QB365

Important Questions - Some Basic Concept of Chemistry

11th Standard CBSE

Chemistry Reg.No. : | | | | | | |

Time : 01:00:00 Hrs

Total Marks : 50

Section-A

1) Calculate the mass of a sample of iron metal that contains 0.250 moles of iron atoms. **1**

2) Describe the difference between the mass of mole of oxygen atom (0) and the mass of a mole of oxygen molecule $(0)_2$ **1**

3) What do you understand by stoichiometric coefficients in a chemical equation? **1**

4) A black dot used as a full stop at the end of a sentence has a mass of about one attogram.Assuming that the dot is made up of carbon , Calculate the approximate number of carbon atoms present in a dot? **1**

5) What is the mass in gram of one molecule of caffeine ($C_8H_{10}N_4O_2$)? **1**

6) Round up the following upto three significant figures **1**
38.216

7) Round up the following upto three significant figures **1**
10.4107

8) Convert the following into kg. **1**
0.91 x 10^{-27} g(mass of electron)

9) Calculate the number of gram of oxygen in 0.10 mole of $Na_2CO_3.10H_20.$ **1**

10) Calculate the percentage composition of the various elements in $MgSO_4$ **1**

Section-B

11) What will be the molality of the solution contaning 18.25g of HCI gas in 500 g of water? **2**

12) The reactant which is entirely consumed in reaction is known as limiting reagent. In the reaction 2A+4B->3C+4D, when 5 moles of A react with 6 moles of B, then **2**
Which is the limiting reagent?

13) How are 0.50 mole $Na_2CO_3$and 0.50 MNa_2CO_3 different? **2**

14) How many gram of Na_2CO_3 should be dissolved to make 100$cm^3$of 0.15 M Na_2CO_3 solution? **2**

15) How amny significant figures are present in the following? **2**
(iii) 5005

16) Describe what you need to do in the laboratory to test (i) the law of conversion of mass, (ii) the law of definite proportion and (iii) the law of multiple proportions **2**

17) Two oxides of a metal contain 27.6% and 30.0% of oxygen respectively. If the formula of the first oxide is M_3O, Find that of the second. **2**

18) Dinitrogen and dihydrogen react with ecah other to produce ammonia according to the following chemical equation, **2**

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

Calculate the mass of ammonia produced if $2.00 \times 10^3 g$ dinitrogen reacts with $1.00 \times 10^3 g$ of dihydrogen.

19) Commercially available concentrated hydrochloric acid contains 38% HCI by mass. **2**

(ii) What volume of the above concentrated HCI is required to make 1.0L of 0.10 M HCI?

20) Chlorine is prepared in the laboratory by treating manganese dioxide (MnO_2) with aqueous hydrochloric acid according to the reaction, **2**

4 HCI (aq) + MnO_2(s) $\longrightarrow$ $2H_2O$(l) + $MnCl_2$(aq) + Cl_2(g)

How many gram of HCI reacts with 5.0 g of manganese dioxide?

Section-C

21) Express the following in the scientific notation **5**

0.000968

22) (ii) Perform the following calculation to proper number of significant figures. **5**

(b) $(1.6 \times 10^2)^2$

23) A Welding fuel gas contains carbon and hydrogen only. Buring a small sample of it in oxygen gives 3.38g carbon dioxide, 0.690 g of water and no other products. A volume 10.0 L (measured at STP) of this welding gas is found to weigh 11.6 g. Calculate **5**

(ii) Molar mass of the gas and

24) Arrange the following in order of their increasing masses in gram **5**

(i) One atom of silver,

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Section-A

1) 14 g **1**

2) A=14g **1**

3) **1**

The coefficients of reactants and products involved in a chemical equation represented by the balanced form are known as stoichiometric coefficients$N_2(g) + 3H_2 \longrightarrow 2NH_3(g)$ The stoichiometric coefficients are 1,2 and 2 respectively.

4) **1**

Mass of carbon in the dot = 1 attogram = 10^{-18} Gram atomic mass of carbon = 12 g, i.e 12 g of carbon contains 6.022×10^{23} atoms of carbon . $\therefore$ 10^{-18} g of carbon will contain carbon atoms

$= \frac{6.022 \times 10^{23}}{12} \times 10_{-18}$ $= 5.02 \times 10_4$ atoms

5) A=3.22×10^{-22} g **1**

6) 38.2 **1**

7) 10.4 **1**

8) 91 x 10^{-25} **1**

9) 20.8g **1**

10) Mg=20%: S=26.67; O=53.33 **1**

Section-B

11) Molality is defined as the number of moles of solute present in 1kg of solvent. It is denoted by m. **2**

Thus Molality (m) $= \frac{moles \quad of \quad solute}{mass \quad of \quad solvent}$

Given that, Mass of solvent(H_2O) =500g=0.5kg

Weight of HCI=$1 \times 1 + 1 \times 35.5 = 36.5g$

Molar of HCI(solute) $= \frac{18.25}{36.5} = 0.5$

$m = \frac{0.5}{0.5} = 1m$ [from Eq.(i)]

12) **2**

$2A + 4B \longrightarrow 3C + 4D$

According to the given reaction,2 moles of A rect with 4 moles of B.

