CHEMISTRY

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SOME BASIC CONCEPTS OF CHEMISTRY

Level I Homework

1. How many moles of lead (II) chloride will be formed from a reaction between 6.5g of PbO and 3.2g of HCI? [At. wt. Pb = 207g]

A. 0.044

B. 0.333

C. 0.077

D. 0.029

Answer:

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2. A silicon (at. wt. = 28) chip used in an integrated circuit of a computer has a mass of 5.68 mg. How many silicon atoms are present in this chip?

A. 2.02×10^{-4}

B. 12.2×10^{20}

C. 122×10^{20}

D. 1.22×10^{20}

Answer:

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3. Haemoglobin contains 0.25% iron by weight. The molecular wt. of haemoglobin is 89600. The no. of iron atoms per molecule is (At. wt. of iron = 55.84)

A. 40

B. 25

C. 1

D. 4

Answer:

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4. In a compound C, H and N atoms are present in 9 : 1 : 3.5 by weight. Mol wt. of compound is 108, its mol. formula is

A. $C_2H_6N_2$

B. C_3H_4N

C. $C_6H_8N_2$

D. $C_9H_{12}N_3$

Answer:

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5. Crystals of which pair are isomorphous ?

A. $ZnSO_4, SnSO_4$

B. $MgSO_4, CaSO_4$

C. $ZnSO_4, MgSO_4$

D. $PbSO_4, NiSO_4$

Answer:

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6. The volume at STP of pure O_2 necessary for the complete combustion of 12 g of magnesium of atomic weight 24 is:

A. $22.4dm^3$

B. $11.2dm^3$

C. $5.6dm^3$

D. $12dm^3$

Answer:

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7. An unknown element forms an oxide. What will be the equivalent weight of the element if the oxygen content is 20% by weight?

A. 8

B. 16

C. 24

D. 32

Answer:

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8. Which among the following statements is correct?

A. 1 mol of electron has $1.6 \times 10^{-19} C$ of charge

B. 1 mol of electron has $16 \times 10^{-19} C$ of charge

C. 1 mol of electron weighs 0.54 Kg

D. 1 mol of electron weighs 0.54 mg

Answer:

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9. The number of oxalic acid molecules in 100 mL of 0.02 N oxalic acid is

A. 12.05×10^{23}

B. 12.05×10^{20}

C. 12.05×10^{21}

D. 6.023×10^{20}

Answer:

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10. An aqueous solution of 6.3 g of oxalic acid dihydrate is made up of 250 ml. The volume of 0.1 N NaOH required to completely neutralize 10 mL of this solution is

A. 20 mL

B. 10 mL

C. 5 mL

D. 40 mL

Answer:

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11. The set of numerical coefficients that balances the equation $K_2CrO_4 + HCl \rightarrow K_2Cr_2O_7 + KCl + H_2O$ is

A. 1, 1, 2, 2, 1

B. 2, 2, 1, 1, 1

C. 2, 1, 1, 2, 1

D. 2, 2, 1, 2, 1

Answer:

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12. To 100 ml $CaCl_2$ solution containing 6.66g $CaCl_2$, 100 ml of 0.5M Na_3PO_4 solution is added. The mass of $Ca_3(PO_4)_2$ precipitated would be ?

A. 4.2 g

B. 5.0 g

C. 6.2 g

D. 7.6 g

Answer:

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13. A 100% pure sample of a divalent metal carbonate weighing 2g on complete thermal decomposition releases 448 mL of carbondioxide at STP. The equivalent mass of the metal is:

A. 40

B. 20

C. 28

D. 12

Answer:

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14. 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_2H_4

B. C_3H_4

C. C_6H_5

D. C_7H_8

Answer:

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15. 10 mL of 2(M) NaOH solution is added to 200 mL of 0.5 (M) of NaOH solution. What is the final concentration of the resultant solution?

A. 0.57 (M)

B. 5.7 (M)

C. 11.4 (M)

D. 1.14 (M)

Answer:

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16. A sample of PCl_3 contains 1.4 moles of the substance. How many atoms are there in the sample?

A. 4

B. 5.6

C. 8.431×10^{23}

D. 3.372×10^{24}

Answer:

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17. The average molar mass of naturally occurring Argon. Calculated using the following data is

Isotope :	Isotopic molar mass :	Abundance
^{36}Ar	35.96755 $g.mol^{-1}$	0.337%
^{38}Ar	37.96272 $g.mol^{-1}$	0.063%
^{40}Ar	39.9624 $g.mol^{-1}$	99.600%

A. $39.2gmol^{-1}$

B. $39.948gmol^{-1}$

C. $38.948gmol^{-1}$

D. $37.948gmol^{-1}$

Answer:

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18. In a reaction vessel 0.184 g of NaOH is required to be added for completing the reaction. How many millilitres of 0.150 M NaOH should be added for this requirement?

A. 30.7 mL

B. 60 mL

C. 15.6 mL

D. 90.2 mL

Answer:

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19. In an eperiment 2.4 g of iron oxide on reduction with hydrogen gave 1.68 g of iron. In another experiment, 2.9g of iron oxide gave 2.09 g of iron on reduction. Which law is illustrated from the data?

A. Law of constant proportions

B. Law of multiple proportions

C. Law of reciprocal proportions

D. Law of conservation of mass

Answer:

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20. Chlorine gas is prepared by reaction of H_2SO_4 with MnO_2 and NaCl. What volume of Cl_2 will be produced at STP if 50 g of NaCl react with excess amount of MnO_2 and H_2SO_4?

A. 1.915 L

B. 22.4 L

C. 11.2 L

D. 9.57 L

Answer:

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21. 1.12 mL of a gas is produced at STP by the action of 4.12 mg of alcohol, ROH, with methylmagnesium iodide. The molecular mass of alcohol is

A. 16 u

B. 41.2 u

C. 82.4 u

D. 156 u

Answer:

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22. The molecular formula of the oxide of iron in which mass percentage of iron is 69.9

A. FeO

B. Fe_2O_3

C. Fe_3O_3

D. Fe_3O_4

Answer:

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23. A mixture of ethane and ethene occupied 41 L at 1 atm and 500 K. The mixture reacts completely with $\frac{10}{3}$ mol of O_2 to produce CO_2 and H_2O. The number of moles of ethane in the mixture is

A. 0.33

B. 0.77

C. 0.67

D. 0.8

Answer:

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24. In an experiment, 4g of M_2O_x (oxide) was reduced to 2.8g of the metal. If the atomic mass of metal is 56, the number of oxygen atoms in the oxide is

A. 1

B. 2

C. 3

D. 4

Answer:

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25. The most abundant amounts by mass in the body of a healthy human adult are oxygen (61.4%), carbon (22.96%) hydrogen (10.0%) and nitrogen (2.6%). The weight which a 75 kg person would gain if all ^{1}H atoms are replaced by ^{2}H atoms is

A. 7.5 kg

B. 10 kg

C. 15 kg

D. 37.5 kg

Answer:

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26. Two elements X and Y combines to form two compounds XY_2 and X_3Y_2 0.1 mol of XY_2 weighs 10 g and 0.05 mol of X_3Y_2 weighs 9g, the atomic weights of X and Y are respectively

A. 40, 30

B. 60, 40

C. 20, 30

D. 30, 20

Answer:

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27. 10 ml of a gaseous hydrocarbon were mixed with 100 ml of oxygen and exploded in a eudiometre tube. The volume of residual gases was 95 ml of which 20 ml was absorbed by caustic soda and the remainder by pyragallol. The molecular formula of the hydrocarbon is

A. C_2H_4

B. C_2H_2

C. C_2H_6

D. C_3H_6

Answer:

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28. The amount of Arsenic pentasulphide that can be obtained when 35.5 g of arsenic acid treated with excess H_2S in the presence of conc. HCl (assuming 100% conversion) is

A. 0.25 mol

B. 0.5 mol

C. 0.333 mol

D. 0.125 ml

Answer:

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29. Which of the following is not an element :

A. Diamond

B. Graphite

C. Silica

D. Ozone

Answer:

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30. An atom is 10 times heavier than $\frac{1}{12^{th}}$ of mass of the carbon atom. The atomic mass is :

A. 10 u

B. 120 u

C. 1.2 u

D. 12 u

Answer:

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31. If the average atomic mass of an element having two isotopes is 71, the ratio of the natural abundance of the two isotopes of mass 70 and 74 will be

A. $4:1$

B. $3:1$

C. $5:1$

D. $6:1$

Answer:

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32. How many moles of electrons weigh one kilogram?

