CHEMISTRY

BOOKS - BRILLIANT PUBLICATION

SOME BASIC CONCAPTS OF CHEMISTRY

Questions

1. How many significant figurees are there in the following numbers ?

(a)24

(b) 205

(c) 1.026

(d) 0.0020

(e) 1.00×10^4

(f) π

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

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

$58.0 + 0.0038 + 0.00001$

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

$4.20 + 1.6523 + 0.015$

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

$415.5 + 3.64 + 0.238$

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6. Find the number of significant digits:

$14.90 \times 0.0070 \div 0.091$

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

$14.90 + 0.0060 + 1.0 + 0.091$

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

$10.022 - 0.03$

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9. How many millimeters are there in 26.0 cm ?

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10. Convert $12gcm^{-3}$ to kilograms per litre.

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

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

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13. 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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14. 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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15. 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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16. 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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17. 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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18. What is the ratio of reactants and products when nitrogen combines with oxygen to from N_2O_5?

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19. $291.2ml$ 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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20. 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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21. 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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22. 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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23. What is the equivalent mass of water?

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24. Find the number of mole in

1.455×10^{24} atoms of silver,

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25. Find the number of mole in

$137.0g$ of copper

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26. Find the number of mole in

4.5 g of water

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27. Find the number of mole in

$78 L of N_2$ at STP.

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28. Calculate the percentage of Cu in CuO

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29. Calculate the mass % of oxygen in Fe_3O_4

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30. 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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31. 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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32. Calculate the volume of CO_2 evolved at STP when 10g of $CaCO_3$ is treated with mineral acid.

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

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

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

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

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

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38. $250mL$ 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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39. 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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40. How much water should be added to $3MHCl$ to get $1L$ $0.25M$ HCl?

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

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

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

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44. 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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45. What is the mole fraction of the solute in 1. 0 m aqueous solution ?

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

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

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

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

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51. What is the concentration of $1.7N$ solution of H_2O_2 in terms of 'volume'?

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52. Calculate the pH value of the following solution:

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

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53. Calculate the pH value of the solution

$0.001MNaOH.$

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54. Convert pH value of 3.8 into $\left[H^{+}\right]$ value.

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55. Convert pH value 4 into $\left[H^{+}\right]$

value

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56. Convert pH value of 7 into $\left[H^{+}\right]$ value

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57. Convert pH value of 2.50 into $\left[H^{+}\right]$ value

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58. Convert pH value of 8.26 to $\left[H^{+}\right]$ value

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59. $0.2g$ 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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60. $0.5g$ 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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61. $1.9g$ 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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62. 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 litres of volume 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. 0.635 g 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. $5.\ 02 \times 10^{23}$

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. 6.02×10^{20}

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

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

A. 1.65×1^{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. 0.1 g 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. $0.5gmolCl_2$

C. $0.10molKCl$

D. $5gHCl$

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. 0.1 g atom of Ca

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

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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 $1.20 gm L^{-1}$. 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. $0.\ 38 \times 10^{21}$

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

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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. 0.256

B. 0.795

C. 1.06

D. $Cr^{3+}, Fe^{2+}, Co^{3+}$

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. $1.00M$

B. $1.75M$

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. 3.57×10^5 ppm

B. 3.57×10^6 ppm

C. $1. 10^6$ ppm

D. 4×10^5 ppm

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. 6g 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

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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. $M = \frac{100 \rho x_2}{(x_1 M_1 + x_2 M_2)}$

D. $M = \frac{100 \rho x_1}{(x_1 M_1 + x_2 M_2)}$

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. $40 g mol^{-1}$

B. $30 g mol^{-1}$

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_7

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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Level Ii

1. 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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2. 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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3. 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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4. 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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5. 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. $10.4M$

Answer: B

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6. 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: B

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7. 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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8. 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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9. 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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10. 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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11. 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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12. 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. $60\ \%\ A, 40\ \%\ B$

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

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

Answer: A

Watch Video Solution

13. 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

Watch Video Solution

14. 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

15. 6.0 g sample of $CaCO_3$ reacts with 20 g solution of HCl having 20% by mass of HCl (density=1.10 g/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

