CHEMISTRY

BOOKS - MHTCET PREVIOUS YEAR PAPERS AND PRACTICE PAPERS

SOME BASIC CONCEPTS OF CHEMISTRY

Example

1. The number of atoms present in one mole of an element is equal to Avogadro number. Which of the following elements contains the greatest number of atoms ?

A. 4 g He

B. 46 g Na

C. 0.4 g Ca

D. 12 g He

Answer: D

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2. A compound contains $4.07 \% H, . 24.27 \% C,$ and $71.65 \% Cl.$ If its molar mass is 98.96, the molecular formula will be

A. CHCl

B. CH_3Cl

C. $C_2H_4Cl_2$

D. C_2HCl

Answer: C

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3. Calculate the moles of CO_2 obtained when

0.274 mole Of C_2H_5OH is burnt in air.

A. 0.548

B. 0.0548

C. 0.558

D. 0.058

Answer: A

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4. Calculate the amount of water (g) produced by the combustion of 16 g of methane.

A. 37

B. 36

C. 44

D. 64

Answer: B

5. Oxygen is prepared by catalytic decomposition of potassium chlorine $(KClO_3)$. Decomposition of potassium, chloride gives potassium chloride (KCl) and oxygen (O_2). How many moles and how many grams of $KClO_3$ are required to produce 2.4 mole O_2?

A. 196.0

B. 190.6

C. 169.0

D. 196.2

Answer: A

6. Calculate the amount of $KClO_3$ needed to supply sufficient oxygen for burning 112 L of CO gas at N.T.P.

A. 203.17

B. 203.167

C. 204.167

D. 201.67

Answer: C

7. What volume of oxygen at N.T.P is needed to cause the complete combustion of 200 mL of acetylene ? Also calculate the volume of carbon dioxide formed.

    A. 300, 400

    B. 500, 400

    C. 400, 300

    D. 400, 500

Answer: B

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Exercise 1

1. A balanced chemical equation is in accordance with

    A. multiple proportions

    B. constant proportions

    C. reciprocal proportions

    D. conservation of mass

Answer: D

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2. The law of multiple proportion is lillustrated by the pair of compounds

A. sodium chlordie and sodium bromide

B. water and heavy water

C. sulphur dioxide and sulphur trioxide

D. magnesium hydroxide and magnesium oxide

Answer: C

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3. One part of an element A combines with two parts of

another element B,6 parts of element C combines with 4

parts of B. if A and C combine together the ratio of their

weights, will be governed by

A. law of definite proportions

B. law of multiple proportions

C. law of reciprocal proportions

D. law of conservations of mass

Answer: C

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4. Potassium combines with two isotopes of chlorine

$\left(^{35}Cl \ and \ ^{37}Cl\right)$ respectively to form two samples of

KCl. Their formation follows the law of

A. constant proportions

B. multiple proportions

C. reciprocal proportions

D. None ot these

Answer: D

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5. In the reaction, $N_2 + 3 \ H_2 \rightarrow 2NH_3,$ the ratio of

volumes of nitrogen, hydrogen and ammonia is

1 : 3 : 2 These ratio illustrate the law of

A. constant proportions

B. Gay-Lussac

C. multiple proportions

D. reciprocal proportions

Answer: B

6. If m_1 and m_2 are masses of two reactants in any reaction, having their gram equivalent masses E_1 and E_2 respectively, which of the following equatios represents the law of equivence correctly?

A. $\dfrac{m_1}{m_2} = \dfrac{E_2}{E_1}$

B. $E_1 E_2 = m_1 m_2$

C. $m_1 E_2 = E_1 m_2$

D. $(m_1 + m_2) = (E_1 + E_2)$

Answer: C

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7. Which one of the following will have the largest

number of atoms?

(i) 1 g Au (s)

(ii) 1 g Na (s)

(iii) 1 g Li (s)

(iv) 1 g of Cl2(g)

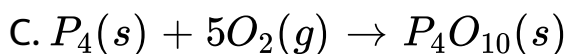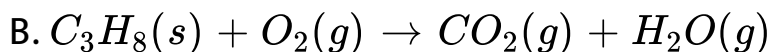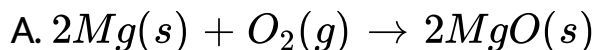A. 1 g Au (s)
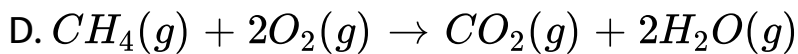
B. 1 g Na (s)

C. 1 g Li (s)

D. 1 g of $Cl_2(g)$

Answer: C

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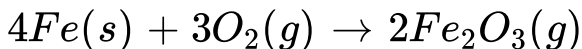**8.** Which of the following reactions is not correct according to the law of conservation of mass ?