A. 6.02×10^{23}

B. $\frac{1}{9.108} \times 10^{23}$

C. $\frac{6.02 \times 10^{54}}{9.108}$

D. $\frac{10^{8}}{9.108 \times 6.02}$

Answer:

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33. The volume occupied by one molecule of water (density = 1 gcm^{-3})

A. $18cm^{3}$

B. $22400cm^{3}$

C. $6.02 \times 10^{-23}cm^{3}$

D. $3 \times 10^{-23}cm^{3}$

Answer:

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34. A sulphur containing organic compound contain 40% sulphur. The minimum molecular mass of the organic compound is

A. 200 u

B. 210 u

C. 220 u

D. 80 u

Answer:

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35. If the vapour density of a gas with respect to methane is 2, molecular mass of the gas will be

A. 4 u

B. 16 u

C. 8 u

D. 32 u

Answer:

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36. 4.4 g of CO_2 and 2.24 L H_2 and STP are mixed in a container. The total number of molecules present in the container will be

A. 6.022×10^{23}

B. 1.2044×10^{23}

C. 12.044×10^{23}

D. 6.022×10^{24}

Answer:

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37. A compound contains 52.2% C and 13 % hydrogen and remaining percentage oxygen. If vapour density of the compound is 46, molecular formula is

A. C_2H_6O

B. C_3H_6O

C. $C_4H_{12}O_2$

D. CH_2O

Answer:

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38. When 22.4 litres of $H_{2(g)}$ is mixed with 11.2 litres of $Cl_{2(g)}$ each at STP, the no. of moles of $HCI_{(g)}$ formed is equal to

A. 1

B. 2

C. 0.5

D. 1.5

Answer:

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39. What is the volume of CO_2 liberated (in litres) at 1 atm pressure and 273 K when 20g of 50% pure calcium carbonate is treated with excess dilute H_2SO_4?

A. 0.224

B. 2.24

C. 22.4

D. 224

Answer:

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40. 0.84 g of a metal hydride contains 0.042 g of hydrogen. Its equivalent mass is

A. 80

B. 40

C. 20

D. 60

Answer:

Watch Video Solution

41. The vapour density of a volatile chloride of a metal is 95 and the specific heat of the metal is 0.13. The equivalent weight of the metal will be approximately

A. 6

B. 12

C. 18

D. 24

Answer:

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42. The carbonate of a metal is isomorphous with magnesium carbonate and contains 6.091 per cent of carbon. The atomic mass of metal is:

A. 24 u

B. 56 u

C. 137 u

D. 260 u

Answer:

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43. 50 ml 10 N H_2SO_4, 25 ml 12N HCl and 40 ml 5N HNO_3 were mixed together and the volume of the mixture was made 1000 ml by adding water. The normality of the resultant solution will be :

A. 1 N

B. 2 N

C. 3 N

D. 4 N

Answer:

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44. 6.02 x 10^21' molecules of urea are present in 100 'mL' of its solution. "The concentration of urea solution is -

A. 10^{-3} M

B. 10^{-1} M

C. 2×10^{-2} M

D. 10^{-2} M

Answer:

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45. A drop (0.05mL) of 12M HCI is spread over a thin sheet of aluminium foil (thickness 1×10^{-2} cm and density 2.7g mL^{-1}). Assuming whole of the HCI is used to dissolve Al. The maximum area of-hole produced in the foil is

A. $2 \times 10^{-1} cm^2$

B. $20 \times 10^{-1} cm^2$

C. $200 \times 10^{-1} cm^2$

D. $2000 \times 10^{-1} cm^2$

Answer:

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46. 5.85g NaCl is dissolved in 1L water. The number of ions of Na^+ and Cl^- in 1 ml of this solution will be

A. 6.02×10^{20}

B. 6.02×10^{19}

C. 6.02×10^{23}

D. 1.2×10^{20}

Answer:

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47. 100 ml of PH_3 on heating forms P_(4) and H_2. The volume change in the reaction is

A. an increase in 50 ml

B. an increase of 100 ml

C. an increase of 150 ml

D. an decrease of 50 ml

Answer:

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48. The present system of atomic masses is based on carbon-12 as the standard and has been agreed upon in

A. 1960

B. 1961

C. 1980

D. 1976

Answer:

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Level Ii

1. How many years it would take to spend Avogadro's number of rupees at the rate 10 lakhs per second?

A. 10^{10} years

B. 1.8×10^{9} years

C. 19×10^{10} years

D. 1.9×10^{9} years

Answer:

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2. Which of the following does not obeys law of multiple proportion?

A. CuO, Cu_2O

B. NH_3, N_2H_4

C. N_2O, NO

D. None of the above

Answer:

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3. Which of the following contain maximum number of atoms?

A. 1g H_2

B. 1 gram atom hydrogen

C. 1 gram molecule hydrogen

D. one gram Cl_2

Answer:

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4. The maximum number of molecules is present in

A. 15 L of H_2 gas at STP

B. 5L of N_2 gas at STP

C. 0.5 g of H_2 gas

D. 10g of O_2 gas

Answer:

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5. The number of atoms of oxygen present in 10.6 g of Na_2CO_3 is

A. 6×10^{22}

B. 12×10^{22}

C. 1.8×10^{23}

D. 3×10^2

Answer:

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6. If mass of one atom is 3.3×10^{-23} g, the number of nucleons (neutrons and protons) present in 2 atoms of the element

A. 40

B. 20

C. 10

D. N_A

Answer:

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7. A mixture of gases contains H_2 and O_2 in the ratio of 1 : 4 (w/w). What is the molar ratio of the two gases in the mixture?

A. $16:1$

B. $2:1$

C. $1:4$

D. $4:1$

Answer:

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8. The number of sodium atom in 2 moles of sodium ferrocyanide is

A. 12×10^{23}

B. 26×10^{23}

C. 34×10^{23}

D. 48×10^{23}

Answer:

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9. In which case the number of molecules of water maximum?

A. 18 ml water

B. 0.18 g of water

C. 0.0024 L of water vapours at 1 atm and 273 K

D. 10^{-3} mole of water

Answer:

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10. From 200 mg of CO_2, 10^{21} molecules are removed. How many moles of CO_2 are left?

A. 2.88×10^{-3}

B. 28.8×10^{-3}

C. 0.288×10^{-3}

D. 1.66×10^{-2}

Answer:

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11. How many moles of magnesium phosphate 'Mg_3(PO_4)_2' will contain 0.25 mole of oxygen atom?

A. 0.02

B. 3.125×10^{-2}

C. 1.25×10^{-2}

D. 2.5×10^{-2}

Answer:

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12. The weight of iron which will be converted into its oxides by the action of 18g steam will be

A. 168 g

B. 84 g

C. 42 g

D. 21 g

Answer:

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13. Caffein has molecular weight of 194. It contain 28.9% by mass of nitrogen. Number of atoms of nitrogen in one molecule of it is

A. 2

B. 3

C. 4

D. 5

Answer:

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14. The crysalline salt, $Na_2SO_4.xH_2O$ on heating loses 55.9% of its weight. The formula of crystalline salt is

A. $Na_2SO_4.5H_2O$

B. $Na_2SO_4.7H_2O$

C. $Na_2SO_4.10H_2O$

D. $Na_2SO_4.6H_2O$

Answer:

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15. 0.24 g of a volatile liquid on vapourisation gives 45 ml of vapours at STP. What will be the vapour density of the substance? (Density of $H_2 = 0.089gL^{-1}$)

A. 95.39

B. 39.95

C. 99.53

D. 59.93

Answer:

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16. The vapour density of a mixture containing NO_2 and N_2O_4 is 38.3 at $27^\circ C$. Calculate the mole of NO_2 in 100mole of mixture

A. 33.48

B. 66.52

C. 86

D. 16.8

Answer:

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17. A plant virus is a uniform cylindrical particle of $150A^\circ$ in diameter and $5000A^\circ$ long. The specific volume of the virus is 0.75 cm/g. If the virus is considered to be a single particle, the molecular weight is

