_2 solution each.



Katrina was further told that:

(a) H_2O_2 solution are used for bleaching of hair.

(b) only one complete bottle to be used per person.

(c) requirement of oxygen for a good bleach is 10% by mass of hair.

Which other combination of two bottles can provide exact amount of H_2O_2 for bleaching , if half of the amount of the solution in two bottle choosen are mixed?

A. A and B

B. C and D

C. B and C

D. A and D

Answer: B

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Comprehension#85

1. 2.7 gm of Al is heated with 100 mL of H_2SO_4 (29.4% w/w density 1 gm/mL) following reaction takes place:

$$Al + H_2SO_4 \rightarrow Al_2\left(SO_4\right)_3 + H_2$$

The volume of H_2 gas evolved at 273 k and 1 atm:

A. 3.36 L

B. 2.24 L

C. 4.48 L

D. 11.2 L

Answer: A

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Comprehension#86

1. 2.7 gm of Al is heated with 100 mL of H_2SO_4 (29.4% w/w density 1 gm/mL) following reaction takes place:

$Al + H_2SO_4 \rightarrow Al_2\left(SO_4\right)_3 + H_2$

The hydrogen gas obtained in the reaction is mixed with 1.2×10^{24} molecules of O_2 . The molecular weight of gaseous mixture is :(Assuming gases are not reacting $N_0 = 6 \times 10^{23}$)

A. 29.9

B. 30.6

C. 17

D. None of these

Answer: A

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Comprehension#87

1. 9×10^{22} atoms of Ar and n moles of O_2 are kept in a vessel of capacity 5L at 1 atm and $27^{\circ} C$.

(Consider $N_A = 6 \times 10^{23}, R = 0.0821 Latm mol^{-1} K^{-1}$) :

Find the mass of O_2 in vessel:

A. 17 gm

B. 3.4 gm

C. 1.7 gm

D. 34 gm

Answer: C

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Comprehension#88

1. 9×10^{22} atoms of Ar and n moles of O_2 are kept in a vessel of capacity 5L at 1 atm and $27^\circ C$.

(Consider $N_A = 6 \times 10^{23}, R = 0.0821 Latm\text{mol}^{-1}K^{-1}\big)$:

If all the O_2 in vessel , then:

A. moles of gas remain same

B. molecules in vessel remain same

C. pressure in vessel remain same

D. total atoms in vessel remain same

Answer: D

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Comprehension#89

1. similar to % labelling of oleum ,a mixture of H_3PO_3 and P_4O_6 is labelled as (100 +x)% where x is maximum mass of water which can reacts with P_4O_6 present in 100 gm mixture of H_3PO_3 and P_4O_6

$P_4O_6 + H_3$

A. 1.25 atm

B. 2.23 atm

C. 0.25 atm

D. None of the above

Answer: A

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Comprehension#90

1. Estimation of halogens:

Carius method: A known mass of compound is heated with conc. HNO_3 in the pressure of $AgNO_3$ contained in a hard glass tube known as Carius tube in a furance . C and H are oxidised to CO_2 and H_2O . The halogen forms the corresponding AgX. It si filtered m dried and weighted . Extimation of sulphur: A known mass of compound is heated with fuming HNO_3 or sodium peroxide $\left(Na_2O_2\right)$ in the presence of $BaCl_2$ solution in Carius tube. Sulphur is oxidised to H_2SO_4 and percipipated as $BaSO_4$ .It is filtered , dried and weighed.

Percentage of S

$$= \frac{\text{Atomic mass of S}}{\text{Molecular mas of} BaSO_4} \times \frac{\text{Mass of} BaSO_4 \times 100}{\text{Mass of compound}}$$

0.15 gm of an organic compound gave 0.12 gm of silver bromide by the Carius method. Find the percentage of bromine in the compound.

A. 34

B. 40

C. 17

D. 68

Answer: A

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Comprehension#91

1. Estimation of halogens:

Carius method: A known mass of compound is heated with conc. HNO_3 in the pressure of $AgNO_3$ contained in a hard glass tube known as Carius tube in a furance . C and H are oxidised to CO_2 and H_2O . The halogen forms the corresponding AgX. It si filtered m dried and weighted . Extimation of sulphur: A known mass of compound is heated with fuming HNO_3 or sodium peroxide $\left(Na_2O_2\right)$ in the presence of $BaCl_2$ solution in Carius tube. Sulphur is oxidised to H_2SO_4 and percipipated as $BaSO_4$ .It is filtered , dried and weighed.

Percentage of S

$$= \frac{\text{Atomic mass of S}}{\text{Molecular mas of} BaSO_4} \times \frac{\text{Mass of} BaSO_4 \times 100}{\text{Mass of compound}}$$

0.2595 gm of an organic substance when treated by Carius method gave 0.35 gm of $BaSo_4$. Calculate the percentage of sulphur in the compound.

A. 9

B. 30.4

C. 18.52

D. 40.52

Answer: C

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Comprehension#92

1. Estimation of phosphorous:

Second method: A known mass of compound is heated with fuming HNO_3 or sodium peroxide $(Na_2O_2$ in Carius tube which converts phosphorous to H_3PO_4. Magnesia mixture $\left(MgCl_2 + NH_4Cl\right)$ is then added, which gives the percipate of magnesium ammonium phosphate $(MgNH_4.PO_4)$ which on heating gives magnesium pyrophosphate $(Mg_2P_2O_7)$, which is weighted.

Percentage of P

$$= \frac{\text{Atomic mass of P}}{\text{Molecular mass of } Mg_2P_2O_7} \times \frac{\text{Molecular mass of } Mg_2P_2O_7 \times 100}{\text{Mass of compound}} = \frac{62}{222} \times$$

0.12 gm of and organic compound containing phosphorus gave 0.22 gm of $Mg_2P_2O_7$ by the usual analysis. Calculate the percentage of phosphorus in the compound.

A. 25

B. 9.25

C. 801

D. 51.20

Answer: D

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Comprehension#93

1. Estimation of phosphorous:

Second method: A known mass of compound is heated with fuming HNO_3 or sodium peroxide $\left(Na_2O_2\right.$ in Carius tube which converts phosphorous to H_3PO_4. Magnesia mixture $\left(MgCl_2 + NH_4Cl\right)$ is then added, which gives the percipate of magnesium ammonium phosphate $\left(MgNH_4 . PO_4\right)$ which on heating gives magnesium pyrophosphate $\left(Mg_2P_2O_7\right)$, which is weighted.

Percentage of P

$$= \frac{\text{Atomic mass of P}}{\text{Molecular mass of } Mg_2P_2O_7} \times \frac{\text{Molecular mass of } Mg_2P_2O_7 \times 100}{\text{Mass of compound}} = \frac{62}{222} \times$$

An organic compound has 6.2% of phosphorus .In the reaction sequence , all phosphorous is converted to $Mg_2P_2O_7$. Find wt. of $Mg_2P_2O_7$ formed

A. 2.22

B. 10.2

C. 15

D. 20

Answer: A

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Comprehension#94

1. Estimation of Nitrogen: There are two methods for the estimation of nitrogen (1) Dumas method and (2) Kjedahl's method.

(1) Duma's method: A known mass of compound is heated with copper oxide (CuO) in an atmosphere of CO_2 , which gives free nitrogen along with CO_2 and H_2O .

$$C_xH_yN_z + \left(2x + \frac{y}{2}\right)CuO \rightarrow xCO_2 + \frac{y}{2}\left(H_2O\right) + \frac{z}{2} + \left(2x + \frac{y}{2}\right)Cu.$$

The gaseous mixture is passed over a heated copper gauze which converts traces of nitrogen oxides formed of N_2 .The gaseous mixture is collected over an aqueous solution of KOH which absorbs CO_2 and nitrogen is collected in the upper part of the graduated tube.

(2) kjeldahl's method: A known mass of organic compound (0.5 gm) is mixed with K_2SO_4 (10 gm) and $CuSO_4$ (1.0 gm) or a drop of mercury (Hg) and conc. H_2SO_4 (25 ml) , and heated in Kjeldahl's flask. $CuSO_4$ or Hg acts as a catalyst , while K_2SO_4 raises the boiling point of H_2SO_4 . The

nitrogen in the organic compound is quantitatively converted to ammonium sulphate . The resulting mixture is then distilled with excess of NaOH solution and the NH_3 evolved is passes into a known but excess volume of standard HCl or H_2SO_4 . The acid left unused is estimated by titration with some standard alkali . The amound of acid used against NH_3 can thus be known and from this the percentage of nitogen is calculated.

(a) $C + H + S \xrightarrow{\text{conc.}} H_2SO_4 CO_2 + H_2O + SO_2$

(b) $N \xrightarrow{\text{conc.}} H_2SO_4 \left(NH_4\right)_2SO_4$

(c) $\left(NH_4\right)_2SO_4 + 2NaOH \rightarrow Na_2SO_4 + 2NH_3 + 2H_2O$

(d) $2NH_3 + H_2SO_4 \rightarrow \left(NH_4\right)_2SO_4$

(3) This method is not applicable to compounds containing N in nitro and azo groups,and N persent in the ring (e.g., pyridine as N of these conpounds does not change to $\left(NH_4\right)_2SO_4$ (ammonium sulphate) under these reaction condition.

0.30 gm of an organic compound gave 50 ml of nitrogen collected at 300K and 715 mm pressure in water or Duma's method . Calculate the percentage of nitrogen in the compound . (Vapour pressure of aqueous tension of water at 300k is 15 mm)

A. 10.2

B. 17.46

C. 24

D. 34

Answer: B

Watch Video Solution

Comprehension#95

1. Estimation of Nitrogen: There are two methods for the estimation of nitrogen (1) Dumas method and (2) Kjedahl's method.

(1) Duma's method: A known mass of compound is heated with copper oxide (CuO) in an atmosphere of CO_2 , which gives free nitrogen along with CO_2 and H_2O .

$$C_xH_yN_z + \left(2x + \frac{y}{2}\right)CuO \rightarrow xCO_2 + \frac{y}{2}\left(H_2O\right) + \frac{z}{2} + \left(2x + \frac{y}{2}\right)Cu.$$

The gaseous mixture is passed over a heated copper gauze which converts traces of nitrogen oxides formed of N_2 .The gaseous mixture is collected over an aqueous solution of KOH which absorbs CO_2 and nitrogen is collected in the upper part of the graduated tube.