16. 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

17. 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

18. 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

19. 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

20. 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

21. 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

22. $5mL$ 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

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

A. 2016 g

B. 1008g

C. 504 g

D. 1800g

Answer: B

Watch Video Solution

24. 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

25. 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

26. 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. $235.04 g$

B. $153.03 g$

C. $135.04 g$

D. $253.04g$

Answer: C

Watch Video Solution

27. 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

28. 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. $5.6 \times 10^5 g$

D. $5.6 \times 10^3 g$

Answer: C

Watch Video Solution

29. 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

30. 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

31. 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

32. 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. 98 g CO

B. 120 g CO

C. 112 g CO

D. 132 g CO

Answer: C

Watch Video Solution

33. 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

34. 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

35. 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

36. 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

37. 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. 96 gm

C. 640 gm

D. 64 gm

Answer: A

Watch Video Solution

38. $100cm^3$ 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

39. 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

40. 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

41. 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

42. A gaseous hydrocarbon X, was burnt in excess of oxygen. A $0.112 dm^3$ sample of X, at STP gave $0.88 g CO_2$. How many C - atoms are there in one molecule of X?

A. 1

B. 2

C. 3

D. 4

Answer: D

Watch Video Solution

43. $10.1g$ 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. $1.38g$

B. 13 g

C. $6.5g$

D. 65 g

Answer: C

Watch Video Solution

44. 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. ≈ 0.4

B. ≈ 0.8

C. ≈ 0.4

D. ≈ 0.2

Answer: C

Watch Video Solution

45. 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

46. 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.

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

A. 3.24×10^{23}

B. 3.6×10^{23}

C. 18×10^{23}

D. 6.02×10^{23}

Answer: B

Watch Video Solution

47. 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 ppm

B. 10 ppm

C. 20 ppm

D. 16 ppm

Answer: B

Watch Video Solution

48. 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: C

Watch Video Solution

49. 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: D

Watch Video Solution

50. 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: B

Watch Video Solution

Level Iii Single Correct Answer Type

1. Zinc sulphate contains 22.65% of zinc and 43.9% of water of crystallization. If the law of constant proportions is true, then the weight of zinc required to produce 20 gof the zinc sulphate crystals will be

A. $45.3g$

B. $4.53g$

C. $0.453g$

D. $453g$

Answer: B

Watch Video Solution

2. 8 litre of H_2 and 6 litre of Cl_2 are allowed to react to maximum possible extent. Find out the final volume of reaction mixture. Suppose P and Tremains constant throughout the course of reaction:

A. 7 L

B. 14 L

C. 2 L

D. 11L

Answer: B

Watch Video Solution

3. 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. NH_2

B. N_2H

C. NH_3

D. N_2H_4

Answer: D

Watch Video Solution

4. 100 mLofa gas at STP was heated with Tin. Tin converted into stannous sulphide evolving hydrogen gas. This hydrogen when passed over hot Cuo, produced 0.081 g of water. If the vapour density of the gas is 17, find its formula.

A. H_2S

B. SO_2

C. SO_3

D. NH_3

Answer: A

Watch Video Solution

5. A mixture of HCOOH and $H_2C_2O_4$ is heated with conc. H_2SO_4. The gas produced is collected and on treating with KOH solution

the volume of the gas decreases by $\frac{1}{6}th$. Calculate molar ratio of two acids in original mixture.

A. $3:1$

B. $4:1$

C. $2:1$

D. $1:2$

Answer: B

Watch Video Solution

6. A solid mixture of 5 g of lead nitrate and sodium nitrate was heated below $600^\circ C$ until mass of residue was constant. If the loss in mass is 28%, find the mass of lead nitrate (a) and sodium nitrate (b) in mixture.

A. $a = 4.21g, b = 0.12g$

B. $a = 5g, b = 2.16g$

C. $a = 3.32g, b = 1.68g$

D. $a = 1.23g, b = 4.20g$

Answer: C

Watch Video Solution

7. 25 mL of a solution of Na_2CO_3 having a specific gravity of $1.25gmL^{-1}$ required 32.9mL of a solution of HCI containing 109.5 g of the acid per litre for complete neutralization. Calculate the volume of $0.84NH_2SO_4$ that will be completely neutralised by 125 g of Na_2CO_3 solution.

A. 470 mL

B. 360 ml

C. 580 mL

D. 250 mL

Answer: A

Watch Video Solution

8. Calculate the number of millilitres of Ammonia, (aq) solution (d=0.986 g/mL) containing 2.5% by weight Ammonia , which will be required to precipitate iron as $Fe(OH)_3$ in a 0.8 g sample that contains $50\ \%\ Fe_2O_3$

A. 0.344 mL

B. 3.44 mL

C. 17.24 mL

D. 10.34 mL

Answer: D

Watch Video Solution

9. 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. 2.8 g of the mineral on heating lost 1.32 g of CO_2. What is the%by weight of the other metal?