A. 7.095×10^7

B. 7.095×10^8

C. 7.095×10^9

D. 7.095×10^6

Answer:

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18. 0.037 g of an alcohol, R-OH was added to C_2H_5Mgl and the gas evolved measured 11.2 ml at STP. The molecular mass of R-OH will be

A. 47 u

B. 79 u

C. 77 u

D. 74 u

Answer:

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19. A mixture of 2.3 g formic acid and 4.5 g oxalic acid is treated with conc. H_2SO_4. The evolved gaseous mixture is passed through KOH pellets. Weight (in g) of the remaining product at STP will be

A. 1.4

B. 3

C. 2.8

D. 4.4

Answer:

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20. Air contains nearly 20% oxygen by volume. The volume of air needed for complete combustion of 100 ml of acetylene will be

A. 500 ml

B. 100 ml

C. 250 ml

D. 1250 ml

Answer:

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21. 20 g of a magnesium carbonate sample decomposes on heating to give carbondioxide, and 8g magnesium oxide. What will be the percentage purity of $MgCO_3$,in the sample

A. 96

B. 60

C. 80

D. 75

Answer:

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22. A mixture of CH_4 and C_2H_4 in the volume ratio X : Y has total volume 30 ml. On complete combustion it gave 40 ml CO_2. If the ratio in the original mixture has been Y : X instead of X : Y, the volume of CO_2 would have been produced on combustion is

A. 40 ml

B. 60 ml

C. 50 ml

D. 30 ml

Answer:

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23. A gaseous compound of nitrogen and hydrogen contains 12.5% (by mass) of hydrogen. The density of the compound relative to hydrogen is 16. The molecular formula of the compound is

A. N_2H_3

B. N_2H

C. NH_3

D. N_2H_4

Answer:

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24. $A + 2B + 3C \rightarrow AB_2C_3$. Reaction of 6g of A, 6×10^{23} atom of B, 0.036 mol of C yields 4.8 g of compound AB_2C_3. If the atomic mass of A and C are 60 and 80 amu, respectively the atomic mass of B is

A. 70 amu

B. 60 amu

C. 50 amu

D. 40 amu

Answer:

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25. In Haber process, 30 litres of H_2 and 30 litres of N_2 were taken for reaction which yielded only 50% of the expected product. What will be the composition of the gaseous mixture under the above said condition in the end?

A. $20LNH_3, 20LN_2, 20LH_2$

B. $10LNH_3, 25LN_2, 15LH_2$

C. $20LNH_3, 10LN_2, 30LH_2$

D. $20LNH_3, 25LN_2, 15LH_2$

Answer:

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26. The carbonate of a metal is isomorphous with $MgCO_3$ and contains 6.091 percentage of carbon. The atomic weight of metal is

A. 24 u

B. 56 u

C. 137 u

D. 65 u

Answer:

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27. 0.84 g of a carbonate of a metal on heating gave 0.4 g metal oxide. The specific heat of metal is 0.25. The atomic mass of metal is

A. 12 u

B. 24 u

C. 36 u

D. 48 u

Answer:

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28. A metal M of atomic mass A forms an oxide of the formula M_xO_y. The equivalent mass of metal is given by

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

B. $\frac{xy}{A}$

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

D. $\frac{Ax}{2y}$

Answer:

Watch Video Solution

29. If the density of methanol is '0.793kgL^(-1)', what is its volume needed for making '2.5 L' of its '0.25M' solution?

A. 35 mL

B. 25 mL

C. 15 mL

D. 12 mL

Answer:

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

A. 15.44 M

B. 11.8 M

C. 19 M

D. 8 M

Answer:

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

A. 3.2

B. 3.5

C. 2.79

D. 1.79

Answer:

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32. A drop (0.05mL) of 12M HCI is spread over a thin sheet of aluminium foil (thickness 1×10^{-2} cm and density 2.7g mL^{-1}). Assuming whole of the HCI is used to dissolve Al. The maximum area of-hole produced in the foil is

A. $2 \times 10^{-1} cm^2$

B. $20 \times 10^{-1} cm^2$

C. $200 \times 10^{-1} cm^2$

D. $2000 \times 10^{-1} cm^2$

Answer:

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33. What is the mass of the precipitate formed when 50 mL of 16.9% solution of $AgNO_3$ is mixed with 50 mL of 5.8% NaCl solution?

A. 3.5 g

B. 7 g

C. 14 g

D. 28

Answer:

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34. A compound made of two elements A and B is found to contain 25% A (atomic mass 12.5) and 75% B (atomic mass 37.5). The simplest formula of the compound is

A. AB

B. A_2B_2

C. AB_3

D. A_3B

Answer: A

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35. The carbonate of a metal is isomorphous with $MgCO_3$ and contains 6.091 percentage of carbon. The atomic weight of metal is

A. 48

B. 68.5

C. 137

D. 120

Answer: C

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36. In the reaction $4NH_3(g) + 5O_2(g) \rightarrow 4NO(g) + 6H_2O(l)$, when 1 mole of ammonia and 1 mole of O_2 are made to react to completion.

A. 1.0 mole of H_2O is produced

B. 1.0 mole of NO will be produced

C. All the oxygen will be consumed

D. All the ammonia will be consumed

Answer: C

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37. X litre of carbon monoxide is present at STP. It is completely oxidised to CO_2. The volume of CO_2 formed is 11.2 litres at STP. What is the value of X in litres?

A. 22.4

B. 11.2

C. 5.6

D. 44.8

Answer: B

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38. 250 ml of a sodium carbonate solution contains 2.65 grams of Na_2CO_3. If 10 ml of this solution is diluted to one litre,what is the concentration of the resultant solution? (mol.wt. of $Na_2CO_3 = 106$)

A. $0.1M$

B. $0.001M$

C. $0.01M$

D. $10^{-4}M$

Answer: B

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39. If one gram of a metal carbonate gave $0.56g$ of its oxide on heating, then equivalent weight of the metal will be

A. 30

B. 40

C. 25

D. 20

Answer: D

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40. 4 g of copper was dissolved in concentrated nitric acid. The copper nitrate solution on strong heating gave 5 g of its oxide. The equivalent weight of copper is

A. 20

B. 12

C. 32

D. 23

Answer: C

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41. The equivalent weight of a metal is 36. What weight of the metal would give $9.322g$ of its chloride?

A. $1.6935g$

B. $2.6935g$

C. $4.6935g$

D. $3.6935g$

Answer: C

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42. Calculate the weight of lime (CaO) obtained by heating 200 kg of 95% pure lime stone $(CaCO_3)$.

A. $104.4kg$

B. $105.4kg$

C. $212.8kg$

D. $106.4kg$

Answer: D

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43. The weight of NaCl decomposed by $4.9g$ of H_2SO_4, if 6g of sodium hydrogen sulphate and $1.825g$ of HCl, were produced in the reaction is:

A. $6.921g$

B. $4.65g$

C. $2.925g$

D. $1.4g$

Answer: C

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44. 2 g of a mixture of CO and CO_2 on reaction with excess I_2O_5 produced $2.54g$ of I_2 . What will be the mass percentage of CO_2 in the original mixture ?

A. $35\ \%$

B. $70\ \%$

C. $30\ \%$

D. $60\ \%$

Answer: C

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

A. $40\ \%\ A, 60\ \%\ B$

B. $60\ \%\ A, 40\ \%\ B$

C. $30\ \%\ A, 70\ \%\ B$

D. $70\ \%\ A, 30\ \%\ B$

Answer: A

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46. When $0.273g$ of Mg is heated strongly in a nitrogen (N_2) atmosphere, $0.378g$ of the compounds is formed. Hence, compound formed is

A. Mg_3N_2

B. Mg_3N

C. Mg_2N_3

D. MgN

Answer: A

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47. A spherical ball of radius 7cm contains 56% iron. If density is $1.4g/cm^3$, number of moles of Fe present approximately is

A. 10

B. 15

C. 20

D. 25

Answer: C

Watch Video Solution

48. $6.0g$ sample of $CaCO_3$ reacts with 20g solution of HCl having 20% by mass of HCl (density $= 1.10g/mL$). Calculate percentage purity of $CaCO_3$ sample .