(2) kjeldahl's method: A known mass of organic compound (0.5 gm) is mixed with K_2SO_4 (10 gm) and $CuSO_4$ (1.0 gm) or a drop of mercury (Hg) and conc. H_2SO_4 (25 ml) , and heated in Kjeldahl's flask. $CuSO_4$ or Hg acts as a catalyst , while K_2SO_4 raises the boiling point of H_2SO_4 . The nitrogen in the organic compound is quantitatively converted to ammonium sulphate . The resulting mixture is then distilled with excess of NaOH solution and the NH_3 evolved is passes into a known but excess volume of standard HCl or H_2SO_4 . The acid left unused is estimated by titration with some standard alkali . The amound of acid used against NH_3 can thus be known and from this the percentage of nitogen is calculated.

(a) $C + H + S \xrightarrow{\text{conc.}} H_2SO_4 CO_2 + H_2O + SO_2$

(b) $N \xrightarrow{\text{conc.}} H_2SO_4 \left(NH_4\right)_2SO_4$

(c) $\left(NH_4\right)_2SO_4 + 2NaOH \rightarrow Na_2SO_4 + 2NH_3 + 2H_2O$

(d) $2NH_3 + H_2SO_4 \rightarrow \left(NH_4\right)_2SO_4$

(3) This method is not applicable to compounds containing N in nitro and

azo groups,and N persent in the ring (e.g., pyridine as N of these conpounds does not change to $(NH_4)_2SO_4$ (ammonium sulphate) under these reaction condition.

0.50 gm of an organic compound was treated according to Kjedahl's method . The ammonia evolved was absorbed in 50 ml of $\frac{M}{2}$ NaOH solution. Find the percentage of nitrogen in the compound.

A. 50

B. 56

C. 66

D. 40

Answer: B

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Comprehension#96

1. Estimation of Nitrogen: There are two methods for the estimation of nitrogen (1) Dumas method and (2) Kjedahl's method.

(1) Duma's method: A known mass of compound is heated with copper oxide (CuO) in an atmosphere of CO_2 , which gives free nitrogen along with CO_2 and H_2O .

$$C_xH_yN_z + \left(2x + \frac{y}{2}\right)CuO \rightarrow xCO_2 + \frac{y}{2}\left(H_2O\right) + \frac{z}{2} + \left(2x + \frac{y}{2}\right)Cu.$$

The gaseous mixture is passed over a heated copper gauze which converts traces of nitrogen oxides formed of N_2 .The gaseous mixture is collected over an aqueous solution of KOH which absorbs CO_2 and nitrogen is collected in the upper part of the graduated tube.

(2) kjeldahl's method: A known mass of organic compound (0.5 gm) is mixed with K_2SO_4 (10 gm) and $CuSO_4$ (1.0 gm) or a drop of mercury (Hg) and conc. H_2SO_4 (25 ml) , and heated in Kjeldahl's flask. $CuSO_4$ or Hg acts as a catalyst , while K_2SO_4 raises the boiling point of H_2SO_4 . The nitrogen in the organic compound is quantitatively converted to ammonium sulphate . The resulting mixture is then distilled with excess of NaOH solution and the NH_3 evolved is passes into a known but excess volume of standard HCl or H_2SO_4 . The acid left unused is estimated by

titration with some standard alkali . The amound of acid used against NH_3 can thus be known and from this the percentage of nitogen is calculated.

(a) $C + H + S \xrightarrow{\text{conc.}} H_2SO_4CO_2 + H_2O + SO_2$

(b) $N \xrightarrow{\text{conc.}} H_2SO_4\left(NH_4\right)_2SO_4$

(c)$\left(NH_4\right)_2SO_4 + 2NaOH \rightarrow Na_2SO_4 + 2NH_3 + 2H_2O$

(d) $2NH_3 + H_2SO_4 \rightarrow \left(NH_4\right)_2SO_4$

(3) This method is not applicable to compounds containing N in nitro and azo groups,and N persent in the ring (e.g., pyridine as N of these conpounds does not change to $\left(NH_4\right)_2SO_4$ (ammonium sulphate) under these reaction condition.

0.4 gm of an organic compound was treated according to Kjeldahl's method .The ammonia evloved was absorbed in 50 ml of 0.5 MH_3PO_3 .The residual acid required 30 ml of 0.5 M $Ca(OH)_2$. Find the percentage of N_2 in the compound .

A. 20

B. 50

C. 70

D. 90

Answer: C

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Comprehension#97

1. Estimation of Nitrogen: There are two methods for the estimation of nitrogen (1) Dumas method and (2) Kjedahl's method.

(1) Duma's method: A known mass of compound is heated with copper oxide (CuO) in an atmosphere of CO_2 , which gives free nitrogen along with CO_2 and H_2O .

$$C_xH_yN_z + \left(2x + \frac{y}{2}\right)CuO \rightarrow xCO_2 + \frac{y}{2}\left(H_2O\right) + \frac{z}{2} + \left(2x + \frac{y}{2}\right)Cu.$$

The gaseous mixture is passed over a heated copper gauze which converts traces of nitrogen oxides formed of N_2 .The gaseous mixture is collected over an aqueous solution of KOH which absorbs CO_2 and nitrogen is collected in the upper part of the graduated tube.

(2) kjeldahl's method: A known mass of organic compound (0.5 gm) is mixed with K_2SO_4 (10 gm) and $CuSO_4$ (1.0 gm) or a drop of mercury (Hg) and conc. H_2SO_4 (25 ml) , and heated in Kjeldahl's flask. $CuSO_4$ or Hg acts as a catalyst , while K_2SO_4 raises the boiling point of H_2SO_4 . The nitrogen in the organic compound is quantitatively converted to ammonium sulphate . The resulting mixture is then distilled with excess of NaOH solution and the NH_3 evolved is passes into a known but excess volume of standard HCl or H_2SO_4 . The acid left unused is estimated by titration with some standard alkali . The amound of acid used against NH_3 can thus be known and from this the percentage of nitogen is calculated.

(a) $C + H + S \xrightarrow{\text{conc.}} H_2SO_4CO_2 + H_2O + SO_2$

(b) $N \xrightarrow{\text{conc.}} H_2SO_4\left(NH_4\right)_2SO_4$

(c) $\left(NH_4\right)_2SO_4 + 2NaOH \rightarrow Na_2SO_4 + 2NH_3 + 2H_2O$

(d) $2NH_3 + H_2SO_4 \rightarrow \left(NH_4\right)_2SO_4$

(3) This method is not applicable to compounds containing N in nitro and azo groups,and N persent in the ring (e.g., pyridine as N of these conpounds does not change to $\left(NH_4\right)_2SO_4$ (ammonium sulphate) under these reaction condition.

0.002 gm of an organic compound was treated according to Kjeldahl's method $.0.2 \times 10^{-4}$ mol of H_2SO_4 was required to neutralise NH_3 . Calculated the percentage of N.

A. 50

B. 28

C. 70

D. 4

Answer: B

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Comprehension#98

1. $FeSO_4$ undergoes decomposition as

$2FeSO_4(s) \rightarrow Fe_2O_3(s) + SO_2(g) + SO_3(g)$

At 1 atm 273 K. If (7.6 gm) $FeSO_4$ so taken then:

The average molar mass of the gaseous mixture,

A. 22.4 L

B. 11.2 L

C. 1.12 L

D. 2.24 L

Answer: C

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Comprehension#99

1. $FeSO_4$ undergoes decomposition as

$2FeDO_4(s) \rightarrow Fe_2O_3(s) + SO_2(g) + SO_3(g)$

At 1 atm 273 K. If (7.6 gm) $FeSO_4$ so taken then:

The average molar mass of the gaseous mixture,

A. 72

B. 36

C. 48

D. 60

Answer: A

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Comprehension#100

1. 8 mole of a mixture of N_2, NO_2 and N_2O_4 has a mean molecular mass of $\frac{378}{8}$. On heating to a temperature at which N_2O_4 dissociated completely $\left(N_2O_4 \rightarrow 2NO_2\right)$, the mean molecular mass become $\frac{378}{9}$.

The ratio of number of moles of $N_2 : NO_2 : N_2O_4$ in original mixture is :

A. $3:4:1$

B. $2:5:1$

C. $3:5:2$

D. $4:2:3$

Answer: B

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Comprehension#101

1. 8 mole of a mixture of N_2, NO_2 and N_2O_4 has a mean molecular mass of $\frac{378}{8}$. On heating to a temperature at which N_2O_4 dissociated completely $\left(N_2O_4 \rightarrow 2NO_2\right)$, the mean molecular mass become $\frac{378}{9}$.

The ratio of number of moles of N_2 and NO_2 after heating is :

A. $1:1$

B. $3:9$

C. $2:7$

D. $1:2$

Answer: C

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Comprehension#102

1. Many a time the reaction are carried out when the reactants are not present in the amounts required by a balanced chemical reaction. In such situations, one reactant is in excess over other. The reactant which is present in th lesser amount gets conserved after sometime and after that no further reaction takes place whatever be the amount of other reactant is present .Hence, the reactant which gets consumed , limits the amount of products formed and is therefore called limiting reagent.

To determine the limiting reagent find the value of ϕ which is the ratio of (given) mole of a substance to the stoichiometric coefficient of that substance . The limiting reagent is the reagent which has minimum value of ϕ.

The insecticide DDT is made by the reaction

$\mathbb{C}lCHO(\text{Chloral}) + 2C_6H_5Cl$(chlorobenzene)

$\rightarrow \left(ClC_6H_4\right)_2CH\mathbb{C}l_3(DDT) + H_2O$

If 100 pound (lb) of chlorobenzene , how much DDT would be formed?