A. 87.5

B. 35.71

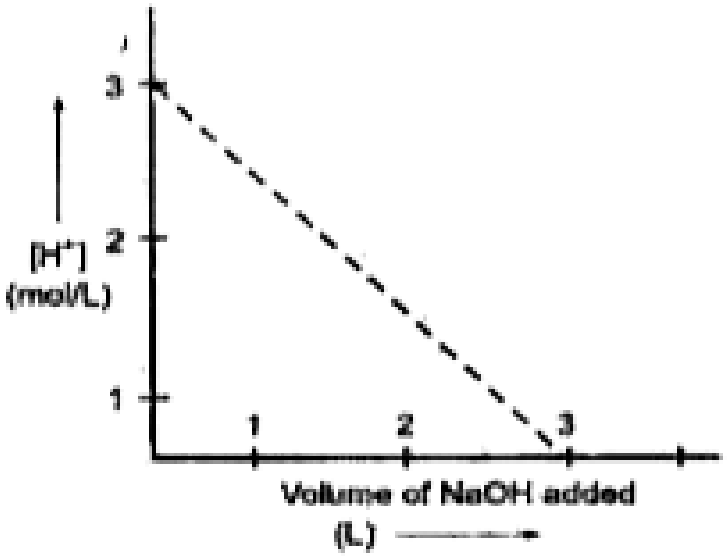
C. 65.11

D. 23.21

Answer: D

Watch Video Solution

10. 1M NaOH solution was slowly added into 1000 mL of 183.75 g impure H_2SO_4 solution and the following plot was obtained. The percentage purity ofH_2SO_4 sample and slope of the curve respectively are:



: $75\ \%\ \frac{1}{3}$, $80\ \%\ -\ \frac{1}{2}, 80\ \%\ -\ 1, 75\ \%\ -\ 1$

A. $75\ \%\ \frac{1}{3}$

B. $80\ \%\ -\ \frac{1}{2}$

C. $80\ \%\ -\ 1$

D. $75\% - 1$

Answer: C

Watch Video Solution

11. 20 mL of 0.2 M NaOH(aq) solution is mixed with 35 mL of 0.1 M NaOH(aq) solution and the resultant solution containing 10% w/w non reacting impurities is diluted to 100 mL. 40mL of this diluted solution reacted with impure sample of anhydrous oxalic acid. The weight of impure sample required is:

A. $0.15g$

B. $0.135g$

C. $0.59g$

D. $0.38g$

Answer: A

Watch Video Solution

12. A 1.0 g sample of a pure organic compound containing chlorine is fused with Na_2O_2 to convert chlorine to NaCl. On dissolving the sample in water and precipitating with $AgNO_3$, it gives $1.96 g of AgCl$. If the molecular weight of organic compound is 147, how many chlorine atoms does each molecule contain?

A. 1

B. 2

C. 3

D. 4

Answer: B

Watch Video Solution

13. A 5.0 g sample containing Na_2CO_3 and Na_2SO_4 is dissolved in 250 mL water. 25 mL of this.solution neutralizes 20 mL of $0.1MH_2SO_4$. Calculate the % of Na_2SO_4 in the sample.

A. 42.4

B. 57.6

C. 36.5

D. 24.8

Answer: B

Watch Video Solution

14. A metal 'M' of atomic mass 54.94 has a density of 7.42 g/cm^3 : Calculate the volume occupied and the radius of the atom of this

metal assuming it to be sphere.

A. $1.44 \times 10^{-23} cm^3, 1.23 \times 10^{-8} cm$

B. $2.21 \times 10^{-23} cm^3, 1.432 \times 10^{-8} cm$

C. $1.23 \times 10^{-23} cm^3, 1.432 \times 10^{-8} cm$

D. $1.32 \times 10^{-23} cm^3, 1.\ 85 \times 10^{-8} cm$

Answer: C

Watch Video Solution

Level Iii Multiple Correct Answer Type

1. Choose the incorrect statement: The number of atoms in 1 g of helium is 1.506×10^{22}, The mass of 1 molecule.of CO is $4.65 \times 10^{-23} g$, The volume at STP occupied by 240g of S_2 is 22.4 litre, The volume at STP occupied by 240g of SO_2 is 84 litre