Hence, 5 moles of A will react with 10 moles of

$b\left(\frac{5 \times 4}{2} = 10moles\right)$

It indicates that recent B is limitng reagent as it will consume first in the reaction because we have only 6 moles of B.

13) Molar mass of $Na_2CO_3 = (2 \times 22.99) + 12.01 + (3 \times 16)$ **2**

$= 105.99 \approx 106gmol^{-1}$

0.5 mole $Na_2CO_3 = 0.50 \times 106 = 53g Na_2CO_3$

0.5 M Na_2CO_3 means 53g Na_2CO_3 is present in 1 L of the solution.

14) 1000 cm^3 of 0.15 M Na_2CO_3 contains Na_2CO_3 **2**

=0.15 mol

100 cm^3 of 0.15 M Na_2CO_3 will contains Na_2CO_3

$= \frac{0.15}{1000} \times 100 = 0.015mol$

Mass of $Na_2CO_3 = 0.015 \times 106 = 1.59g$

15) 4 **2**

16) **2**

(i) To test the law of conversion of mass, a reaction would have to be carried out in which the mass of the reactants and the mass of the produces are weighted and shown to be the same.

(ii) The law of definite proportions colud be shown by demonstrating that no matter how a compound is obtained, the reactant remains at the same proportions by mass. Th9is can be done by decomposing a compound and showing that the masses of the elements present are always in the same ratio

(iii) To test the law of multiple proportions, two different compounds made up of the same elements would have to be decomposed. If the mass of one of the elements is kept constants the masses of other elements combining with that of the element in different samples would have to be in the small whole number ratio.

17) **2**

In the first oxide,oxygen =27.6

Metal = 100 - 27.6 = 72.4 parts by mass.

As the formula of the oxide is M_3O_4, it means 72.4 parts by mass of metal = 3 atmos of metal and 4 atoms of oxygen = 27.6 parts by mass.

In the second oxide, oxygen = 30.0 parts by mass amd metal = 100 - 30 = 70 parts by mass.

But 72.4 parts by mass of metal = 3 atoms of metal.

$\therefore$ 70 parts by mass of metal = $\frac{3}{72.4} \times 70$ atoms of metal

= 2.90 atoms of metal

Also, 27.6 parts by mass of oxygen = 4 atoms of oxygen.

$\therefore$ 30 parts by mass of oxygen = $\frac{4}{27.6} \times 30$ atoms of oxygen

= 4.35 atoms of oxygen

Hence, ratio of M : O in the second oxide

= 2.90 : 4.35 = 1: 1.5 or 2 : 3

$\therefore$ Formula of the other metal oxide is M_2O_3.

18) $N_2(g) + 1 \ mol \ 28g 3H_2(g) \longrightarrow 3 \ mol \ 6g 2NH_3(g) 2 \ mol 34g$ **2**

28 g N_2 reacts with 6 g H_2.

$\therefore$ 1 g N_2 will react with $\frac{6}{28} g H_2$.

$\therefore$ 2000 g N_2 will react with $\frac{2000 \times 6}{28} = 428.57$g H_2

Hence, N_2 is the limiting reagent and H_2 is in excess.N_2limits the amount of ammonia produced.

28 g N_2 produces 34 g NH_3 and 1 g N_2 produces $\frac{34}{28}$ g NH_3

19) From the molarity equation, $M_1V_1 = M_2V_2$ **2**

$\breve{a}cid_1 \quad \breve{a}cid_2$

12.38 M $\times$ V_1 = 0.10 M $\times$ 1.0 L

$\therefore$ $V_1 = \frac{0.1 \times 1.0}{12.38}$ = 0.00808 L = 8.08 cm^3

20) 4 HCI (aq) + MnO_2(s) $\longrightarrow$ 2H_2O (l) **2**

4 $\times$ 36.5 87g + $MnCl_2$ (aq) + Cl_2(g)

According to the balanced chemical equation,

87g of MnO_2 react with 4 $\times$ 36.5 g HCI

5g of MnO_2 will react with $\frac{4 \times 36.5 \times 5}{87}$ = 8.39 g HCI

Section-C

21) 0.000968 = 9.68 x 10^{-4} **5**

22) 2.56×10^4 **5**

23) (ii) **Calculation for molar of the gas** **5**

10.0 L of the given gas at STP weigh=11.6 g

$\therefore$ 22.4 L of the given gas at STP will weigh

$\frac{11.6 \times 22.4}{10} = 25.984 \ g$

Molar mass = 25.984= 26 mol^{-1}

24) (i) 1 mole of Ag atom=108 g=6.022 X 10^{23} atoms **5**

Mass of 6.022 X 10^{23} atoms of Ag=108 g.

Mass of 1 atom of Ag= $\left(\frac{108}{6.022\times10^{23}}\right) = 1.793 \times 10^{-22} g$