A. $9.13\ \%$

B. $91.33\ \%$

C. $54.8\ \%$

D. $5.48\ \%$

Answer: B

Watch Video Solution

49. If a person inhale 10^{20} oxygen atom per sec, the volume of oxygen gas (O_2) inhaled by the person in a day at STP is :

A. 16.06 litre

B. 16.06×10^{-5} litre

C. 16.06×10^{-2} litre

D. 16.06×10^{1} litre

Answer: D

Watch Video Solution

50. The number of O_2 molecules and its volume at S.T.P in 50.6 g of hydrated sodium carbonate ore:

A. 6.926×10^{23}, 22.4 litre

B. 5.92×10^{21}, 25.76 litre

C. 6.926×10^{23}, 25.76 litre

D. 5.92×10^{21}, 22.4 litre

Answer: C

Watch Video Solution

51. 10g of CO on burning in air gives the product which have the number of nucleons

A. 9.47×10^{23}

B. 94.7×10^{23}

C. 947×10^{23}

D. 947×10^{24}

Answer: B

Watch Video Solution

52. A plant virus is a uniform cylindrical particle of $150A^\circ$ in diameter and $5000A^\circ$ long. The specific volume of the virus is 0.75 cm/g. If the virus is considered to be a single particle, the molecular weight is

A. 7.095×10^7

B. 70.95×10^7

C. 9.705×10^7

D. 7.095×10^5

Answer: A

Watch Video Solution

53. Haemoglobin contains 0.25% iron by weight. The molecular wt. of haemoglobin is 89600. The no. of iron atoms per molecule is (At. wt. of iron = 55.84)

A. 4

B. 2

C. 6

D. 8

Answer: A

Watch Video Solution

54. Copper forms two oxides . For the same amount of copper, twice as much oxygen was used to form first oxide than to form

second one. What is the ratio of the valencies of copper in first and second oxides ?

A. $2:1$

B. $1:2$

C. $3:1$

D. $1:3$

Answer: A

Watch Video Solution

55. $5mL$ of a gaseous hydrocarbon reacts with 30mL of O_2. The resultant gas, on cooling is found to measure 25mL of which 10mL are absorbed by NaOH and the remainder by pyrogallol. Determine molecular formula of hydrocarbon. All measurements are made at constant pressure and temperature.

A. C_2H_6

B. C_3H_6

C. C_2H_4

D. CH_3

Answer: C

Watch Video Solution

56. Calculate the mass of calcium oxide required that react with 852 g of P_4O_{10}.

A. $2016g$

B. $1008g$

C. $504g$

D. $1800g$

Answer: B

Watch Video Solution

57. Asample of an alloy weighing $0.50g$ and containing 90% Ag was dissolved in conc. HNO_3. Ag was analysed by Volhard method in which 25mL of KCNS were required for complete neutralization. Determine normality of KCNS.

A. 0.167

B. 0.326

C. 0.267

D. 0.067

Answer: A

Watch Video Solution

58. 109% labelled oleum has x mole of H_2SO_4 and y mole of SO_3 respectively. What is the value of (x+y)/(x-y)

A. 8.81

B. 9.91

C. 10.6

D. 11.6

Answer: B

Watch Video Solution

59. What is the molar mass of a substance, each molecule of which contains 9 carbon atoms, 13 hydrogen atoms and $2.33 \times 10^{-23} g$ of other component?

A. $235.04g$

B. $153.03g$

C. $135.04g$

D. $253.04g$

Answer: C

Watch Video Solution

60. The molality of an H_2SO_4 solution is 9. The weight of the solute in 1 kg H_2SO_4 solution is:

A. $900.0g$

B. $469g$

C. $882.0g$

D. $9.0g$

Answer: B

Watch Video Solution

61. Calculate the mass of CaO required to remove the hardness of 10^6 litre of water containing $1.62g$ of calcium bicarbonate per litre.

A. $5.6 \times 10^4 g$

B. $5.6 \times 10^5 g$

C. $5.6 \times 10^6 g$

D. $5.6 \times 10^3 g$

Answer: C

Watch Video Solution

62. Two litres of NH_3 at $30^\circ C$ and 0.20 atmosphere is neutralized by 134 mL of a solution of H_2SO_4. Calculate normality of H_2SO_4.

A. 0.12

B. 0.23

C. 0.17

D. 0.19

Answer: A

Watch Video Solution

63. How much $BaCl_2$ would be needed to make 250mL of a solution having same concentration of Cl^- as the one containing 3.78 g of NaCl per 100 mL?

A. $15.30g$

B. $12.80g$

C. $18.30g$

D. $17.00g$

Answer: D

Watch Video Solution

64. A $6.90M$ solution of KOH in water has 30% by mass KOH. Calculate density of solution.

A. $1.33gmL^{-1}$

B. $1.288gmL^{-1}$

C. $1.66gmL^{-1}$

D. $1.44gmL^{-1}$

Answer: B

Watch Video Solution

65. Calculate the number of atoms of oxygen present in $88gCO_2$. What would be the mass of CO having the same number of oxygen atoms?

A. $98gCO$

B. $120gCO$

C. $112gCO$

D. $132gCO$

Answer: C

Watch Video Solution

66. What volume at NTP of ammonia gas will be required to be passed into 30mL of $1NH_2SO_4$ solution to bring down the acid normality to $0.2N$?

A. $537.6mL$

B. $520.7mL$

C. $433.6mL$

D. $420.5mL$

Answer: A

Watch Video Solution

67. A $0.60g$ sample consisting of only CaC_2O_4 and MgC_2O_4 is heated at $500^\circ C$, converting the two salts into $CaCO_3$ and $MgCO_3$. The sample then weighs $0.465g$. If the sample had been heated to $900^\circ C$, where the products are CaO and MgO, what would the mixtures of oxides have weighed?

A. $0.12g$

B. $0.21g$

C. $0.252g$

D. $0.3g$

Answer: C

Watch Video Solution

68. Urea (H_2NCONH_2) is manufactured by passing $CO_2(g)$ through ammonia solution followed by crystallization. CO_2 for the above reaction is prepared by combustion of hydrocarbon. If combustion of 236kg of a saturated hydrocarbon (C_nH_{2n+2}) produces as much CO_2 as required for production of $999.6kg$ urea then molecular formula of hydrocarbon is : $C_{10}H_{22}$, $C_{12}H_{26}$, $C_{13}H_{28}$, C_8H_{18},

A. $C_{10}H_{22}$

B. $C_{12}H_{26}$

C. $C_{13}H_{28}$

D. C_8H_{18}

Answer: B

Watch Video Solution

69. A silver coin weighing $11.34g$ was dissolved in nitric acid. When sodium chloride was added to the solution all the silver (present at $AgNO_3$) was precipitated as silver chloride. The weight of the precipitated silver chloride was $14.35g$. Calculate the percentage of silver in the coin. : $4.8\,\%$, $95.2\,\%$, $90\,\%$, $80\,\%$

A. $4.8\,\%$

B. $95.2\,\%$

C. $90\,\%$

D. $80\,\%$

Answer: B

Watch Video Solution

70. The conversion of oxygen to ozone occurs to the extent of 15% only. The mass of ozone that can be prepared from $67.2L$ of oxygen at 1 atm and 273k will be :

A. $14.4gm$

B. $96gm$

C. $640gm$

D. $64gm$

Answer: A

Watch Video Solution

71. $100cm^3$ of a solution of an acid (molar mass =98) containing $29.4g$ of the acid per litre were completely neutralized by $90.0cm^3$ of aq.NaOH containing 20g of NaOH per $500cm^3$.The basicity of the acid is :

A. 3

B. 2

C. 1

D. 4

Answer: A

Watch Video Solution

72. A 150ml of solution of I_2 is divided into two unequal parts. One part reacts with hypo solution in acidic medium . 15ml of $0.4M$ hypo was consumed. The second part was added to 100ml of $0.3M$

hot NaOH sodium to produce IO_3^-. Residual base required 10ml of $0.3MH_2SO_4$ solution for complete neutralization.What was the initial concentration of I_2 ?