(Assume the reaction goes to completion without side reactions or losses)

[1 lb =453.6 g]

A. 157 lb

B. 71.3 lb

C. 84 lb

D. 15 lb

Answer: A

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Comprehension#103

1. Many a time the reaction are carried out when the reactants are not present in the amounts required by a balanced chemical reaction. In such situations, one reactant is in excess over other. The reactant which is present in th lesser amount gets conserved after sometime and after that no further reaction takes place whatever be the amount of other reactant is present .Hence, the reactant which gets consumed , limits the amount of products formed and is therefore called limiting reagent.

To determine the limiting reagent find the value of ϕ which is the ratio of (given) mole of a substance to the stoichiometric coefficient of that substance . The limiting reagent is the reagent which has minimum value of ϕ.

The reduction of Cr_2O+_3 by Al proceeds quantitatively on ignition of a suitable fuse. The reaction is :

$2Al + Cr_2O_3 \rightarrow Al_2O_3 + 2Cr$

How much metallic chromium can be made by bringing to reaction temperature a mixture of 5 kg Al and 20 kg Cr_2O_3 ?

A. 9.6 kg

B. 14.4 kg

C. 5.9 kg

D. 1.41 kg

Answer: A

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Comprehension#104

1. Many a time the reaction are carried out when the reactants are not present in the amounts required by a balanced chemical reaction. In such situations, one reactant is in excess over other. The reactant which is present in th lesser amount gets conserved after sometime and after that no further reaction takes place whatever be the amount of other reactant is present .Hence, the reactant which gets consumed , limits the amount of products formed and is therefore called limiting reagent.

To determine the limiting reagent find the value of ϕ which is the ratio of (given) mole of a substance to the stoichiometric coefficient of that substance . The limiting reagent is the reagent which has minimum value of ϕ.

In the above question , how much reactant is remaining at the completion of reaction and which one?

A. Nothing

B. 5.9 kg Cr_2O_3

C. 14.1 kg Cr_2O_3

D. 14.1 kg Al

Answer: B

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Comprehension#105

1. Potassium dichromate $(K_2Cr_2O_7)$ is an orange coloured compound , very frequently used in laboratory as an oxidising agent as well as in a redox titration. It is generally prepared from chromite $(FeCr_2O_4)$ ore according to the following reactions:

(1) Fusion of chromite ore with sodium carbonate in excess of air.

$FeCr_2O_4 + Na_2CO_3 + O_2 \rightarrow Na_2CrO_4 + Fe_2O_3 + CO_2$

(2) Acidifing filtered sodium chromate solution with sulphuric acid.

$Na_2CrO_4 + H_2SO_4 \rightarrow Na_2Cr_2O_7 + Na_2SO_4 + H_2O$

(3) Treating sodium dichormate with potassium choride .

$Na_2Cr_2O_7 + KCl \rightarrow K_2Cr_2O_7 + NaCl$

If you are initially provided with 224 gm of pure chromite ore and 169.6 gm of sodium carbonate , the minimum volume of air required at 1 atm and 273 K to consume at least one of the reactant completely, if air contains 20% by volume of oxygen gas is :

A. 156.8 L

B. 196 L

C. 28 L

D. 152.4 L

Answer: A

Watch Video Solution

Comprehension#106

1. Potassium dichromate $\left(K_2Cr_2O_7\right)$ is an orange coloured compound , very frequently used in laboratory as an oxidising agent as well as in a redox titration. It is generally prepared from chromite $\left(FeCr_2O_4\right)$ ore according to the following reactions:

(1) Fusion of chromite ore with sodium carbonate in excess of air.

$FeCr_2O_4 + Na_2CO_3 + O_2 \rightarrow Na_2CrO_4 + Fe_2O_3 + CO_2$

(2) Acidifing filtered sodium chromate solution with sulphuric acid.

$Na_2CrO_4 + H_2SO_4 \rightarrow Na_2Cr_2O_7 + Na_2SO_4 + H_2O$

(3) Treating sodium dichormate with potassium choride .

$Na_2Cr_2O_7 + KCl \rightarrow K_2Cr_2O_7 + NaCl$

If the number of moles of reactant available for reaction are :

$\left[FeCr_2O_4 = 0.25\text{moles}, O_2 = 0.35\text{moles}, Na_2CO_3 = 0.60\text{moles}, H_2SO_4 = 0.2\text{mol}\right.$

, then the maximum number of moles of $K_2Cr_2O_7$, that can be produced is :

A. 0.05 moles

B. 0.1 moles

C. 0.2 moles

D. 0.5 moles

Answer: C

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Comprehension#107

1. Potassium dichromate $\left(K_2Cr_2O_7\right)$ is an orange coloured compound , very frequently used in laboratory as an oxidising agent as well as in a redox titration. It is generally prepared from chromite $\left(FeCr_2O_4\right)$ ore according to the following reactions:

(1) Fusion of chromite ore with sodium carbonate in excess of air.

$FeCr_2O_4 + Na_2CO_3 + O_2 \rightarrow Na_2CrO_4 + Fe_2O_3 + CO_2$

(2) Acidifing filtered sodium chromate solution with sulphuric acid.

$Na_2CrO_4 + H_2SO_4 \rightarrow Na_2Cr_2O_7 + Na_2SO_4 + H_2O$

(3) Treating sodium dichormate with potassium choride .

$Na_2Cr_2O_7 + KCl \rightarrow K_2Cr_2O_7 + NaCl$

If whole of the chormite ore given in the previous question gets consumed and sufficient amount of rest of the reactants are given, then the mass of $K_2Cr_2O_7$ obtained is:

A. 14.7 gm

B. 7.35 gm

C. 73.5 gm

D. 147 gm

Answer: C

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Comprehension#108

1. 12 mol gaseous mixture of an alkane and an alkene (containing same number of carbon atoms) require exactly 285 ml of air (containing 20% v/v O_2 and rest N_2) for complete combustion at 200K . After combustion when gaseous mixture is passes through KOH solution it shows volume

contraction of 36 ml.

Formula of alkane is:

A. C_5H_{12}

B. C_3H_8

C. C_2H_6

D. C_4H_{10}

Answer: B

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Comprehension#109

1. 12 mol gaseous mixture of an alkane and an alkene (containing same number of carbon atoms) require exactly 285 ml of air (containing 20% v/v O_2 and rest N_2) for complete combustion at 200K . After combustion when gaseous mixture is passes through KOH solution it shows volume

contraction of 36 ml.

Mole fraction of CO_2 in final gaseous sample:

A. $\frac{6}{51}$

B. $\frac{6}{44}$

C. $\frac{6}{45}$

D. $\frac{6}{13}$

Answer: B

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Comprehension#110

1. 12 mol gaseous mixture of an alkane and an alkene (containing same number of carbon atoms) require exactly 285 ml of air (containing 20% v/v O_2 and rest N_2) for complete combustion at 200K . After combustion when gaseous mixture is passes through KOH solution it shows volume

contraction of 36 ml.

Calculate mol % of oxygen which is converted into H_2O

A. 0.3684

B. 0.7368

C. 0.2061

D. 0.2563

Answer: A

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Comprehension#111

1. Two litre Duma's bulb contains nitrogen gas at 0.5 atm . On adding 0.01 mole of O_2 gas it is necessary to cool bulb to a temperature passage of 10° C to maintain the same pressure.

The total no. of moles of N_2 in Duma's bulb is :

A. 0.033

B. 0.066

C. 3.34

D. 0.334

Answer: A

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Comprehension#112

1. Two litre Duma's bulb contains nitrogen gas at 0.5 atm . On adding 0.01 mole of O_2 gas it is necessary to cool bulb to a temperature passage of 10° C to maintain the same pressure.

The initial temperature of the Duma's bulb is :

A. 95.6 K

B. 368.6 K

C. 555.12 K

D. 273.0 K

Answer: B

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Match the columns

1. Match the following columns:

Column-I		Column-II
32 g each of O_2 and S	(p)	2 moles of Fe
2 gram-molecule of $K_3[Fe(CN)_6]$	(q)	3 moles of ozone molecule
144 g of oxygen atom	(r)	one mole
From 168 g of iron, 6.022×10^{23} atoms of iron are removed, the iron left	(s)	12 moles of carbon atoms

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2. Match the following columns:

Column-I		Column-II
(a) 1 M glucose solution	(p)	1 mol solute per litre solution
(b) 3 M urea solution	(q)	180 g solute per litre solution
(c) 3 M CH_3COOH solution	(r)	% w/v = 18% (solution)
(d) 1 M H_2SO_4 solution	(s)	% w/v = 9.8% (solution)

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3. Match the following columns:

Column-I		Column-II
(a) 50 ml of 3 M HCl + 150 ml of 1 M $FeCl_3$	(p)	1.85 m
(b) Mole fraction of NaCl in aqueous solution of NaCl is 0.1 then molality of the solution is	(q)	$[Cl^-] = 3$ M
(c) 10% (w/w) propanol (C_3H_7OH) solution has molality	(r)	$[H^+] = 0.75$ M
(d) 10.95% (w/v) HCl	(s)	6.1 m

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4. Match the following columns:

Column-I		Column-II	
(a)	120 g CH_3COOH in 1 L solution $d_{sol} = 1.2\ g/mL$	(p)	$M = 2$
(b)	120 g glucose dissolved in 1 L solution $d_{sol} = 1.2\ g/mL$	(q)	10% w/w sol.
(c)	$X_{NH_2CONH_2} = \frac{1}{31}$ (aqueous solution)	(r)	12% w/v sol.
(d)	19.6% (w/v) H_2SO_4 solution $\longrightarrow (d_{sol} = 1.2\ g/mL)$	(s)	$m = 1.85$

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5. Match the following columns:

Column-I		Column-II	
(a)	Vapour density (V.D.) of SO_2 with respect to O_2	(p)	22
(b)	Specific gravity of the solid with mass 10 gm and volume 5 cc	(q)	32
(c)	Molar mass of the compound having V.D. 16	(r)	9
(d)	V.D. and number of atoms in 132 a.m.u. CO_2	(s)	2

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6. Match the following columns:

Column-I		Column-II	
(a)	Compound containing 5 g S and 5 g oxygen atom	(p)	Empirical formula CH_2
(b)	Hydrocarbon contain $\frac{600}{7}$% C	(q)	Molecular formula C_2H_4
(c)	$\frac{300}{11}$% of C and $\frac{800}{11}$% of O	(r)	Empirical formula SO_2
(d)	Hydrocarbon containing $\frac{100}{7}$% H	(s)	Empirical formula CO_2

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7. Match the following columns:

Column-I For 1 mole of reactant placed in open container in each reaction		Column-II Product	
(a)	$PCl_5(g) \xrightarrow{\Delta} PCl_3(g) + Cl_2(g)$	(p)	$2N_A$ molecules
(b)	$CaCO_3(s) \xrightarrow{\Delta} CaO(s) + CO_2(g)$	(q)	68.1 litre gaseous product at STP
(c)	$2HCl(g) \xrightarrow{\Delta} H_2(g) + Cl_2$	(r)	22.7 litre gaseous product at STP
(d)	$NH_4COONH_2(s) \xrightarrow{\Delta} 2NH_3 + CO_2(g)$	(s)	45.4 litre gaseous product at STP

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8. Match parameters involved in column-I with those in column-II.