A. $2Mg(s) + O_2(g) \rightarrow 2MgO(s)$

B. $C_3H_8(s) + O_2(g) \rightarrow CO_2(g) + H_2O(g)$

C. $P_4(s) + 5O_2(g) \rightarrow P_4O_{10}(s)$

D. $CH_4(g) + 2O_2(g) \rightarrow CO_2(g) + 2H_2O(g)$

Answer: B

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9. Which of the following statements is correct about the reaction given below:

$4Fe(s) + 3O_2(g) \rightarrow 2Fe_2O_3(g)$

   A. Total mass of iron and oxygen in reactants = total mass of iron and oxygen in product therefore it follows law of conservation of mass

B. Total mass of reactants = total mass of product,

therefore, law of multiple proportions is followed

C. Amount of Fe_2O_3 can be increased by taking any

one

of the reactants (iron or oxygen) in excess

D. Amount of Fe_2O_3 produced will decrease if the

amount of any one of the reactants (iron or

oxygen)

is taken in excess

Answer: A

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10. Which of the following statements indicates that law of multiple proportion is being followed?

A. Sample of carbon dioxide taken form any source will always have carbon and oxygen in the ratio 1 : 2

B. Carbon forms two oxides namely CO_2 and CO, where masses of osygen which combine with fixed mass of carbon are in the simple ratio 2 : 1

C. When magnesium burns in oxygen, the amount of magnesium taken for the reaction is wqual to the

D. At constant temperatur in magnesium oxide formed

hydrogen will combine with 100 mL oxygen to

produce 200 mL of water vapour

Answer: B

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11. An element forms an oxide, in which the oxygen is

20% of the oxide by weight, the equivalent weight of

the given element will be

A. 32

B. 40

C. 64

D. 72

Answer: A

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12. In the standardization of $Na_2S_2O_3$ using $K_2Cr_2O_7$ by iodometry, th equivalent weight of K_2Cr_2O is

A. $\dfrac{\text{molecular weight}}{2}$

B. $\dfrac{\text{molecular weight}}{6}$

C. $\dfrac{\text{molecular weight}}{3}$

D. same as molecular weight

Answer: B

13. $74.5g$ of a metallic chloride contain $35.5g$ of chlorine.

The equivalent weight of the metal is

A. 19.5

B. 35.5

C. 39.0

D. 78.0`

Answer: C

14. Number of atoms of He in 100 amu of He is :

(Atomic mass of He is 4) :-

A. 25

B. 100

C. 50

D. $100 \times 6 \times 10^{-23}$

Answer: A

15. What is the molecular mass of a compound X, if its

3.0115×10^9 molucules weigh $1.0 \times 10^{-12} g$?

A. 150 g

B. 200 g

C. 630 g

D. 500 g

Answer: B

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16. Equivalent mass of a metal is 12 g mol^{-1}. Hence, equivalent mass of its oxide is

A. 24 g mol^{-1}

B. 28 g mol^{-1}

C. 20 g mol^{-1}

D. 34 g mol^{-1}

Answer: C

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17. A divalent metal has 12 equivalent weight.

The molecular weight of its oxide is

A. 16

B. 32

C. 40

D. 52

Answer: C

18. The oxide of an element contains 67.67% of oxygen.

Equivalent weight of the element is

    A. 2.46

    B. 3.82

    C. 4.36

    D. 4.96

Answer: B

19. If equivalent mass of suiphur in SCl_2 is $16u$, then equivalent mass of S in S_2Cl_2 will be

    A. 8 g equivalent $^{-1}$

    B. 16 g equivalent $^{-1}$

    C. 32 g equivalent $^{-1}$

    D. 64 g equivalent $^{-1}$

Answer: C

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20. The same amount of a metal combines with 0.20 g of oxygen and with 3.17 g of a halogen. Hence equivalent mass of halogen is

    A. 127 g

    B. 80 g

    C. 36.5 g

    D. 9 g

Answer: A

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21. In the combustion of 5.00 g of a metal, 9.44 g of metal oxide are formed. Hence, equivalent mass of the metal is
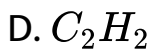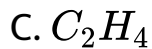
    A. 4.44 g