A. $0.08M$

B. $0.1M$

C. $0.2M$

D. $0.03M$

Answer: B

Watch Video Solution

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

A. 0.87

B. 0.197

C. 0.259

D. 0.216

Answer: B

Watch Video Solution

74. Concentrated HNO_3 is 69% by mass of nitric acid. Calculate the volume of the solution which contains 23 g of HNO_3. (Density of concentrated HNO_3 solution is $1.41 gml^{-1}$)

A. 23.6

B. 32.6

C. 26.8

D. 18.5

Answer: A

Watch Video Solution

75. A gaseous hydrocarbon X, was burnt in excess of oxygen. A $0.112dm^3$ sample of X, at STP gave $0.88gCO_2$. How many C - atoms are there in one molecule of X?

A. 1

B. 2

C. 3

D. 4

Answer: D

Watch Video Solution

76. $10.1g$ of KNO_3 is dissolved in 500 mL of H_2O. Mass of $Ba(NO_3)_2$ that should be added to this solution to get a molality of 0.3 with respect to NO_3^- irons is $\left(Mw \text{ of } KNO_3 = 101gmol^{-1}, Mw \text{ of } Ba(NO_3)_2 = 261gmol^{-1}\right)$

A. $1.3g$

B. $13g$

C. $6.5g$

D. $65g$

Answer: C

Watch Video Solution

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

A. ≈ 0.04

B. ≈ 0.8

C. ≈ 0.4

D. ≈ 0.2

Answer: C

Watch Video Solution

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

A. $3.1\ \%$

B. $2.4\ \%$

C. $1\ \%$

D. $5\ \%$

Answer: A

Watch Video Solution

79. Calculate the number of oxygen atoms required to combine with $7.0g$ of N_2 to from N_2O_3 if 80% of N_2 is converted into products.

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

3.24×10^23

3.6×10^23

1.8×10^23

6.02×10^23

A. 3.24×10^{23}

B. 3.6×10^{23}

C. 1.8×10^{23}

D. 6.02×10^{23}

Answer: B

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80. One litre of a sample of hard water contains $5.55mg$ of $CaCl_2$ and $4.75mg$ of $MgCl_2$. The total hardness in terms of ppm of $CaCO_3$ is

A. 5 p pm

B. 10p pm

C. 20p pm

D. 16p pm

Answer: B

Watch Video Solution

81. 10mL of $0.2N$ HCI and 30mL of $0.1N$ HCI together exactly neutralise 40 mL of solution of NaOH, which is also exactly neutrlised by a solution in water of $0.61g$ of an organic acid. What is the equivalent acid. What is the equivalent weight of the organic acid?

A. 61

B. 91.5

C. 122

D. 183

Answer: B

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82. Element X reacts with oxygen to produce a pure sample of X_2O_3. In an experiment it is found that $1.00g$ of X produces $1.16g$ of X_2O_3. Calculate the atomic weight of X. (Atomic weight of oxygen, $16.0gmol^{-1}$).

A. 67

B. 100.2

C. 125

D. 150

Answer: C

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83. Resultant molarity of H^+ ion in a mixture of 100 mL of $0.1MH_2SO_4$ and200 mL of $0.1H_3PO_3$ is:

A. 0.1

B. $0.2M$

C. $0.267M$

D. $0.133M$

Answer: D

Watch Video Solution

84. In each of the following question, an Assertion (A) is following by a corresponding Reason (R). Use the following keys to choose the appropriate answer.

Assertion : The equivalent mass of an element is variable.

Reason : It depends on the valency of the element.

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

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

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

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

Answer: A

Watch Video Solution

85. In each of the following question, an Assertion (A) is following by a corresponding Reason (R). Use the following keys to choose the appropriate answer.

Assertion : In a combustion reaction in the air, oxygen is the limiting reactant.

Reason : Oxygen is present in limited amount (only21%) in the air.

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

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

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

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

Answer: D

Watch Video Solution

86. In each of the following question, an Assertion (A) is following by a corresponding Reason (R). Use the following keys to choose

the appropriate answer.

Assertion : 12 parts by mass of carbon combine with 16 and 32 parts by mass of oxygen to from CO and CO_2 respectively.

Reason : A given compound always contains exactly the same proportion of elements by weight.

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

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

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

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

Answer: B

Watch Video Solution

87. In each of the following question, an Assertion (A) is following by a corresponding Reason (R). Use the following keys to choose the appropriate answer.

Assertion : Molar volume of gases changes considerably with temperature and pressure.

Reason : Molar volume of a substance is the volume occupied by 1 mole of that substance.

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

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

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

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

Answer: B

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88. In each of the following question, an Assertion (A) is following by a corresponding Reason (R). Use the following keys to choose the appropriate answer.

Assertion : 1 amu equals to $1.66 \times 10^{-24} g$.

Reason : $1.66 \times 10^{-24} g$ equals $1/12$th mass of C^{12} atom.

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

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

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

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

Answer: A

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Watch Video Solution

89. In each of the following question, an Assertion (A) is following by a corresponding Reason (R). Use the following keys to choose the appropriate answer.

Assertion : Average atomic mass of an element depends upon the atomic masses of different isotopes and their fractional abundances.

Reason : Average atomic mass is obtained by multiplying the atomic mass of the heavier isotope with its fractional abundances.

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

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

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

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

Answer: C

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90. In each of the following question, an Assertion (A) is following by a corresponding Reason (R). Use the following keys to choose the appropriate answer.

Assertion : The number of O atoms in 1 g of O_2 1 g of O_3 and 1 g of atomic oxygen is same.

Reason : Each value represents $1/16g$-atom of oxygen.

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

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

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

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

Answer: A

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91. Assertion : In gaseous reaction, the ratio of volumes of reactants and products is in agreement with their molar ratio

Reason : Volume of a gas is inversely proportional to its moles at a particular temperature and pressure

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

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

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

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

Answer: C

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92. In each of the following question, an Assertion (A) is following by a corresponding Reason (R). Use the following keys to choose the appropriate answer.

Assertion : Components of a homogeneous mixture cannot be separated by using physical methods.

Reason : Composition of homogeneous mixture is uniform throughout as the components react to form a single compound.

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

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

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

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

Answer: D

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93. In each of the following question, an Assertion (A) is following by a corresponding Reason (R). Use the following keys to choose the appropriate answer.

Assertion : The reactant which is present in larger amount limits the amount of product formed is called limiting reagent.

Reason : Amount of product formed does not depend upon the amount of reactants taken.

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

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

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

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

Answer: D

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94. In each of the following question, an Assertion (A) is following by a corresponding Reason (R). Use the following keys to choose the appropriate answer.

Assertion : The ratio by volume of $H_2 : Cl_2 : HCl$ in a reaction $H_2 + Cl_2 \rightarrow 2HCl$ is 1 : 1 : 2.

Reason : Substances always react in such a way that their volume ratio is simple whole number.

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

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

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

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

Answer: C

Watch Video Solution

95. In each of the following question, an Assertion (A) is following by a corresponding Reason (R). Use the following keys to choose the appropriate answer.

Assertion : 1 mole oxygen and 1 mole nitrogen have same volume at same temerature and pressure..

Reason : 1 mole gas occupies 22.4 litres at STP.

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

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

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

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

Answer: B

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96. In each of the following question, an Assertion (A) is following by a corresponding Reason (R). Use the following keys to choose

the appropriate answer.

Assertion : The standard unit for expressing the mass of atoms is amu.

Reason : amu is also called as avogram.

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

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

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

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

Answer: B

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97. In each of the following question, an Assertion (A) is following by a corresponding Reason (R). Use the following keys to choose the appropriate answer.

Assertion : Vapour density of CH_4 is half of O_2.

Reason : 1.6 g of CH_4 contains same number of electrons as 3.2 g of O_2.

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

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

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

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

Answer: C

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98. In each of the following question, an Assertion (A) is following by a corresponding Reason (R). Use the following keys to choose the appropriate answer.

Assertion : Molarity of a solution does not depend upon temperature whereas molality depends.

Reason : Molarity and molality both depend only on the number of moles of solute particles.