Column-I		Column-II	
(a)	Moles of any one element in 244 gm of salicylaldehyde	(p)	4
(b)	Ratio of density of ozone gas to that of methane at same temperature and pressure	(q)	6
(c)	gm-atoms or gm-molecules in 22.4 litres of N_2 gas at 273 K and 3 atm pressure	(r)	12
(d)	gm-ion of anion or total moles of all the ions in 342 gm of aluminium sulphate	(s)	5
		(t)	3

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9. Match the following columns:

Column-I		Column-II	
(a)	3 mole of $Co(NH_3)_4SO_4$	(p)	3 mole of S atom
(b)	1 mole $FeKCo(NO_2)_6$	(q)	1 mole Fe
(c)	1.5 mole $[Fe(H_2O)_5SCN]SO_3$	(r)	12 mole O atoms
(d)	0.75 mole $K_2Cu(SCN)_4$	(s)	6 mole N atoms
		(t)	1.5 mole K atoms

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10. Match Column-I with Column-II.

	Column-I		Column-II
(a)	100 ml of 0.2 M $AlCl_3$ solution + 400 ml of 0.1 M HCl solution	(p)	Concentration of cation = 0.12 M
(b)	50 ml of 0.4 M KCl + 50 ml H_2O	(q)	$[SO_4^{2-}] = 0.06$ M
(c)	30 ml of 0.2 M K_2SO_4 + 70 ml H_2O	(r)	$[SO_4^{2-}] = 2.5$ M
(d)	200 ml 24.5% (w/v) H_2SO_4	(s)	$[Cl^-] = 0.2$ M

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11. Match Column-I with Column-II.

	Column-I		Column-II
(a)	$Zn(s) + 2HCl(aq) \rightarrow ZnCl_2(g) + H_2(g)$ above reaction is carried out by taking 2 moles each of Zn and HCl	(p)	50% of excess reagent left
(b)	$AgNO_3(aq) + HCl(aq) \longrightarrow AgCl(s) + HNO_3(g)$ above reaction is carried out by taking 170 g $AgNO_3$ and 18.25 g HCl (Ag = 108)	(q)	22.7 L of gas at STP is liberated
(c)	$CaCO_3(s) \longrightarrow CaO(s) + CO_2(g)$ 100 g $CaCO_3$ is decomposed	(r)	1 moles of solid (product) obtained.
(d)	$2KClO_3(s) \longrightarrow 2KCl(s) + 3O_2(g)$ $\frac{2}{3}$ moles of $KClO_3$ decomposed	(s)	HCl is the limiting reagent

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12. Match Column-I with Column-II.

	Column-I		Column-II
(a)	4.5 m solution of $CaCO_3$ (density 1.45 gm/ml)	(p)	Mole fraction of solute is 0.2
(b)	3 M 100 ml H_2SO_4 mixed with 1 M 300 ml H_2SO_4 solution	(q)	Mass of the solute is 360 gm
(c)	14.5 m solution of Ca	(r)	Molarity = 4.5
(d)	In 4 M 2 litre solution of NaOH, 40 gm NaOH is added.	(s)	Molarity = 1.5

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13. Match the following columns:

	Column-I		Column-II
(a)	49 g H_2SO_4	(p)	0.5 mole
(b)	20 g NaOH	(q)	1.5 N_A atoms
(c)	11.35 L of CO_2 at STP	(r)	0.5 N_A molecule
(d)	6.022×10^{23} atoms of oxygen	(s)	2 mole of O atom

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14. Match the following columns:

Column-I (Amount of substance)		Column-II (No. of moles of particular atoms i[n] the given substanc[e])	
(a)	6.022×10^{24} molecules of $Al_2(SO_4)_3 \cdot 3H_2O$	(p)	15 mole O-atoms
(b)	90 gm $C_6H_{12}O_6$	(q)	60 mole H-atoms
(c)	112 litre $SO_3(g)$ at 1 atm and 0° C	(r)	3 mole O-atoms
(d)	3.75 mole N_2O_4	(s)	30 mole S-atoms
		(t)	150 mole O-atom

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15. Match the following columns:

Column-I		Column-II	
(a)	N_2	(p)	40% carbon by mass
(b)	CO	(q)	Empirical formula CH_2O
(c)	$C_6H_{12}O_6$	(r)	Vapour density = 14
(d)	CH_3 COOH	(s)	14 N_A electrons in a mole (N = Avoga number)
		(t)	25 % carbon by mole

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16. Match the following columns:

	Column-I		Column
(P)	100 gm of 9.8 % H_2SO_4 by mass [$d_{sol.}$ = 1.8 g/ml]	(1)	3.6 M
(Q)	100 gm of 9.8 % H_3PO_4 by mass [$d_{sol.}$ = 1.2 g/ml]	(2)	1.2 M
(R)	1.8 N_A molecules of HCl in 500 ml solution [$d_{sol.}$ = 1 g/ml]	(3)	1.8 m
(S)	On mixing 250 ml 4M NaOH and 250 ml of 1.6 M$Ca(OH)_2$. Final [OH^-] [$d_{sol.}$ = 1 g/ml]	(4)	1.1 m

A.

	(P)	(Q)	(R)	(S)
(a)	(4)	(1, 2, 4)	(2, 3)	(2, 4)

B.

	(P)	(Q)	(R)	(S)
(a)	(2, 3)	(2, 4)	(1, 2, 4)	(1, 4)

C.

	(P)	(Q)	(R)	(S)
(a)	(4)	(2, 4)	(1, 3)	(1, 3)

D.

	(P)	(Q)	(R)	(S)
(a)	(1, 2, 4)	(2, 4)	(1, 3)	(1, 4)

Answer: c

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17. Match the column:

	Column-I		Column-II
(P)	20% (w/w) solution of KOH (density of solution = 1.02 gm/mL)	(1)	8.64 M
(Q)	Solution containing 864 gm of $CaCO_3$ in a 1 L solution	(2)	3.64 M
(R)	Volume of 1.204×10^{24} molecules of water at 4° C	(3)	5 mL
(S)	Volume of 0.2 M NaOH solution containing 40 mg of NaOH	(4)	36 mL

A.

	(P)	(Q)	(R)	(S)
(a)	4	1	2	3

B.

	(P)	(Q)	(R)	(S)
(a)	2	1	3	4

C.

	(P)	(Q)	(R)	(S)
(a)	4	1	3	2

D.

	(P)	(Q)	(R)	(S)
(a)	2	1	4	3

Answer: d

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18. Match the following columns:

Column-I (Reaction)	Column-II (At the end)
$\underset{4\ mol}{2A} + \underset{6\ mol}{2B} \xrightarrow{50\%\ yield} 3C$	(p) 3 moles C is formed
$\underset{4\ mol}{\frac{1}{2}A} + \underset{6\ mol}{2B} \xrightarrow{80\%\ yield} C$	(q) 3.2 moles C is formed
$\underset{15\ mol}{3A} + \underset{20\ mol}{2B} \xrightarrow{60\%\ yield} C$	(r) A is limiting is reagent
$\underset{5\ mol}{A} + \underset{12\ mol}{3B} \xrightarrow{40\%\ yield} 2C$	(s) B is limiting reagent
	(t) 1.6 moles C is formed

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19. Match the following columns:

Column-I		Column-II
$\underset{0.1\ mol}{N_2} + \underset{0.1\ mol}{3H_2} \xrightarrow{50\%} 2NH_3$	(p)	6.25×10^{-2} mol product
$\underset{1\ gm}{H_2} + \underset{1\ gm}{2C} \longrightarrow C_2H_2$	(q)	5×10^{-2} mol product
$\underset{0.6\ gm}{C} + \underset{1.135L\ at\ STP}{O_2} \longrightarrow CO_2$	(r)	4.16×10^{-2} mol product
(d) $\underset{1\ gm}{2H_2} + \underset{1\ gm}{O_2} \longrightarrow 2H_2O$	(s)	3.33×10^{-2} mol product

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20. Match the following columns:

	Column-I		Column-II
(a)	Same number of atoms	(p)	4.25 g NH_3 and 4.5 g H_2O
(b)	Same number of molecules	(q)	2.20 g CO_2 and 0.90 g H_2O
(c)	Same numbers of atoms as well as molecules	(r)	4.0 g CH_3Cl and 5.0 g NH_3
(d)	Different numbers of atoms as well as molecules	(s)	4.80 g O_2 and 2.80 g CO

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21. Match the following columns:

	Column-I		Column-II
(a)	Gram atom present in one atom	(p)	$2N_A$
(b)	N_A gram atom contains atom	(q)	$\frac{1}{N_A}$
(c)	No. of protons in 1 gm molecule of H_2	(r)	$4N_A$
(d)	No. of electrons added to 32 gm O atom to convert it into O^{2-}	(s)	N_A^2

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22. Match the following columns:

	Column-I Atomic masses				Column-II % composition of heavier isotope
	Isotope-I	Isotope-II	Avg		
(a)	$(z-1)$	$(z+2)$	z	(p)	33.33% by moles
(b)	$(z+1)$	$(z+3)$	$(z+2)$	(q)	50% by moles
(c)	z	$3z$	$2z$	(r)	% by mass dependent on z
(d)	$(z-1)$	$(z+1)$	z	(s)	75% by mass

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23. Match the following columns:

	Column-I		Column-II
(a)	5 m NaOH solution (density = 0.6 gm/ml). Molarity of solution is	(p)	6 M
(b)	250 ml of H_2O_2 solution provides 24 gm O_2. Molarity of H_2O_2 solution is	(q)	1 M
(c)	100 ml, 1 M H_2SO_4 solution is mixed with 400 ml of water. Final Molarity of H_2SO_4 solution is	(r)	2.5 M
(d)	100 ml, 6 M NaCl solution is mixed with 100 ml of 17% w/w $AgNO_3$ solution ($d_{solution}$ = 8 gm/ml) Molarity of Ag^+ ions in final solution is	(s)	0.2 M

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24. Two substance C and O_2 are allowed to react completely to form CO and CO_2 mixture , leaving none of the reactants . Its is known that when I mole of CO_2 ,100 Kcal of energy is released and when 1 mole of carbon reacts with 0.5 mole of O_2 to give of CO,25 Kcal is liberated . Using this information match column I and column II.