A. The number of atoms in 1 g of helium is 1.506×10^{22}

B. The mass of 1 molecule.of CO is $4.65 \times 10^{-23} g$

C. The volume at STP occupied by:240g of S_2 is 22.4 litre

D. The volume at STP occupied by 240g of SO_2 is 84 litre

Answer: B

Watch Video Solution

2. In which of the following pairs do 1 g of each have an equal number of molecules? N_2O and CO, N_2 and C_3O_2, N_2 and CO, N_2O and CO_2

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

3. 8 g of oxygen has the same number of molecules as in: $11gCO_2$, $22gCO_2, 7gCO, 14gCO$

A. $11gCO_2$

B. $22gCO_2$

C. $7gCO$

D. $14gCO$

Answer: A::C

Watch Video Solution

4. Which of the following statements are correct?

A. The equivalent mass of $KMnO_4$ in strongly alkaline medium is equal to its molar mass.

B. The equivalent mass of $S_4O_3^{2-}$ in its reaction with I_2, is molar mass divided by two.

C. A solution of cerium (IV) in sulphuric acid acts as an oxidizing reagent.

D. The equivalent mass of $K_2Cr_2O_7$ in acidic medium'is molar divided by five.

Answer: A::C

Watch Video Solution

5. Which of the following statements are correct?

$IO_3^- + 2I_z + 10Cl^- + 6h^+ \rightarrow 5ICl_2^- + 3H_2O$

In this reaction, the equivalent mass of IO_3^- is molar mass divided by four.

A. Potassium bromate, $KBrO_3$, acts as a strong oxidizing agent. It accepts 6 electrons to give KBr.

B. Potassium bromate can quantitatively convert Br^- to Br_2.

C. Potassium iodate solution can be kept for a long time without decomposition.

D. n 3N HCI solution, iodate can oxidize I_2 according to the reaction

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

View Text Solution

6. Which of the following statements are correct

A. The oxidation number of iodine in orthoperiodic acid $(H_5IO_6)$is + 7

B. Hydrazine (N_2H_4) is a reducing agent. In its reaction with I_2 nitrogen is evolved. The equivalent mass of hydrazine in this reaction is molar mass divided by two.

C. In the reaction $IO_3^- + 5I^- + 6H^+ \rightarrow 3I_2 + 3H_2O$ the equivalent mass of IO_3^- is molar mass divided by five.

D. The iodine produced in the reaction $iO_3^- + 5I^- + 6H^+ \rightarrow 3I_2 + 3H_2O$ is titrated against $S_2O_3^{2-}$ ions. Knowing the normality of $S_2O_3^{2-}$, normality of iodine and hence normality of IO_2^- is determined. To get the

strength of IO_3^- in gL^{-1}, the equivalent mass employed for IO_3^- in gL^{-1} would be molar mass divided by four.

Answer: A::C

Watch Video Solution

7. Which of the following statements are correct?

A. One mole of potash alum contains a total 32 mol of the independent species.

B. One of mole of $K_3[Fe(CN)_6]$ contains a total 32 mol of the independent species.

C. 0.1 M sulphuric acid has a normality ofo.2 N.

D. The oxidation number of alkali metal is always taken equal to +1.

Answer: A::C::D

Watch Video Solution

8. 1.8 g of Mg is burnt in a closed vessel which contains 0.8 gofoxygen. Which of the following facts are correct for the resultant system?

A. Amount of MgO formed is 0.05 mol

B. Mass of Mg left in excess is 0.8 g

C. Amount of oxygen left is zero

D.

Answer: A::C::D

Watch Video Solution

Level Iii Numerical Type

1. The measured density at NTP of He is 0.1784 g/L. What is the mass of one mole of He?

Watch Video Solution

2. One litre of sample of hard water contains 1 mg of $CaCl_2$ and 1 mg of $MgCl_2$. Find the total hardness of water in terms of $CaCO_3$ present per 10^6 parts of water by mass.