    B. 9.00 g

    C. 5.00 g

    D. 2.22 g

Answer: B

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22. A hydrocarbon has 75 % C. Thus, hydrocarbon is

A. CH_4

B. $C_2H - (6)$

C. C_2H_4

D. C_2H_2

Answer: A

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23. The percentage composition SiO_2 silica in the sample of clay $(Al_2O_3 \cdot K_2O \cdot 6SiO_2)$ is

A. $16.90\,\%$

B. $18.35\,\%$

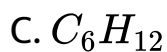C. 64.75%

D. 25.52%

Answer: C

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24. A hydrocarbon contains $10.5g$ of carbon per gram of hydrogen. $1L$ of vapour of the hydrocarbon at $127°C$ and 1 atm pressure weighs $2.8g$. Find the molecular formula of the hydrocarbon.
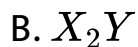
A. C_6H_{14}

B. C_5H_{10}

C. C_6H_{12}

D. C_7H_8

Answer: D

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

A. XY

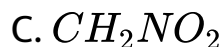B. X_2Y
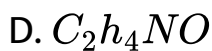
C. XY_2

D. X_(2)Y_(3)

Answer: B

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26. An organic compound containing oxygen, carbon,

Hydrogen and nitrogen contains 20% C, 6.7% H and

46.67% N. Its molecular weight was found to be 60.

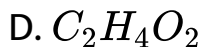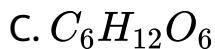The molecular formula of the compound is

A. CH_4N_2O

B. CH_5NO

C. CH_2NO_2

D. C_2h_4NO

Answer: A

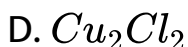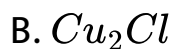▶ **Watch Video Solution**

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27. The empirical formula and molecular mass of a compound are CH_2O and 180 g respectively. What will be the molecular formula of the compound ?

A. $C_9H_{18}O_9$

B. CH_2O

C. $C_6H_{12}O_6$

D. $C_2H_4O_2$

Answer: C

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28. The equivalent mass of chlorine is 35.5, and the molar mass of copper is 63.5. The equivalent mass of copper chloride is 99.0. Hence, formula of copper chloride is

A. $CuCl$

B. Cu_2Cl

C. $CuCl_2$

D. Cu_2Cl_2

Answer: A

29. At a given temperature, 1 mole O_2 occupy $20dm^3$ of volume. Thes volume occupied by 1 equivalent of O_2 is

    A. $20 \quad dm^3$

    B. $10 \quad dm^3$

    C. $2.5 \quad dm^3$

    D. $5.0 \quad dm^3$

Answer: D

30. Number of atoms in 12 g $._{12}^{24} Mg$ is equal to

    A. oxygen atoms in 11 g CO_2

    B. hydrogen atoms in 4 g CH_4

    C. nitrogen atoms in 46 g N_2O_4

    D. sulphur atoms in 79 g $Na_2S_2O_3$

Answer: A

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31. To make 0.01 mole, which of the following has

maximum mass?

A. Sodium bicarbonate

B. Sodium carbonate

C. Sudium sulphate

D. Sodium oxalate

Answer: C

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32. The mass of 11.2 L of ammonia gas at STP is

A. 8.5 g

B. 85 g

C. 17 g

D. 4.25 g

Answer: A

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33. The number of gram-molecules of oxygen in 6.022×10^{24} molecules of CO is :

A. 1

B. 0.5

C. 5

D. 10

Answer: D

34. Mass of the solution of 1 molal glucose solution to get 0.2 mole of glucose is

A. 200 g

B. 300 g

C. 236 g

D. 108 g

Answer: C

35. The number of Cl^- ions present in 222 g anhydrous $CaCl_2$ is

36. By heating $10gCaCO_3, 5.6gCaO$ is formed. What is the weight of CO_2 obtained in this reaction

A. 2.4 g

B. 5.6 g

C. 4.4 g

D. 3.6 g

Answer: C

37. The weight of oxygen that will react with 1 g of

calcium is

A. 0.2 g

B. 0.6 g

C. 0.4 g C

D. 0.8 g

Answer: C

38. The volume occupied by 1 mole of H atoms at NTP is

    A. 22.4 L

    B. 11.2 L

    C. 40.2 L

    D. None ot these

Answer: D

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39. A mixture of $NaCl$ and Na_2CO_3 is given. On heating $12g$ of the mixture with dilute HCl, $2.24g$ of CO_2 is

removed. Calculate the amounts of each in the mixture.