Column-I (Amount of reactants)		Column-II (Energy released)	
(a)	36 g C and 80 g O_2	(p)	125 kcal
(b)	12 g C and 24 g O_2	(q)	225 kcal
(c)	24 g C and 48 g O_2	(r)	150 kcal
(d)	36 g C and 64 g O_2	(s)	62.5 kcal

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25. Match the column-I (Reaction) with column-II (maximum yield of the product)

Column-I (Reaction)		Column-II (Maximum yield of the product)	
(a)	$\underset{1\,g}{2H_2} + \underset{1\,g}{C} \longrightarrow CH_4$	(p)	1.214 g
(b)	$\underset{1\,g}{H_2} + \underset{1\,g}{Cl_2} \longrightarrow 2HCl$	(q)	1.125 g
(c)	$\underset{1\,g}{3H_2} + \underset{1\,g}{N_2} \longrightarrow 2NH_3$	(r)	1.33 g
(d)	$\underset{1\,g}{2H_2} + \underset{1\,g}{O_2} \longrightarrow 2H_2O$	(s)	1.028 g

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Subjective type

1. An alloy of iron and carbon was treated with suphuric acid, in which only iron reacts

$2Fe(s) + 3H_2SO_4(aq) \rightarrow Fe_2\left(SO_4\right)_3(aq) + 3H_2(g)$ If a sample of alloy weighing 140 g gave 6 g hydrogen, What is the percentage of iron in the alloy?

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2. What volumn (in mL) of 0.250 M HNO_3 (nitric acid) reacts with 50 mL of 0.150 M Na_2CO_3 (sodium carbonate) in the following reaction?

$2HNO_3(aq) + Na_2CO_3(aq) \rightarrow 2NaNO_3(aq) + H_2O(l) + CO_2(g)$

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3. How many millilitres of 0.5 M $KMnO_4$ are needed to react with 3.04 gms of iron (II) sulphate , $FeSO_4$? The reaction is as follows?

$10FeSO_4(aq) + 2KMnO_4(aq) + 8H_2SO_4(aq) \rightarrow 5Fe_2\left(SO_4\right)_3(aq) + 2MnSO_4(aq)$ -

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4. What weight of CO is required to form $Re_2(CO)_{10}$ from 2.50 g fo fRe_2O_7 according to the unbalanced reaction:

$Re_2O_7 + CO \rightarrow Re_2(CO)_{10} + CO_2$

(Re =186 ,C =12 and O=16).Give your answer to the nearest integar.

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5. 2.5 of a mixture of BaO and CaO when heated with H_2SO_4 , produced 4.713 g of the mixed sulphates . Find the percentage of BaO present in the mixture.

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6. If 150 g of carbon reacts with 250 g of Cl_2 and the reaction has an 85% yield, how many grams of $\mathbb{C}l_4$ are produced? Given answer excluding decimal places.

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7. Equal weight of Cu metal and iodine are mixed together and the iodine is completely converted to CuI_2 . What percentage of weight of the original copper remains unreacted? (Cu=63.5, $I_2 = 254$)

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8. What is the minimum amount of $Fe\left(NH_4\right)_2\left(SO_4\right)_2H_2O(392)$ needed for the synthesis of 10.0 g of $K_3Fe\left(C_2O_4\right)_3(437)$? Give your answer to the nearest integer.

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9. Calculate the number of moles of ammonia required to produce 2.5 moles of $\left[Cu\left(NH_3\right)_4\right]SO_4$.

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10. A compound contains 28% N and 72% of a metal by weight . Three atoms of metal combine with two atoms of N . Find the atomic weight of metal.

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11. Haemoglobin contains 0.25% iron by weight , the molecular weight of Haemoglobin is 89600, calculate the weight (in g) of $K_4\left[Fe(CN)_6\right]$ that can be produced if all the iron atoms from 4.48 kg haemoglobin are converted into $K_4\left[Fe(CN)_6\right]$ through a series of reaction . Give your answer to the nearest integer.

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12. Concentrated HNO_3 is $63\,\%$ HNO_3 by mass and has a density of $1.4g/mL$. How many millilitres of this solution are required to prepare $250mL$ of a $1.20MHNO_3$ solution ?

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13. Many cereals are made with high moisture content so that the product can be formed into various containing 50% H_2O by mass is produced at the rate of 1000 kg/hr. How much water (in kg) must b evaporated per hour if final product contains only 20% water?

(Fill your answer dividing it by 62.5)

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14. Nitrogen (N), phosporus (P) and potassium (K) are the main nutrients in plant fertilizers. . According to an industry convention , the numbers on the label refer to the mas % of N, P_2O_5 and K_2O in that order. If the N:P:K (in terms of moles of each elements) ratio of a fertilizer labelled as 28:14.2:4.7 is expressed as 20:x:1.0, then calculate x.

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15. 34 gm of ammonia on decomposition gives some hydrogen gas along with N_2 gas. Hydrogen underwent combustion with oxygen gas and water wa formed. Calculate number of drops of water formed if each drop contain 6 ml of water.

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16. A 12 gm sample of metallic element M reacts completely with 0.02 mole of X_3 to form MX. Find atomic mass of M.

(Fill your answer divinding it by 100)

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17. Calculate the amount of the water which must be added to 2 ml of a solution of concentration of 40 mg silver nitrate per ml, yield a solution of concentration fo 16 mg silver nitrate per ml?

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18. 500 ml of 2M $AlCl_3$ solution is mixed with 200 ml of $58.5\,\%\,w/v$ NaCl solution and 300 ml of 50% $w/w\ BaCl_2$ solution $(d = 2.08g/ml)$. Calculate molarity of Cl^- in the final solution.

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19. The molality of a pure gas A is 50/2.4 and that of pure B is 100/3.2, Calculate molarity of A in gaseous solution of A and B at 8 atm pressure and 200/0.821K, if the vapour density of the gaseous mixture at 10 atm and 400 K is 18.

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20. 100 gm water is saturated with glucose to form a solution of density X gm//ml and contains 50% gulcose, by mass. If the volume of solution formed is 100 ml, the value of X is:

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21. 40 ml of 22.7 V H_2O_2 solution is mixed with 60 ml of 8.5% (w//v) H_2O_2 solution and the mixture is diluted to 230 ml. If 20 ml of diluted solution is callected in an empty beaker, the molarity of collected solution is:

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22. Calculate total number of SO_2 molecules in a sample having 32 milligrams of the SO_2 gas, 1.4×10^{20} number of SO_2 molecules, 0.8 ml of SO_2 gas at 6 atm and 300 K.

[Given: $N_A = 6 \times 10^{23}, R = 0.08 atmL/molK$]

[Express your answer in terms of multiple of 10^{20} and then round off to nearest integer for e.g. if your answer is 6.2×10^{20} fill 6 in OMR after rounding off.]

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23. Calculate number of gm ions present in an aqueous solution containing 369 gm of $K_2SO_4 . (NH_4)_2SO_4 . 24H_2O$ if the salt undergoes complete dissocation into ions and water does not dissociate.

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24. What volume of liquid A_2O_3 has same number of atoms as there are atom in BO_2(I) having volume 20 Ml? [Given: Density of $A_2O_3 = 1.5 gm/ml$ and density of $BO_2 = 0.7$ gm/ml, Atomic mass of $A = 50$, Atomic mass of $B = 60$ and O represents oxygen]

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25. H_2 gas is often used as a reducing gas. In a particular set up 17.4 gm of MnO_2 on reacting with excess of hydrogen gas gives water and new oxide Mn_xO_y such that mass of the oxide obtained is 12.6 g. What will be value of y if x is 2. $[Mn = 55]$

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26. Excess of calcium orthophosphate is reacted with magnesium to form calcium phosphide (Ca_3P_2) along with magnesium oxide. Calcium phosphide on reacting with excess of water liberate phosphine gas (PH_3) along with calcium hydroxide. Phosphine is burnt in excess of oxygen to form P_2O_5 along with water. Oxides of magnesium and phosphorous react to give magnesium metaphophate. Calculate grams of magnesium metaphosphate obtained if 1.92 gm of magnesium is taken.

[Round off your answer to nearest integer]

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27. What is the maximum mass of H_2O (in gm) which can be obtained if total 42 gm of propyne and oxygen are subjected to combustion?

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28. The density of mercury is 13.6 gm//ml. The diameter of an atom of mercury (in $\overset{\circ}{A}$) assuming that each atom of mercury is occupying a cube of edge length equal to the diameter of the mercury atom is:

[Take: $\left(\frac{125}{5.1}\right)^{1/3} = 3, Hg = 200$]

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29. The number of gm -molecules of oxygen in 6.0×10^{24} CO molecules is:

$\left[Take : N_A = 6 \times 10^{23}\right]$

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30. From 0.2 kg calcium, 1.2×10^{24} atoms are removed. The number of g-atoms of calcium left is:

[Take: $N_A = 6 \times 10^{23}$, $Ca = 40$]

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31. A 12.0 gm sample of magnesium is burnt in air to form magnesium oxide (MgO) and magnesium nitrides $\left(Mg_3N_2\right)$. When the products are treated with water, 1.7 gm gaseous ammonia is generated. What is the mass (in gm) of $Mg(OH)_2$ formed simultaneously.