A. 2.5ppm

B. 1.95ppm

C. 2.15ppm

D. 195ppm

Answer: 2

Watch Video Solution

3. The formula of a hydrated salt of barium is $BaCl_2, xH_2O$If 1.936 g of this compound gives 1.846 g of anhydrous $BaSO_4$ on treatment with $H_2SO_4,$ the value of 'x' is:

Watch Video Solution

4. A macromolecule of iron has molar mass 2800 amu, it contains 8% iron by mass. The number of iron atom in one formula unit of the macromolecule is:

Watch Video Solution

5. The formula mass of an acid is $82.0.$ $100cm^3$ of a solution of this acid containing 39.0 g of the acid per litre were completely

neutralized by $95.0cm^3$ of aqueous NaOH containing 40.0 gof NaOH per litre. What is the basicity of the acid?

Watch Video Solution

6. How many grams of dibasic acid (molar mass 200) should be present in 100 mL of the aqueous solution to give 0.1 N solution:

A. 1g

B. 2g

C. 10g

D. 20g

Answer: 1

Watch Video Solution

7. How many mL of a solution of concentration $100 mg Co^{2+}$ per mL is needed to prepare 10 mL of a solution of concentration 20 mg Co^{2+} per mL.

Watch Video Solution

8. HCl gas is passed into water, yielding a soultion of density $1.095 gml^{-1}$ and containing 30% HCI by weight. Calculate the molarity of the solution.

Watch Video Solution

9. A solution contains 75 mg NaCl per mL. To what extent must it be diluted to give a solution of concentration 15 mg NaCl per mL of solution.

Watch Video Solution

Level Iii Matching Column Type

1. A compound H_2X with molecular weight 80 is dissolved in a solvent having densit 0.4 g/mL. Assuming no change in volume upon dissolution, the molality of a 3.2 molar solution is

Watch Video Solution

2. Match the Column-I and Column-II:

Column-I	Column-II
A) 1.6 g CH_4	p) 0.1 mol
B) 1.7 g NH_3	q) 6.02×10^{23} electrons
C) HCHO	r) 40% carbon
D) $C_6H_{12}O_6$	s) Vapour density = 15

Watch Video Solution

3. Match the Column-I with Column-II for the reaction : $A + B_2 \rightarrow AB_2$.

Column-I	Column-II
A) 300 atoms of A+200 molecules of B_2	p) B_2 is limiting reagent
B) 100 atoms of A+100 molecules of B_2	q) A is limiting reagent
C) 5 mol of A + 2.5 mol of B_2	r) None of the reactant is in excess
D) 2.5 mol of A+5 mol of B_2	s) 200 molecules of AB_2 will be formed

Watch Video Solution

4. Column I lists some of the concentration on therms and Coumn II includes of their characteristics. Match each entry of Column I with those listed in Column II.

Column-I	Column-II
A) Molarity	p) eq dm^{-3}
B) Molality	q) mol dm^{-3}
C) Mole fraction	r) unit less
D) Normality	s) mol kg^{-1}
	t) Temperature dependent
	u) Temperature independent

Watch Video Solution

5. Column I lists some of the concentration on therms and Coumn II includes of their characteristics. Match each entry of Column I with those given in Column II.

Column-I	Column-II
A) Molar mass/(5 eq mol^{-1})	p) $KMnO_4$ in Fe^{2+} versus MnO_4^- titration in alkaline medium
B) Molar mass/(2 eq mol^{-1})	q) $KMnO_4$ in oxalic acid versus MnO_4^- titration in acidic medium
C) Molar mass/(6 eq mol^{-1})	r) $Na_2S_2O_3$ in I_2 versus $S_2O_3^{2-}$ titration
D) Molar mass/(1 eq mol^{-1})	s) $K_2Cr_2O_7$ in Fe^{2+} versus $Cr_2O_7^{2-}$ titration in alkaline
	t) Oxalic acid in oxalic acid versus MnO_4^- titration in acidic medium.

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6. Column I lists some of the concentration on therms and Coumn II includes of their characteristics. Match each entry of Column I

with those given in Column II.

Column-I	Column-II
A) 2 mol octane required O_2 for completely combustion	p) 1100 g
B) 300 g carbon combines with 800 g of oxygen to produce CO_2	q) 11.2 L at 0°C and 1 atom
C) 1 g-atom of Nitrogen	r) 25 mol
D) 124 g of NO_3^- ion	s) 48.16×10^{23} atoms
	t) 800 g

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7. Column I lists some of the concentration on therms and Coumn II includes of their characteristics. Match each entry of Column I with those given in Column II.