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

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

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

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

Answer: D

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99. Assertion : Both 106g sodium carbonate and 12g carbon contain same number of carbon atoms

Reason : Both contain 1 gram atom carbon which contains 6×10^{23} carbon atoms

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

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

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

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

Answer: A

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100. Assertion : Equal moles of different substances contain same number of constituent particles

Reason : Equal weights of different substances contain the same number of constituent particles

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

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

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

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

Answer: C

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101. In each of the following question, an Assertion (A) is following by a corresponding Reason (R). Use the following keys to choose the appropriate answer.

Assertion : Volume of a gas is directly proportional to the number of moles of gas.

Reason : The ratio by volume of gaseous reactants and products is in agreement with their mole ratio.

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

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

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

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

Answer: A

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102. Assertion : One mole of SO_2 contain the same number of molecules present in one mole of O_2

Reason : Molecular mass of SO_2 is twice that of O_2

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

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

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

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

Answer: B

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103. In each of the following question, an Assertion (A) is following by a corresponding Reason (R). Use the following keys to choose the appropriate answer.

Assertion : Average atomic mass of chlorine is 35.5 amu.

Reason : Chlorine has two isotopes $Cl-35$ and $Cl-37$ and their relative abundance is 3:1.

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

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

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

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

Answer: A

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Level Ii Assertion Reason Type Questions

1. Assertion : Equal moles of different substances contain same number of constituent particles

Reason : Equal weights of different substances contain the same number of constituent particles

A. If both assertion and reason are correct and reason is the correct explanation of assertion.

B. Both assertion and reason are correct but reason is not the correct explanation of assertion

C. If assertion is correct and reason is not correct

D. Assertion is wrong and reason is correct

Answer:

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2. Assertion : Cinnabar is a chemical compound whereas brass is a mixture

Reason : Cinnabar always contain 6.25 times as much mercury as sulphur by weight. Brass can be made with widely different ratios of copper and zinc

A. If both assertion and reason are correct and reason is the correct explanation of assertion.

B. Both assertion and reason are correct but reason is not the correct explanation of assertion

C. If assertion is correct and reason is not correct

D. Assertion is wrong and reason is correct

Answer:

Watch Video Solution

3. Assertion : In gaseous reaction, the ratio of volumes of reactants and products is in agreement with their molar ratio

Reason : Volume of a gas is inversely proportional to its moles at a particular temperature and pressure

A. If both assertion and reason are correct and reason is the correct explanation of assertion.

B. Both assertion and reason are correct but reason is not the correct explanation of assertion

C. If assertion is correct and reason is not correct

D. Assertion is wrong and reason is correct

Answer:

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4. Assertion : Both 106g sodium carbonate and 12g carbon contain same number of carbon atoms

Reason : Both contain 1 gram atom carbon which contains 6×10^{23} carbon atoms

A. If both assertion and reason are correct and reason is the correct explanation of assertion.

B. Both assertion and reason are correct but reason is not the correct explanation of assertion

C. If assertion is correct and reason is not correct

D. Assertion is wrong and reason is correct

Answer:

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5. Assertion : Vapour density of CH_4 is half that of O_2

Reason : 1.6 g CH_4 contains same number of electron as in 3.2 g of O_2

A. If both assertion and reason are correct and reason is the correct explanation of assertion.

B. Both assertion and reason are correct but reason is not the correct explanation of assertion

C. If assertion is correct and reason is not correct

D. Assertion is wrong and reason is correct

Answer:

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6. Assertion : Equivalent weight of an element is not always same

Reason : Element may have variable valency

A. If both assertion and reason are correct and reason is the correct explanation of assertion.

B. Both assertion and reason are correct but reason is not the correct explanation of assertion

C. If assertion is correct and reason is not correct

D. Assertion is wrong and reason is correct

Answer:

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7. Assertion : One mole of SO_2 contain the same number of molecules present in one mole of O_2

Reason : Molecular mass of SO_2 is twice that of O_2

A. If both assertion and reason are correct and reason is the correct explanation of assertion.

B. Both assertion and reason are correct but reason is not the correct explanation of assertion

C. If assertion is correct and reason is not correct

D. Assertion is wrong and reason is correct

Answer:

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Questions

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

24

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2. How many significant figures are there in the following number?

205

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3. How many significant figures are there in the following number?

1.026

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4. How many significant figures are there in the following number?

0.0020

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5. How many significant figures are there in the following number?

1.00×10^4

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6. How many significant figures are there in the following number?

π

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7. Calculate to the proper number of significant digits, $4.5 \times 10^4 m + 3.00 \times 10^5 mm.$

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8. Add the following quantities to the proper number of significant digits.

$58.0 + 0.0038 + 0.00001$

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9. Add the following quantities to the proper number of significant digits.

$4.20 + 1.6523 + 0.015$

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10. Add the following quantities to the proper number of significant digits.

$415.5 + 3.64 + 0.238$

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11. Find the number of significant digits:

$14.90 \times 0.0070 \div 0.091$

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12. Find the sum to the correct number of significant digits:

$14.90 + 0.0060 + 1.0 + 0.091$

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13. Find the difference to the correct number of significant digits:

$10.022 - 0.03$

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14. How many millimeters are there in $25.0cm$?

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15. Convert $12.5gcm^{-3}$ to kilograms per litre.

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16. Find out the volume of 40 kg of a substance whose density is $1.60 g cm^{-3}$.

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17. The density of a metal is $9.50 g cm^{-3}$ Calculate the number of kilograms per cubic metre.

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18. The density of a solution containing 17.0% of $NaCl$ is $1.13 cm^{-3}$. What volume of the solution will contain $35.0 g$ of NaCl?

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19. 2 g of $CaCO_3$ on strong heating gave $1.12g$ of CaO and 448 ml of CO_2. Show that the results illustrate the law of conservation of mass.

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20. A simple iron oxide was found to contain $72.17\,\%$ iron. 2 g of the oxide from another source gave $1.44g$ of iron. Show that the results illustrate law of definite proportions.

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21. Nitrogen and oxygen from two compounds. The nitrogen content of one of these is $30.43\,\%$ and the other is $46.53\,\%$. Show that the data is in agreement with the law of multiple proportions.

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22. Sulphur combines with hydrogen and oxygen to give $H_2S$and SO_2 respectively. In what ratio will H_2 and O_2 combine to from H_2O?

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23. What is the ratio of reactants and products when nitrogen combines with oxygen to from N_2O_5?

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24. $291.2ml$ of N_2reacts with 873 mL of H_2 to from 582.4 mL of NH_3 at STP. Find out whether the results are in accordance with Gay Lussac's law?

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25. Chlorine is a mixture of two isotopes with atomic masses 35u and 37u which are present in the ratio of 3:1. Find out the average atomic mass.

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26. Naturally occuring boron has two isotopes of masses 10 amu and 11 amu. Calculate the percentage of each isotope if the average atomic mass of boron is 10.2.

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27. Nitrogen forms NO and NH_3. Show that equivalent mass is not a fixed quantity and that it varies from reaction to reaction.

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28. What is the equivalent mass of water?

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29. Find the number of moles in 1.445×10^{24} atoms of silver.

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30. Find the number of moles in $127.0g$ of copper.

Watch Video Solution

31. Find the number of moles in $45g$ of water.

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32. Find the number of moles in $7.8L$ of N_2 at STP.

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33. Calculate the percentage of Cu in CuO

Watch Video Solution

34. Calculate the mass $\%$ of oxygen in Fe_3O_4

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35. An organic compound contains $40\,\%$ carbon, $6.67\,\%$ hydrogen and $53.33\,\%$ oxygen by mass. What is the molecular formula of the compound if its molecular mass is 180?

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36. Calculate the mass of CaO formed from $25g$ of $CaCO_3$ on strong heating (mol.mass of $CaCO_3 = 100$ and $CaO = 56$).

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37. Calculate the volume of CO_2 evolved at STP when 10g of $CaCO_3$ is treated with mineral acid.

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38. What is the volume of H_2 produced by the decomposition of 5L of NH_3 at STP?

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39. Find out the limiting reagent when 5g of H_2 reacts with 24g of O_2 to form water.

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40. Construct an ionic equation for the neutralisation of HNO_3 and KOH.

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41. Calculate the mass percent of a solution containing $2.5g$ of KCl in $50g$ of water.

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42. Calculate the molarity of a solution containing $2.8g$ of KOH per litre (molar mass of KOH= 56).