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32. The number of alkoxy groups in an organic compound, $A(OR)_x$, may be determined by the sequential reactions:

$A(OR)_x + xHI \rightarrow A(OH)_x + xRI$

$RI + Ag^+ + H_2O \rightarrow ROH + AgI(s) + H^+$ When 4.8 gm of the organic compound, $A(OR)_x$, (molar mass=240 gm//mol) is treated as above, 9.4 gm Agl is precipitated. The number of alkoxy groups in the compound is:

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33. Water gas contains CO and H_2 in mole ratio, 1:1. A nickel ore containing Ni_2O_3 may be reduced into Ni as

$Ni_2O_3(s) + 3H_2(g) \rightarrow 2Ni(s) + 3H_2O(g)$ But due to presence of CO(g), the nickel formed get converted into $Ni(CO)_x(g)$. Both the reaction occurs $100\ \%$ If 240 gm water gas is needed to convert one mole of $Ni_2O_3(s)$ into $Ni(CO)_x(g)$, the value of x is:

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34. A mixture pf H_2, N_2 and O_2 occupying 100 ml underwent reaction so as to form $H_2O_2(l)$ and $N_2H_2(g)$ as the only products , causing the volume to contract by 60 ml. The remaining mixture was passed through pyrogallol causing a contraction of 10 ml . to the remaining mixture excess H_2 was added and the above reaction was repeaped , causing a reduction in volume of 10 ml .(No other products are formed)

What is the volume of $N_{20H_2(g)}$ formed in this reaction after adding excess of $H_2(g)$?

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35. 4.54 L O_2 gas at STP is liberated from all H_2O_2 present in 200 ml H_2O_2 solution. The molarity (in mol//litre) of H_2O_2 solution is:

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36. 50 ml of a gaseous mixture of hydrogen and hydrogen chloride was exposed to sodium amalgam. The volume decreased to 40 ml. if 10 ml of the same mixture is mixed with 5 ml of gaseous ammonia and then exposed to water, what will be the final volume (in ml) of gas left ? all the volumes are measured at the same temperature and pressure.

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37. $Br_2(l)$ reacts with $Cl_2(g)$ to form $BrCl$ and $BrCl_3$, simultaneously. How many moles of $Cl_2(g)$ reactas completely with 3 moles of $Br_2(i)$ to give $BrCl$ and $BrCl_3$ in 5:1 mole ratio?

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38. Find the density of $CO_2(g)$ with respect to $N_2O(g)$.

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39. 340 g of $NH_3(M = 17)$ when decomposes how many liters of nitrogen gas is produced at STP?

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40. 117 gm $NaCl$ is dissolved in 500 ml aqueous solution. Find the molarity of the solution.

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41. If, from 10 moles NH_3 and 5 moles of H_2SO_4, all the H-atoms are removed in order to form H_2 gas, then find the number moles of H_2 formed.

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42. If from 3 moles $MgSO_4.7H_2O$, all the 'O' atoms are taken out and converted into ozone find the number of moles of O_3 formed.

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43. The density of liquid mercury is $13.6 g/cm^3$. How many moles of mercury are there in 1 litre of the metal? (Atomic mass of $Hg = 200$).

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44. A fluorine disposal plant was constructed to carryout the reactions:

$F_2 + 2NaOH \rightarrow \frac{1}{2}O_2 + 2NaF + H_2O$

$2NaF + CaO + H_2O \rightarrow CaF_2 + 2NaOH$

As the plant operated, excess lime was added to bring about complete precipitation of the fluoride as CaF_2. Over a period of operation, 1900 kg of fluorine was fed into a plant and 10,000 kg of lime was required. What was the percentage utilisation of lime? $[At, massF = 19], [\text{ Lim } e = CaO]$

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45. The following process has been used to obtain iodine from oil-field drines in California.

$NaI + AgNO_3 \rightarrow AgI + NaNO_3$ ...(1)

$2AgI + Fe \rightarrow FeI_2 + 2Ag \ldots(2)$

$2FeI_2 + 3Cl_2 \rightarrow 2FeCl_3 + 2I_2$ ...(3)

How many grams of $AgNO_3$ are required in the first step for every $254kgI_2$ produced in the third step?

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46. Carbon disulphide, CS_2 can be made from by-product SO_2. The overall reaction is

$5C + 2SO_2 \rightarrow CS_2 + 4CO$

How much CS_2 (in kg) can be produced from 440 kg of waste SO_2 with 60 kg of coke if the SO_2 conversion is 80%?

[Give answer after rounding off to the next integer.]

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47. Find the Cl^- concentration in solution which is obtained by mixing one mole each of $BaCl_2$, $NaCl$ and HCl in 500 ml of water.

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48. 3.0 litre of water are added to 2.0 litre to 2.0 litre of 5 M HCl. What is the molarity of HCl in the resultant solution?

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49. Determine the volume (in mL) of dilute nitric acid $\left(d = 1.08 gmL^{-1},\right.$ 19% HNO_3 by wt.) that can be prepared by diluting 48 mL of conc. HNO_3 $\left(d = 1.44 gmL^{-1},\right.$ 76% by wt.).

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50. What volume of water (in mL) should be added to 50 ml of HNO_3 having density $1.5 g\ ml^{-}$ and 63.0% by weight to have one molar solution

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51. 5 g of K_2SO_4 was dissolved in 250 ml of solution. How many ml of this solution sholuld be used so that 2.33 g of $BaSO_4$ may be precipitated from $BaCl_2$ solution.

$K_2SO_4 + BaCl_2 \rightarrow BaSO_4 + 2KCl$

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52. A sodium hydroxide solution containing 40% by weight of pure $NaOH$ has a specific gravity of 1.5. What volume (in mL) of this solution will be required in the preparation of 500 mL of a 0.45 M NaOH solution?

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53. Three oxides of nitrogen $N_2O, NO_2 \text{and} N_2O_3$ are mixed in a molar ratio of 3:2:1 Find the vapour density of gaseous mixture.

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54. 1135 mL of ozonised oxygen at STP weigh 1.76 g. Calculate the volume of oxygen in the ozonised oxygen.

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55. 90.8 litres of a mixture of nitrogen and hydrogen measured at STP were passed over a catalyst. After the reaction, the volume of the mixture reduced to 68.1 litres. Ammonia thus formed was dissolved in 101 ml of an aqueous ammonia solution of density of 0.85 g//ml containing 12% by mass of NH_4OH. Determine the percent weight strength of the final solution.

[Give answer exculding decimal places]

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56. A mixture of gases liberated upon decomposition of 33.1 gm of lead (II) nitrate is dissolved in 10 ml of water. What is the mass (in g) of 0.1 M KOH solution with density of 1.05 g/ml required to neutralize this acid. The reactions are:

$2Pb(NO_3)_2 \rightarrow 2PbO + 4NO_2 + O_2$

$KOH + HNO_3 \rightarrow KNO_3 + H_2O$

[Atomic mass of Pb=207]

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57. The measured density at STP of He is 0.1762 g/L. What is the weightof one mole of He?

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58. How many grams of CaO are required to neutralise 852 g of P_4O_{10}?

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59. 252 mL of a sample of ozonised oxygen at 1 atm, 273K, weighs 0.38 g. On passing this sample through turpentine there was contraction in volume by 28 mL. Calculate the molecular weight of ozone.

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60. The 'roasting' of 100.0 g of a copper ore yielded 71.8 g pure copper. If the ore is composed of Cu_2S and CuS with 4.5% inert impurity, calculate the percent of Cu_2S in the ore.

The reactions are:

$Cu_2S + O_2 \rightarrow 2Cu + SO_2$ and

$CuS + O_2 \rightarrow Cu + SO_2$

[Atomic masses Cu=63.5m S=32]

[Give answer exculuding decimal places]

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61. 1g of a mixture of equal number of moles of $Li_2CO_3 \text{and} M_2CO_3$. Required 44.44 ml of 0.5 M HCl for completion of the reactions,

$Li_2CO_3 + 2HCl \rightarrow 2LiCl + H_2O + CO_2$

$M_2CO_3 + 2HCl \rightarrow 2MCl + H_2O + CO_2$

If the atomic mass of Li is 7, then find the Atomic mass of M.

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62. 92 gm mixture of $CaCO_3 \text{and} MgCO_3$ was heated strongly in an open vessel. After complete decomposition of the carbonates it was found that the weight of residue left behind is 48g. Find the mass of $MgCO_3$ in grams in the mixture.

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63. CCl_4 can be produced by the reaction of 12 g of carbon with 213 g chlorine. Determine the mass of excess reagent that is left unreacted in grams.

(Given atomic mass of C=12, Cl=35.5)

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64. What volume (in ml) of 0.2 M H_2SO_4 solution should be mixed with the 40 mL of 0.1 M $NaOH$ solution such that the resulting solution has the concentration of H_2SO_4 as $\frac{6}{55}M$?

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65. 100 ml of 5 M $NaOH$ solution (density 1.2 g/ml) added to 200 mL of another $NaOH$ solution which has a density of 1.5 g/ml and contains 20 mass percent of $NaOH$. What will be the volume of the gas (at STP) in litres liberated when aluminium reacts with this (final) solution?

[Give answer excluding decimal places]

The reaction is $Al + NaOH + H_2O \rightarrow NaAlO_2 + H_2$

$(At. wt. Na = 23, 0 = 16, H = 1)$

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66. A piece of Al weighing 27 g is reacted with 200 ml of H_2SO_4 (specific gravity=1.8 and 54.5% by weight). After the metal is completley dissolved, 73 gm HCl is added and solution is further is further diluted to 500 ml solution then find the concentration of H^+ ion in $mol/litre$.