A. 6.6 g
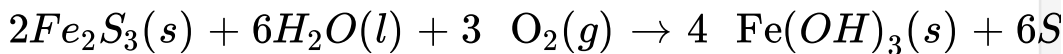
B. 5.8 g

C. 6.8 g

D. 7.2 g

Answer: A

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40. Consider the following reactions.

$$2Fe_2S_3(s) + 6H_2O(l) + 3 \ O_2(g) \rightarrow 4 \ Fe(OH)_3(s) + 6S$$

The number of moles of Fe_2S_3 are 2, H_2O is 2 and 3

moles of O_2 to react. Then find no. of moles of $Fe(OH)_3$

are

A. 2.62

B. 3.62

C. 1.33

D. 2.43

Answer: C

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Exercise 2

1. An organic compound containing C and H has 92.3 % of carbon, its empirical formula is

    A. CH

    B. CH_2

    C. C_2H_2

    D. CH_3

Answer: A

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2. The number of Na atom in 46 g Na (Atomic weight of Na = 23) is

A. 6.023×10^{23}

B. 2

C. 1

D. 12.046×10^{23}

Answer: D

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3. If the density of methanol is 0.8 kg L^{-1}, what is its volume needed for making 4 L of its 0.25 M solution?

A. 4 mL

B. 8 mL

C. 40 mL

D. 80 mL

Answer: C

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4. 3.011×10^{22} atoms of an element weighs $1.15gm$. The
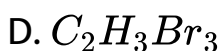
atomic mass of the element is :

A. 23

B. 10

C. 16

D. 35.5

Answer: A

5. A carbon compound contains 12.8% of carbon, 2.1% of hydrogen and 85.1% of bromince. The molecular weight of the compound is 187.9. Calculatte the molecular formula of the compound.

(Atomic weight of $H + 1.008$, $C = 12.0$ and Br = `79. 9$))

A. CH_3Br

B. CH_2Br_2l

C. $C_2H_4Br_2$

D. $C_2H_3Br_3$
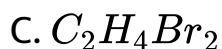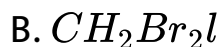
Answer: C

6. 1.0 g of magnesium is burnt with 0.56 g O_2 in a closed vessel. Which reactant is left in excess and how much?

A. Mg, 0.16 g

B. O_2, 0.16 g

C. Mg, 0.44 g

D. O_2, 0.28 g

Answer: A

7. When $22.4L$ of $H_2(g)$ is mixed with 11.2 of $Cl_2(g)$, each

at STP, the moles of HCl(g) formed is equal to

    A. 1 mole of HCL(g)

    B. 2 moles of HCl (g)

    C. 0.5 mole of HCl (g)

    D. 1.5 moles of HCl (g)

Answer: A

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8. $10g$ of a mixture of BaO and CaO requires $100cm^3$ of $2.5mHCl$ of react competely. The percentage of calcium oxide in the mixture is approximately (given, molar mass of $BaO = 153$)

    A. 52.6

    B. 55.1

    C. 44.9

    D. 47.4

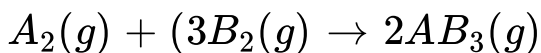**Answer: A**

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9. In a closed vessel, 5 moles of $A_2(g)$ and 7 moles of B_2 (g) are reacted in the following maner,

$$A_2(g) + (3B_2(g) \rightarrow 2AB_3(g)$$

What is the total number of moles of gases present in the container at the end of the reaction?

A. $22/3$

B. $7/3$

C. $14/3$

D. $8/3$

Answer: B

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10. What is the mass of one molecule of yellow phosphorus? (Atomic mass, P = 30)

    A. 1.993×10^{-22} mg

    B. 1.993×10^{-19} mg

    C. 4.983×10^{-20} mg

    D. 4.983×10^{-23} mg

Answer: D

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11. The number of sodium atoms in 2 moles of sodium ferrocyanide is

A. 12×10^{23}

B. 26×10^{23}

C. 34×10^{23}

D. 48×10^{23}

Answer: C

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12. The system thet contains the maximum number of

atoms is

A. 4.25 g of NH_3

B. 8 g of O_2

C. 2 g of H_2

D. 4 g of He

Answer: A

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13. 10^{21} molecules are removed from 200 mg of CO_2.