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43. $250mL$ of $0.2MH_2SO_4$ is mixed with 100mL of $0.5MH_2SO_4$. What is the molarity of the resulting solution?

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44. What is the final molarity of a solution of $9.8gH_2SO_4$ in 250mL water when mixed with 250mL of $0.1MH_2SO_4$?

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45. How much water should be added to $3MHCl$ to get $1L$ $0.25M$ HCl?

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46. Calculate the molarity of 10% by mass KCl in water solution (molecular mass of $KCl = 74.5gmol^{-1}$).

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47. The density of $2.5M$ acetic acid in water is $1.02gml^{-1}$. Calculate the molality of the solution.

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48. What is the normality of a solution of 0.285 mol of NaOH dissolved in 250 mL water?

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49. 50 mL acid is titrated against $0.25N$ base. It took $22.3mL$ of base to reach end-point. What is the normality of the acid ?

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50. What is the mole fraction of the solute in a 1m aqueous solution?

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51. What is the mole fraction of CCl_4 in solution if 2.3 moles of CCl_4 is dissolved in 5.7 moles of benzene?

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52. What is the concentration in ppm, of a solution containing 50mg of Hg per litre?

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53. What is the degree of hardness of a water sample containing $5 \times 10^{-3} g/L$ of $CaCO_3$?

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54. Find the % labelling of 100g oleum sample containing $10g$ SO_3

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55. What is the $\%\ (w/v)$ of '20V' H_2O_2?

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56. What is the concentration of $1.5N$ solution of H_2O_2 in terms of volume ?

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57. Calculate the pH value of the following solution:

A solution containing $0.315g$ of nitric acid in 500mL of solution.

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58. Calculate the pH value of the following solution:

$0.0001 M NaOH.$

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59. Convert pH value of 3.6 into $\left[H^{+}\right]$ value.

Watch Video Solution

60. Convert pH value of 3.6 into $\left[H^{+}\right]$ value.

Watch Video Solution

61. Convert pH value of 3.6 into $\left[H^{+}\right]$ value.

Watch Video Solution

62. Convert pH value of 3.6 into $\left[H^{+}\right]$ value.

Watch Video Solution

63. Convert pH value of 3.6 into $\left[H^{+}\right]$ value.

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64. $0.2g$ of a substance displaced $65.2mL$ of air at 300 K and 749 mm pressure. Calculate the molecular mass of the substance. (Aqueous Tension at 300 K is $26.7mm$)

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65. $0.5g$ of silver salt of a dibasic organic acid left a residue of 0.27 of silver on ignition. Calculate the molecular mass of the acid.

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66. $1.9g$ of the chloroplatinate of a diacid base when ignited left $0.75g$ of Pt. Calculate the molecular mass of the base. (Atomic mass of Pt is 195)

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67. A mixture of 40 litres of ethane and ethene at 1 atm pressure and 400k reacts completely with $130g$ of O_2 to form CO_2 and H_2O. Assuming ideal behaviour, calculate the mole fraction of ethane and ethene.

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Level I

1. Which of the following is a characteristic of both mixtures and compounds?

A. Their properties are same as those of their constituents

B. Energy is absorbed when they are formed

C. Their mass equals to the sum of the masses of their components

D. They contain components in fixed proportions

Answer: C

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2. A mixture of sand and iodine can be separated by

A. Crystallisation

B. Sublimation

C. Distillation

D. Fractionation

Answer: B

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3. The largest number of molecules is in

A. 54 g of nitrogen dioxide

B. 28 g of carbon dioxide

C. 36 g of water

D. 46 g of ethyl alcohol

Answer: C

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4. Five grams of each of the following gases at $87^{\circ}C$ and 750mm pressure are taken. Which of them will have the least volume?

A. HF

B. HCl

C. HBr

D. HI

Answer: D

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5. The number of moles of H_2 in 0.224 litre of hydrogen gas at STP(273k,1atm) (assuming ideal gas behaviour)is

A. 1

B. 0.1

C. 0.01

D. 0.001

Answer: C

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6. 7.5 grams of a gas occupy 5.6 litre of volumes at STP. The gas is

A. NO

B. N_2O

C. CO

D. CO_2

Answer: A

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7. Which of the following has the largest number of atoms?

A. 0.5 g atom of Cu

B. $0.635g$ of Cu

C. 0.25 moles of Cu atom

D. 1 g of Cu

Answer: A

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8. An english word,written in carbon pencil weighs 1mg. What is the number of carbon atoms present in the word?

A. 0.502×10^{20}

B. 6.02×10^{20}

C. 5.02×10^{20}

D. 5.02×10^{23}

Answer: A

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9. The number of atoms of oxygen present in 10.6 g of Na_2CO_3 is

A. 6.02×10^{22}

B. 12.04×10^{22}

C. 1.806×10^{23}

D. 31.80×10^{28}

Answer: C

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10. The specific heat of a metal is 0.16. Its approximate atomic weight would be

A. 32

B. 16

C. 40

D. 64

Answer: C

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11. Law of multiple proportion is illustrated by one of the following pairs.

A. H_2S and SO_2

B. NH_3 and NO_2

C. Na_2S and Na_2O

D. N_2O and NO

Answer: D

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12. Given that the oxidation state of sulphur is -2, calculate the gram equivalent wt.of sulphur.

A. 16

B. 8

C. 32

D. 64

Answer: A

Watch Video Solution

13. How many molecules are present in $5.23g$ of glucose $(C_6H_{12}O_6)$?

A. 1.65×10^{22}

B. 1.75×10^{22}

C. 1.75×10^{21}

D. 1.65×10^{21}

Answer: B

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14. Which one of the following is the lightest?

A. 0.2 mole of hydrogen gas

B. 6.02×10^{22} molecules of nitrogen

C. $0.1g$ of silver

D. 0.1 mole of oxygen gas

Answer: C

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15. Which of the following substance contains greatest mass of chlorine?

A. $5.0gCl_2$

B. $0.5 mol Cl_2$

C. $0.10 mol KCl$

D. 5 g HCl

Answer: B

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16. Mass of one atom of X is $6.66 \times 10^{-23} g$. Hence number of mole of atom X in 40kg is

A. 10^3 mol

B. 10^{-3} mol

C. $\frac{40 \times 10^3}{6.66 \times 10^{-23}} mol$

D. $\frac{40 \times 10^3}{6.022 \times 10^{23}} mol$

Answer: A

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17. In a gas S and O are 50% by mass, hence,their mol ratio is

A. $1:1$

B. $1:2$

C. $2:1$

D. $3:1$

Answer: B

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18. The density of CCl_4 vapour in g/L at STP will be

A. 3.425

B. 6.875

C. 10.252

D. 4.575

Answer: B

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19. The number of electrons present in 5.6 litre of H_2 gas at S.T.P is

A. 6.02×10^{23}

B. 3.01×10^{23}

C. 12.04×10^{23}

D. 3.0×10^{10}

Answer: B

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20. $10g$ of $CaCO_3$ contains

A. 10 moles of $CaCO_3$

B. $0.1g$ atom of C

C. 6×10^{23} atoms of Ca

D. 0.1 of equivalent of Ca.

Answer: B

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21. The vapour density of a chloride of an element is 39.5. The equivalent mass of the element is 3.82. The atomic weight of the element is

A. 15.28

B. 7.64

C. 3.82

D. 11.46

Answer: B

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22. In an experiment, $6.67g$ of $AlCl_3$ was produced and $0.54gAl$ remained unreacted. How many g atoms of Al and Cl_2 were taken orginally (Al= 27, Cl = 35.5)?