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67. 2.0 g of a sample containing $NaCl$, $NaBr$ and some inert impurity is dissolved in enough water and treated with excess of $AgNO_3$ solution. A 3.0g of precipitate was formed. Precipitate on shaking with aqueous $NaBr$ gains 0.76 g of weight. Determine mass percentage of $NaCl$ in the original sample.

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68. In a compound C, H, N atoms are present in $9:1:3.5$ by weight. Molecular weight of compound is 108. Its molecular formula is:

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69. Calculate moles of electrons in 1900 mg of PO_4^{3-} ion.

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70. A 96 gm mixture containing $CaCO_3 \text{and} MgCO_3$ on heating produces a gas which dissolves in 1 litre of water to form 1 MH_2CO_3 solution. Mole ratio of $CaCO_3 \text{and} MgCO_3$ in original mixture is:

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71. 6 gm of nitrogen on successive reaction with different compounds gets finally converted into 30 gm $\left[Cr\left(NH_3\right)_x Br_2\right]$. Value of x is:

[Atomic mass of Cr=52]

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72. Calculate the density (in gm//ml) of aqueous $NaOH$ solution of which molarity and (% w//w) are equal.

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73. If 40 gm of NaOH is added to 2 litre solution of 4 M $NaOH$, find the molality of final solution (density of solution=0.68 g/ml).

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74. A mixture of NaI and $CaBr_2$ having mole fraction of $CaBr_2$ equal to $\frac{1}{3}$ is mixed with water and solution is made upto 1 litre, where, molality of NaI is found to be $\frac{10}{9}$. If density of solution is $1.15 g/ml$. Calculate mass of NaI in original mixture.

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75. 0.5 gm of fuming H_2SO_4 (Oleum) is diluted with water. This solution is completely neutralised by 26.7 ml of 0.4 M $NaOH$ solution. Calculate the percentage of free SO_3 in the given sample. Give your answer excluding the decimal places.

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76. A solvent X (mol mass 50) contains solute A (mol. Mass 125) and solute B (mol mass 100). If solution is 4 M A and 6 M B, then find simplest ratio of moles of

A:B:X[Given: $d_{solution} = 1.3 gm/ml$].

If your answer is A:B:C, then fill your answer is A+B+C.

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77. Find the sum of molarity of all the ions present in an aqueous soultion of 5 M $NaNO_3$ and 3 m $BeCl_2$? The specific gravity of the given solution is 1.665. Assume 100% dissociation of each salt. $[Be = 9]$

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78. If 87g of K_2SO_4 (molar mass=174g) is dissolved in enough water to make 250 mL of solution, calculate sum of concentration of $\left[K^+\right] + \left[SO_4^{-2}.\right]$

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79. A 50 gm oleum sample contains $\left(\frac{400}{49}\right)$ gm of combined SO_3. Find percent label of the oleum sample.

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80. A 3 L gas mixture of propane $\left(C_3H_8\right)$ and butane $\left(C_4H_{10}\right)$ on complete combustion at 25 C produced 10 L $CO_{2.}$ Assuming constant P and T conditions what was volume of butane present in initial mixture?

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81. SO_2Cl_2, (sulphuryl chloride) reacts with water to give a mixture of H_2SO_4 and HCl. What volume of 0.1 M $Ba(OH)_2$ (in ml) is needed to completely neutralize 5 millimole SO_2Cl_2 in water?

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82. An alkene upon combustion produces $CO_2(g)$and$H_2O(g)$. In this combustion process if there is no volume change, then, the no. of C atoms per molecule of alkene will be:

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83. 100 gm oleum sample (labelled as 107.8%) is mixed with 7.8 gm water and requires, 1.1 L of x molar aq. Solution of $NaOH$ for complete neutratization. The value of x is:

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84. A hydrocarbon is burnt with just sufficient amount of oxygen. After combustion the volume contraction was 2.5 times of volume of hydrocarbon burnt. On passing this mixture through KOH, if volume contraction is twice the volume of hydrocarbon taken. Calculate no. of atoms in one molecule of the hydrocarbon.

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85. An oleum sample is labelled as $(100 + x)\%$ and it contains $\frac{80}{3}\%$ free SO_3, by weight. Hence x is:

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86. If volume of 1 M aqueous NaOH solution is required to react completely with 71 gm of an aqueous acetic acid solution in which mole fraction of acid is 0.18 is $\frac{1}{x}$ litre, then calculate value of x.

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87. A complex compound of iron has molar mass=2800 and it contains 8% iron by weight. The number of iron atoms in one formula unit of complex compound is:

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88. Find volume of H_2O (in Litre) added to make 500ml,

1 M $NaOH(aq)$ solution to $\frac{1}{9}$ M.

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89. Calculate % mass loss when $MgCO_3(s)$ is thermally decomposed to MgO(s) "and" $CO_2(g)$.

[Give answer excluding decimal places]

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90. 0.9 gm of a volatile solid organic compound (molecular weight =90) containing carbon, hydrogen and oxygen was heated with 224 ml of oxygen at 1 atm and 0° c. After combustion, the total volume of gases was 560 ml at same T and P. On treatment with KOH, the volume decreased to 112ml. Determine the value of x+y+z if molecular formula of organic compound is $C_xH_yO_z$.

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91. 150ml of an aq. Solution containing 5 millimoles of A (specific gravity=1.2) is mixed with 250 ml of another aq. Solution containing 10 millimoles of A (sepecific gravity= 1.4). If on mixing the density of the solution becomes $\frac{5.3}{4.5}gm/ml$, then the molarity of A in the final solution becomes x M. The value of 60xx x` is:

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92. How many gram water should be added in 200gm of 104.5% labelled oleum sample to make the new labelling equal to $\frac{5225}{52}\%$?

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93. The mole fraction of glucose in an aqueous solution is $\frac{9}{109}$. The molality of solution is:

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94. 50 ml of '20 V' H_2O_2 is mixed with 200 ml, '10 V' H_2O_2. The volume strength of resulting solution is:

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95. 20 ml of $\frac{1}{3}$ M solution of acid is required to neutralise 0.8 M, 25 ml $NaOH$ solution. Hence, basicity of acid is:

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96. 100 ml of 0.3 M HCl is mixed with 200 ml of 0.3 M H_2SO_4. Calculate the final molarity of the H^+ ions in the resulting solution. Fill your answer by multiplying with 10.

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97. A 20 ml mixture of $C_2H_4 \text{and} C_2H_2$ undergoes sparking in gas eudimeter with just sufficient

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98. An impure sample of $CaCO_3$ contains 38 % of Ca. The percentage of impurity present in the sample is :

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99. 500 ml of $2MCH_3COOH$ solution is mixid with $600ml12\% w/vCH_3COOH$ solution then calculate the final molarity of solution.

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100. 10 gm equimolar mixture of $KHCO_3$ and K_2CO_3 after treatment with KOH is dried and heated. What will be mass (in gm) of $CO_2(g)$ obtained after heating ?

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101. A bottle is 12 M, 75 ml HCl is diluted to 300 mL. What is the molarity of resulting HCl solution ?

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102. Mole fraction of dilute acetic acid is 0.6 then find the moles of water in 108 gm of solution

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103. $35\% w/v 400ml$ of NH_4OH is mixed with $12M, 600ml$ of H_2SO_4. Find the molarity $\left[NH_4^+\right]$ in solution.

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104. In order to remove Pb^{2+} from 10 litre H_2O, $Na_2H_2EDTA(0.4M, 100mL)$ is required.

$PbCl_2(aq) + Na_2H_2EDTA \rightarrow 2NaCl + PbH_2EDTA$

Hence millimoles of $PbCl_2$ present in 1 litre of H_2O is :

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105. How many blood cells of 5 ml each having $\left[K^+\right] = 0.1M$ should burst into 25 ml of blood plasma $\left[K^+\right] = 0.02M$ so as to give final $\left[K^+\right] = 0.06M$?

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106. A sample of $NaHCO_3(s)$ on heating undergoes $1.845 gm$ loss of mass. Approximate mass of $NaHCO_3$ (in nearest integer) in gm is :

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107. N_2O_4 dissociates into NO_2. If % dissociation of N_2O_4 is 33.33%, calculate average molecular weight of gaseous mixture formed.

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108. Based on following reaction given, minimum possible value of x for 1 mol AF_6 will be :

$AF_6 + H_2O \rightarrow AO_x + HF.$

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109. An element has atomic mass 31. Mass of 2.24 litres at 1 atm, $273.^\circ C$ of vapours of element is 6.2 gm. Atomicity of element is :

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110. Find number of moles of Na_3PO_4 which contain as many ions as are present in 6840 gm of $Al_2\left(SO_4\right)_3$ (Assuming complete dissociation of salt and no reaction with H_2)

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111. 27 gm of Al reacts with excess of oxygen to give 4.59 gm of Al_2O_3. Calculate percentage yield of reaction.

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112. 90 g of a silver coin was dissolved in strong nitric acid and excess of sodium chloride solution added. The silver chloride precipitate was dried and weighed 71.75 g. Calculate the precentage of silver in the coil (Atomic mass of Ag = 108)

$Ag + 2HNO_3 \rightarrow AgNO_3 + NO_2 + H_2O$

$AgNO_3 + NaCl \rightarrow AgCl + NaNO_3$

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113. Preparation of Na_2SnO_2 involves the following set of reactions : $[Sn = 119]$

$(P)Sn + 2HCl \rightarrow SnCl_2 + H_2$

$(Q)SnCl_2 + 2NaOH \rightarrow Sn(OH)_2 + 2NaCl$

$(R)Sn(OH)_2 + 2NaOH \rightarrow Na_2SnO_2 + 2H_2O$

If % yield of reaction $(P), (Q), (R) 25\%, 50\%, 40\%$ respectively. Calculate the mass of Sn (in kg required to produce 19.7 kg of Na_2SnO_2.

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114. 5.00 moles of hydrogen gas, 3 moles of white phosphorus $\left\{P_4(s)\right\}$ and 12 moles of oxygen gas are taken in a sealed flask and allowed to react as follows :

$H_2(g) + P_4(s) + O_2(g) \rightarrow H_2PO_4$

Determine the moles of ortho-phosphoric acid that can be produced, considering that the reaction occurs in 90% yield.