The moles of CO_2 left are:

A. 2.88×10^{-3}

B. 28.8×10^{-3}

C. 288×10^{-3}

D. 28.8×10^3

Answer: A

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14. 1 mol of CH_4 contains

   A. 4 g atoms of hydrogen

   B. 3.0 g atoms of carbon

   C. 6.02×10^{23} atoms of hydrogfen

   D. 1.81×10^{23} molecules of CH_4

Answer: A

15. The oxygen obtained form 72 kg of water is

    A. 72 kg

    B. 46 kg

    C. 50 kg

    D. 64 kg

Answer: D

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16. The weight of 112 m L of oxgen at NTP is

    A. 0.64 g

B. 0.96 g

C. 0. 32 g

D. 0. 16 g

Answer: D

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17. Forr 14 g of CO, the wrong statement is

A. it occupies 2.24 L at NTP

B. It correspends to $1/2$ mole of CO

C. It corresponds ot same mole of CO and nitrogen

gas

D. it corresponds to 3.01×10^{23} molecules of CO

Answer: A

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18. The vapour denstiy of a gas is 11.2 The volume

occupied by one gram of the gas at STP is

A. 1.0 L

B. 11.2 L

C. 22.4 L

D. None ot these

Answer: A

19. What is the atomic weight of an element X for which

a sample containing 1.58×10^{22} atoms weigh 1.05 g?

    A. 28 g

    B. 20 g

    C. 40 g

    D. 23 g

Answer: C

20. The percentage of nitrogen in urea is about:

A. 28

B. 18

C. 85

D. 46

Answer: D

21. Number of molecules in 1 L of water is close to

A. $\dfrac{18}{22.4} \times 10^{23}$

B. $55.5 \times 6.023 \times 10^{23}$

C. $\dfrac{6.023}{23.4} \times 10^{23}$

D. $18 \times 6.023 \times 10^{23}$

Answer: B

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22. The mass of $112cm^3$ of CH_4 gas at STP is

A. 0.16 g

B. 0.8 g

C. 0.08 g

D. 1.6 g

Answer: C

23. Cyclohexanol is dehydrated to cyclohexene on

heating with conc. H_2SO_4. If the yield of this reaction

is 75 % how cyclohexene will be obtained from

100 g of cyclohexanol ?
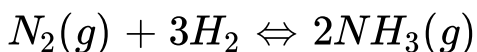
    A. 61.5 g

    B. 75.0 g

    C. 20.0 g

    D. 41.0 g

Answer: A

24. In the synthesis of ammonia

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

If the quantity of N_2 reacted is $700mL$, the quantity of

H_2 and NH_3 would be

A. 300 mL H_2 and 200 mL NH_3

B. 300 mL H_2 and 300 mL NH_3

C. 300 mL H_2 and 100 mL NH_3

D. 100 mL H_2 and 200 mL NH_3

Answer: A

25. A metal oxide has the formula A_2O_3. It can be reduced by hydrogen to give free metal and water. 0.1596 g of this metal oxide requires 6 mg of hydrogen for complete reduction. What is the atomic wight of metal?

A. 52.3

B. 57.3

C. 55.8

D. 59.3

Answer: C

26. How many moles of magnesium phosphate, $Mg_3(PO_4-(2)$ will contain 0.25 mole of oxygen atoms?

A. 0.02

B. 3.125×10^{-2}

C. 1.25×10^{-2}

D. 2.5×10^{-2}

Answer: B

27. 20.0 kg of $N_2(g)$ and 3.0 kg of $H_2(g)$ are mixed to produce $NH_3(g)$. The amount of $NH_3(g)$ formed is

A. 17 kg

B. 34 kg

C. 20 kg

D. 3 kg

Answer: A

28. The total number of electrons present in $18mL$ of water is ......

    A. 6.023×10^{25}

    B. 6.023×10^{24}

    C. $6.023 \times 18 \times 10^{23}$

    D. 6.023×10^{23}

Answer: B

29. Stoichiometric ratio of sodium dihydrogen orthophosphate and sodium hydrogen orthophosphate

required for synthesis of $Na_5P_3O_{10}$ is

A. $1.5:3$

B. $3:1.5$

C. $1:1$

D. $2:3$

Answer: A

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30. Which of the following sets of compounds correctly

ltbr. Illustrate the law of reciprocal proportions?

A. P_2O_3, PH_3, H_2O

B. P_2O_5, PH_3, H_2O

C. N_2O_5, NH_3, H_2O

D. N_2O, NH_3, H_2O

Answer: A

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