A. $0.07, 0.15$

B. $0.07, 0.05$

C. $0.02, 0.05$

D. $0.02, 0.15$

Answer: A

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

A. 32 amu

B. 37 amu

C. 42 amu

D. 98 amu

Answer: A

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24. The simplest formula of a compound containing 50 % of element X (atomic mass 10) and 50 % of element Y (atomic mass 20) is

A. XY

B. X_2Y

C. XY_2

D. X_2Y_3

Answer: B

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25. The molality of $X\ \%\ H_2SO_4$ solution is equal to 9. The weight of the solvent present in the solution is 910g.The value of 'X' is : $90, 80.3, 40.13, 9$

A. 90

B. 80.3

C. 40.13

D. 9

Answer: B

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26. Consider the following reaction , $N_2 + 3H_2 \rightarrow 2NH_3$

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

A. $\left(\frac{2x_1 - x_2}{6}\right)$

B. $(x_1 - x_2)$

C. $(3x_1 - x_2)$

D. $(x_1 - 3x_2)$

Answer: A

Watch Video Solution

27. How many moles of electrons weigh one kilogram?

A. 6.02×10^{23}

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

C. $\frac{6.02}{9.108} \times 10^{54}$

D. $\frac{1}{9.108 \times 6.02} \times 10^{8}$

Answer: D

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28. $36.5\ \%\ HCl$ has density equal to $1.20 gmL^{-1}$. The molarity (M) and molality (m) respectively, are

A. $15.7, 15.7$

B. $12, 12$

C. $15.7, 12$

D. $12, 15.7$

Answer: D

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29. Dissolving 120 g of urea (mol wt . 60) in 1000 g of water gave a solution of densit 1.15 g/mL. The molarity of the solution is

A. $1.78M$

B. $2.00M$

C. $2.05M$

D. $2.22M$

Answer: C

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30. If air contains 71% N_2 by volume, the number of atoms of nitrogen per litre of air at STP is.

A. 3.8×10^{23}

B. 0.38×10^{23}

C. 38×10^{23}

D. 0.38×10^{21}

Answer: B

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31. $8.6g$ of an element when treated with excess of acid produce 1900ml of H_2 gas STP. The equivalent mass of metal is?

A. 48.69

B. 58.69

C. 50.69

D. 56.69

Answer: C

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32. Molarity of $560g$ pure H_2O at $4^\circ C$ is

A. 40

B. 4

C. 55.5

D. 44.6

Answer: C

Watch Video Solution

33. The mass of 60% HCI required for the netralisation of 10L of $0.1MKOH$ is

A. $60.8g$

B. $21.9g$

C. $100g$

D. $219g$

Answer: A

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34. Cortisone is a molecular substance containing 21 atoms of carbon per molecule. The mass percentage of carbon in cortisone is $69.98\,\%$. It's molar mass is

A. $176.5 gmol^{-1}$

B. $252.2 gmol^{-1}$

C. $287.6 gmol^{-1}$

D. $360.1 gmol^{-1}$

Answer: D

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35. A sample of ammonium phosphate $(NH_3)_4PO_4$ contains 3.18 moles 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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36. Consider the following laws of chemical combination with examples:

I) Law of multiple proportion, N_2O, NO, NO_2

II) Law of reciprocal proportion, H_2O, SO_2, H_2S

Which is correct with examples?

A. I and II

B. I only

C. II only

D. I and II are incorrect

Answer: A

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37. $1g$ urea (NH_2CONH_2), 1g acetic acid (CH_3COOH) and 1g of formaldehyde $(HCHO)$ will have H-atoms in the ratio.

A. $2:2:1$

B. $1:1:2$

C. $1:1:1$

D. $1:2:1$

Answer: C

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38. The molarity of a solution obtained by mixing 750mL of $0.5MHCl$ with 250 mL of $2MHCl$ will be

A. 1.00

B. 1.75

C. 0.975

D. 0.875

Answer: D

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39. $40\,\%\,W/VNaCl$ solution (specific gravity $= 1.12$) is equivalent to : 3.57×10^5 p pm, 3.57×10^6 p pm, 1.10^6 p pm, 4×10^3 p pm

A. $3.57 \times 10^5 p \pm$

B. $3.57 \times 10^6 p \pm$

C. $1.10^6 p \pm$

D. $4 \times 10^3 p \pm$

Answer: A

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40. In compound A, $1.0g$ nitrogen combines with $0.57g$ of Oxygen. In compound B $2.0g$ nitrogen units with $2.24g$ Oxygen and in

compound C. $3.0g$ of nitrogen combine with $5.11g$ oxygen. These results obey the law of

A. multiple proportions

B. constant proportions

C. reciprocal properties

D. law of conservation of mass

Answer: A

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41. Which one of the phrases would be incorrect to use?

A. One mole of an element

B. one mole of a compound

C. An atom of an element

D. An atom of a compound

Answer: D

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42. Which one of the best example of law of conservation of mass?

A. 6 g of carbon is heated in vacuum, there is no change in mass.

B. 6 g of carbon combines with 16 g of oxygen to from 22 g of CO_2

C. 6 g water is completely converted into steam.

D. A sample of air is heated at constant pressure when its volume increases but there is no change in mass.

Answer: B

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43. Number of atoms present in 4.25g of 'NH_3' is

A. 6.02×10^{23}

B. $4 \times 6.02 \times 10^{23}$

C. 1.7×10^{24}

D. $4.5 \times 6.02 \times 10^{23}$

Answer: A

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44. 3g of a hydrocarbon 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 proporations

C. constant proportions

D. reciprocal proportions

Answer: A

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45. A metal oxide is reduced by heating it in a stream of hydrogen. It is found that after complete reduction, $3.15g$ of the oxide have yeilded $1.05g$ of the metal. We may conclude that:

A. atomic mass of the metal is 4

B. atomic mass of the metal is 8

C. equivalent mass of the metal is 4

D. equivalent mass of the metal is 8

Answer: C

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46. The volume occupied by one molecule of water (density = 1 gcm^{-3})

A. $3 \times 10^{-23} cm^3$

B. $5.5 \times 10^{-23} cm^3$

C. $9 \times 10^{-23} cm^3$

D. $6.02 \times 10^{-23} cm^3$

Answer: A

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47. Common salt obtained from sea-water contains $95\ \%\ NaCl$ by mass. The approximate number of formula units present in $10g$ salt is :

A. 10^{21}

B. 10^{22}

C. 10^{23}

D. 10^{24}

Answer: C

Watch Video Solution

48. The volume of H_2 evolved at STP when $0.9g$ of Al(molar mass : $27gmol^{-1}$) is dissolved in excess of dilute H_2SO_4 is

A. $0.58L$

B. $1.12L$

C. $2.40L$

D. $2.9L$

Answer: B

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49. The mass of $NaBrO_3$ required to prepare 150 mL of $0.75N$ of a solution based on the reaction $BrO_3^- + 6H^+ + 6e^- \rightarrow Br^- + 3H_2O$ is

A. $1.42g$

B. $2.83g$

C. $3.85g$

D. $4.25g$

Answer: B

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50. The expression converting mole fraction of a solute into molarity of solution is

A. $M = \frac{x_2 M_2}{(x_1 M_1 + x_2 M_2)}$

B. $M = \frac{(x_1 M_1 + x_2 M_2)}{x_2 M_2}$

C. $M = \frac{1000 p x_2}{(x_1 M_1 + x_2 M_2)}$

D. $M = \frac{1000 p x_1}{(x_1 M_1 + x_2 M_2)}$

Answer: C

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51. 6×10^{24} atoms of an element weigh 200g. If this element form homodiatomic gas, then calculate the molar mass of gas.

A. $40 gmol^{-1}$

B. $30 gmol^{-1}$

C. $50 gmol^{-1}$

D. $60 gmol^{-1}$

Answer: A

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52. The vapour density of a mixture containing NO_2 and N_2O_4 is 38.3 at $27^\circ C$. Calculate the mole of NO_2 in 100mole of mixture

A. 76.6 mole

B. 3.348 mole

C. 334.8 mole

D. 33.48 mole

Answer: D

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53. What is the empirical formula of vanadium oxide, if $2.74g$ of the metal oxide contains $1.53g$ of metal ? (Atomic mass of vanadium=52 u)

A. V_2O_3

B. VO

C. V_2O_5

D. V_2O_3

Answer: C

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54. 1.44 gram of titanium (At. wt. = 48) reacted with excess of O_2 and produce 'x' gram of non-stoichiometric comound $Ti_{1.44}O$. The value of 'x' is :

A. 2

B. 1.77

C. 1.44

D. 2.35

Answer: B

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55. What is the molarity of SO_4^{2-} ions in aqueous solution that contains 34.2 ppm of $Al_2(SO_4)_3$? (Assume complete dissociation and density of solution $1g/mL$)

A. $3 \times 10^{-4}M$

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

C. $10^{-4}M$

D. $2 \times 10^{-5}M$

Answer: A

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