Column-I	Column-II
A) N_2 (3.5 g) + H_2 (1.0g) → NH_3	p) First reactant is the limiting reagent
B) H_2 (1.0 g) + O_2 (4.0 g) → H_2O	q) Second reactant is the limiting reagent
C) S (4.0 g) + O_2 (6.0 g) → SO_3	r) Stoichiometric amounts of reactants
D) Fe (11.2 g) + O_2 (3.2 g) → Fe_2O_3	s) Mass of reactants > mass of product formed

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Level Iii Statement Type

1. Statement 1 : Volume of a gas is directly proportional to the number of moles of gas.

Statement 2 : The ratio by volume of gaseous reactants and products is in agreement with their mole ratio.

A. Statement 1 is True, statement 2 is True, Statement 2 is 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

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2. Statement 1 : One mole of SO_2 contains the same number of molecules present in one mole of O_2.

Statement 2 : Molecular weight of SO_2 is double to that of O_2

A. Statement 1 is True, statement 2 is True, Statement 2 is 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: B

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3. Statement 1 : Average atomic mass of chlorine is 35.5 amu.

Statement 2 : Chlorine has two isotopes Cl-35 and Cl-37 and their relative abundance is 3:1.

A. Statement 1 is True, statement 2 is True, Statement 2 is 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

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4. Statement 1 : Vapour density of sulphur vapour relative to oxygen is 2 because sulphur atom is twice as heavy as that of oxygen atom Statement

2 : Vapour density depends upon the molecular state of the substance in vapour state.

A. Statement 1 is True, statement 2 is True, Statement 2 is 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

5. Statement 1 : The number of atoms in 1 gof O_2 1 g of O_3 and 1 gof atomic oxygen is same.

Statement 2 : Each value represents 1/16 g-atom of oxygen.

A. Statement 1 is True, statement 2 is True, Statement 2 is 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

6. 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. Statement 1 is True, statement 2 is True, Statement 2 is 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: C

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Level Iii Linked Comprehension Type

1. Isotopes are the atoms of same element: they have same atomic number but different mass numbers. Isotope have different number of neutrons in their nucleus. If an element exists in two isotopes having atomic mas 'a' and 'b' in the ratio m:n, then average atomic mass will be $\frac{m \times a + n \times b}{m + n}$

Different isotopes of same element have same position in the periodic table. The elements which have single isotope are called monoisotopic elements. Greater is the percentage composition of an isotope, more will be its abundance in nature.

Atomic mass of boron is 10.81. It has two isotopes namely ${}_{5}^{11}B$ and ${}_{5}^{x}B$ with their relative abundance of 80 and 20% respectively. The value of x is

A. 10.05

B. 10

C. 10.01

D. 10.02

Answer: B

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2. Isotopes are the atoms of same element: they have same atomic number but different mass numbers. Isoto have different number of neutrons in their nucleus. If an element exists in two isotopes having atomic mas 'a' and 'b' in the ratio m:n, then average atomic mass will be $\frac{m \times a + n \times b}{m + n}$

Different isotopes of same element have same position in the periodic table. The elements which have sin isotope are called monoisotropic elements. Greater is the percentage composition of an isotope, more wiki be its abundance in nature.

An element, X has the following isotopic.composition.

$^{2}X: 90\,\%$, $^{109}X, 8\,\%\,(202)X, 2\,\%$. The weight average atomic mass of the naturally occurring element 'X' is closest to:

A. 20.1 amu

B. 20.2 amu

C. 14.6 amu

D. 20 amu

Answer: D

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3. Given that the abundance of isotopes ^{54}Fe, ^{56}Fe and $(57)Fe$ are 5%, 90% and 5% respectively, the atomic mass of Fe is:

A. $55.85u$

B. $55.95u$

C. $55.75u$

D. $56.05u$

Answer: B

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4. What is the molarity of "11.2 V" of H_2O_2 ?

A. 1 M

B. 2 M

C. $5.6M$

D. $11.2M$

Answer: A

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5. What is the percentage strength (%w/V) of "11.2 V " H_2O_2 ?

A. 1.7

B. 3.4

C. 34

D. 17

Answer: B

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6. 40 g Ba $(MnO_4)_2$ (mol. wt, = 375) sample containing some inert impurities in acidic medium is completely reacted with 125 mL of "33.6 V" of H_2O_2. What is the percentage purit of the sample ?

A. $28.12\ \%$

B. $70.31\ \%$

C. $85\ \%$

D. $65\ \%$

Answer: B

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