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115. A certain metal M forms an insoluble oxalate complex $M_4O_3(C_2O_4)_3.12H_2O$. If 2.38 gm of the complex are formed from 1 gm of oxalic acid $(H_2C_2O_4)$, what is the atomic weight of M ?

[Write nearest integral valve].

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116. When C_2H_4 is burnt in air, carbon dioxide and water are formed. If on combustion of C_2H_4, 2 moles of CO_2 is produced, calculate the number of drops of water produced, calculate the number of drops of water produced along with this quantity of CO_2 if each drop contains 6.022×10^{21} water molecules.

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117. Fluorocarbon polymers can be made by florinating polyethylene according to the reaction

$2CoF_2 + F_2 \rightarrow 2CoF_3$

$(CH_2)_n + 4nCoF_3 \rightarrow (CF_2)_n + 2nHF + 4nCoF_2$

The CoF_3 can be regenerated by the reaction

$2CoF_2 + F_2 \rightarrow 2CoF_3$

Calculate kg of fluorine consumed per kg of fluorocarbon produced $(CF_2)_n$

[Write the answer excluding the decimal places]

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118. Cis-platin $[Pt(NH_3)_2Cl_2]$, a compound used in cancer treatment is prepared by reaction of ammonia with potassium tetrachloro platinate

$K_2PtCl_4 + 2NH_3 \rightarrow 2KCl + Pt(NH_3)_2Cl_2$

(P) How many grams of cis-platin are formed from

$41.5 g K_2PtCl_4$ and $34 g NH_3$ if the reaction takes place in 90% yield ? [Ans = (x)]

(Q) What is the maximum mass of KCl which can be produced if initially total 9 moles of reactant are taken. Assuming 100% reaction. [Ans = (y)]

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119. 45 g of gaseous mixture of NO_2N_2O gas occupy 22.7 litre at STP. Find the mole $\%$ of NO_2 in the gaseous mixture.

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120. The abundance of three isotopes of oxygen are as follows :

% of $O^{16} = 90\%$

% of $O^{17} + \%$ of $O^{18} = 10\%$

Assume at. Mass same as mass no. find $\%$ of O^{17}, if the isotopic mass is 16.12

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121. Assume isotope of chlorine present on the unknown planet are $.^{34}Cl$ and $.^{38}Cl$. If average molecular weight of $Cl$is found to be 35, what is the sum of moles of proton and neutron in 7 gm sample of chlorine ?

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122. Mr. Gupta has lost the secret code of his bag which consists of lots of chocolates.From the information given below help Mr. Gupta to recall his code. The code consists of five digits a b c d e :

(a) = represents moles of hydrogen gas formed by converting all the hydrogen in 6 moles of NH_3

(b) $= \dfrac{\text{density of } SO_2 \text{gas at same T and P}}{\text{density of } O_2 \text{gas at same T and P}}$

(c) = % moles of NH_3 in a mixture of NH_3 and H_2S having an average molecular weight of 33.15

(d,e) = represents % yield of reaction if 16.8 L of O_2 is produced at 1 atm and 273 K from $122.5gm$ of $KClO_3$.

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123. Calculate the percentage loss (nearest integral value) in the mass, when $2.02 \times 10^2 gm KNO_3$ is completely decomposed by heating into $KNO_2(s)$ and $O_2(g)$

$KNO_3(s) \rightarrow KNO_2(s) + O_2(g)$

Watch Video Solution

124. Calculate the amount of ZnO produced (in gm) when 195 gm of ZnS reacts with $89.6 L O_2$ at 1 atm and 274 K. Write nearest integral value

$ZnS + O_2 \xrightarrow{2} ZnO + SO_2$

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125. 20 ml of pure acetic acid (density = 0.75 gm ml^{-1}) is mixed with 50 gm of water (density = 1 gmml^{-1}) at a certain temperature. Calculate the molality of acetic acid in the final solution.

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126. Calculate the minimum molarity of a H_2O_2 solution which can produce at least 1 gm each of I_2 and KOH, when 5 litre of H_2O_2 solution is added to excess KI solution.

$H_2O_2 + 2KI \rightarrow I_2 + 2KOH$

(Given answer by multiplying with 560)

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127. 100 g a calcium was burnt in excess of O_2 and the oxide obtained was dissolved in water to make 1 litre solution. Calculate the molarity of OH^- ion of the alkaline solution.

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128. Calculate molarity of NaOH in a solution made by mixing 2 L of $1.5 M NaOH$, $3L$ of 2 M NaOH and 1 L water

[Give your answer after multiplying by 10]

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129. An unknown solution [mol. Wt. of solute = 250] is 20 % (w/w). Molarity of solution is :

[Given : d_{solution} is = 1.25 g/ml]

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130. 50 gm of $109\ \%$ oelum is mixed with 50 gm of another $118\ \%$ oleum. Calculate the maximum weight of H_2SO_4 which can be obtained from the resulting mixture. (Fill the OMR after multiplying with 10)

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131. 100 gm oleum sample (labelled as X %) is mixed with excess water to make solution 4 litre. 1 L of this solution is neutralizes completely by

$\frac{1}{3}M, 1.8 L NaOH$ solution. Calculate 10 X.

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132. 34 gm of a mixture containing N_2 and H_2 in $1:3$ by mole is partially coverted into NH_3. Calculate the molar mass of the mixture (containing remaining N_2, H_2 and NH_3 formed) after reaction if it has been found that the NH_3 formed required 0.5 moles of H_3PO_4 for complete neutralization

$3NH_3 + H_2PO_4 \rightarrow (NH_4)_3PO_4$

Write nearest integral value.

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133. Calculate the moles of $BaSO_4$ obtained in each case if excess of $BaCl_2$ is reacted with :

(a) H_2SO_4 solution produced from collecting only SO_3 present in $100 gm$ of 104.5% oleum and reacted with excess of water

(b) only H_2SO_4 taken from 100 g 104.5 % oleum

(c) H_2SO_4 solution obtained when 4.5 gm water is added to 100 gm oleum labelled as 104.5%

Write the nearest integral value of $(a) + (b) + (c)$.

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134. A mixture of sodium chloride(NaCl) and anhydrous sodium carbonate (Na_2CO_3) has a mole ratio, $2:1$. It is dissolved in water and treated with $BaCl_2$ solution. The mass of $BaCO_3$ precipitated is 197 gm.

Calculate the mass (in gm) of NaCl in the mixture.

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135. Certain metals have a tendency to form compounds which have a "comple structure" and are known as complex. M is a metal with such tendencies and is forming compound like $\left[M\left(NH_3\right)_5Br\left[Br_2\right.\right.$. If it is known that solution of these furnish only those ions which are outside the coordination sphere "[ ]" (the bracketed part), then calculate the weight (in g) of AgBr ppt obtained when 1000 g solution of the complex compound containing 40 % by wt. of the complex compound is reacted with 1000 g solution of $AgNO_3$ containing 17 % $AgNO_3$ by weight.

[Atomic weight of M = 75]

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136. Water is the working fluid used in Kota thermal power plant for generating electricity. Coal is combusted for generating heat as per reaction, $C + O_2 \rightarrow CO_2$. $0.01\,\%$ of the released CO_2 gas is absorbed in water and gets coverted to weak acid, H_2SO_3 which dissociated to give H^+ as $H_2CO_3 \rightarrow 2H^+ + CO_3^{2-}$. The percentage dissociattion of acid is 5 %. Assume no ionisation of water. From this information answer the questions. if in a certain application $\left[H^+\right]$ concentration can maximum be $10^{-5}M$, then,

(P) Calculate maximum moles of $H^+(x)$ and $CO_3^{2-}(y)$ in the water water if 10^9 litres of H_2O is used

(Q) Calculate maximum moles of carbon (z) which can be burnt so that water remains fit to be used

Hence, write the value of $\left(xy^2/z\right)$

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137. Calculate % yield of the reaction if $200gKHCO_3$ produces $22g$ of CO_2 upon strong heating.

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138. The weight (in gram) of pure potash alum $\left[K_2SO_4.Al_2\left(SO_4\right)_3.24H_2O\right]$ which contains 0.64 kg oxygen. (Atomic weight of $K = 39, S = 32, Al = 27$)

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139. 280 g of a mixture containing CH_4 and C_2H_6 in $5:2$ molar ratio is burnt in presence of excess of oxygen. Calculate total moles of CO_2

produced.

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140. A mother cell disintegrates into sixty identical cells and each daughter cell further disintegrates into 24 smaller cells. The smallest cell is uniform cylindrical in shape with diameter of 120 Å and each cell is 6000 Å long. Determine molar mass of the mother cell, it density of the smallest cell is $1:12gm/cm^3$. Using scientific notation if your answer is $x \times 10^y$, then write the value of $[x] + y$, where [ ] is an integer function.

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141. Calculate the number of Na^+ ion present in 710 mg of Na_2SO_4 in aqueous solution

$\left(N_A = 6 \times 10^{23}\right)$

If your answer is $x \times 10^y$ (in scientific notation) then fill x in OMR, where x is single digit number

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142. What is the concentration of H^{+} in a solution that is prepared by mixing $50.0mL$ of $0.50MHCl$ with 200.0 mL of 0.25 M HCl ? Fill your Answer of the multiplying it with 10.

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143. 1 gm of dry green algae absorbs 5 moles of CO_2 per hour by photosynthesis. If fixied carbon atoms were all stored in the form of starch $\left(C_6H_{12}O_6\right)_n$ after photosynthesis, then calculate time required (in sec) to double the weight of algae.

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144. It is found that in 11.2 L at $0^{\circ}C$ and 1 atm, of any gaseous compound of 'X', there is never less than 15.5 gm of 'X'. It is also found that 11.2 L of vapours of 'X' at $0^{\circ}C$ and 1 atm, weighs 62 gm. The automicity of 'X' is :

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145. When 100 ml of O_2 - O_3 mixture was passed through turpentine oil, there was reduction of volume by 20 ml. If 100 ml of such a mixture is heated, what will be the increase in the volume?

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