DPP

DAILY PRACTICE PROBLEMS

CLASS : XIth
DATE :

Solutions

SUBJECT : CHEMISTRY
DPP No. : 4

Topic :- SOME BASIC CONCEPTS OF CHEMISTRY

1 **(d)**

Silica	Water	Clay	Mineral
45	12	43	Initial %
a	8	(92 - a)	% after heating

The % ratio of silica and clay remains constant on heating

i.e., $\frac{45}{43} = \frac{a}{92 - a}$

$\therefore$ $a = 47\%$

2 **(b)**

N atom = 1 g atom

3 **(a)**

Meq. of conc. HCl = Meq. of dil. HCl

$10 \times V_1 = 100 \times 1$

$\therefore$ $V_1 = 10\text{mL}$

Thus, 10 mL of conc. HCl should be added 90 mL to make at 100 mL of desired normality.

4 **(a)**

$CaF_2 = 146.4$ g

Molecular weight of $CaF_2 = 78.08$g/mol

$$\text{Moles of } CaF_2 = \frac{\text{weight}}{\text{molecular weight}}$$

$$= \frac{146.4}{78.08} = 1.875 \text{ mol}$$

Number of formula units of

CaF_2 in 146.4 g of CaF_2

$= \text{No.of moles} \times 6.022 \times 10^{23}$

$= 1.875 \times 6.022 \times 10^{23}$

$= 11.29 \times 10^{23}$

$= 1.129 \times 10^{24}\ CaF_2$

5 **(a)**

$C_2H_4 + 3O_2 \rightarrow 2CO_2 + 2H_2O$

28 g   96 g

$\because$ The weight of oxygen required for complete combustion of 28 g ethylene=96 g.

$\therefore$ Weight of oxygen required for combustion of 2.8 kg ethylene

$= \frac{96 \times 2.8 \times 1000}{28 \times 1000}$ kg=9.6 kg

7 **(b)**

$2Na_2HPO_4 + NaH_2PO_4 + 2(NH_2)_2CO \rightarrow Na_5P_3O_{10} + 4NH_3 + 2CO_2$

Hence, the stoichoimetric ratio of sodium dihydrogen orthophosphate and sodium hydrogen orthophosphate is 2 : 1 or 3 : 1.5

8 **(b)**

44 g $CO_2 = N$ molecules,

$\therefore$4.4 g $CO_2 = N/10$ molecules,

22.4 litre H_2at STP $= N$ molecules,

$\therefore$ 2.24 litre H_2at STP $= N/10$ molecules,

Thus, total molecules $= \frac{N}{10} + \frac{N}{10} = \frac{N}{5}$.

9 **(c)**

Molecular mass of $CO_2 = 12 + 32 = 44$

$44g$ of CO_2 has $= 6.023 \times 10^{23}$ molecule

$0.2g$ of CO_2 has $= \frac{6.023 \times 10^{23}}{44} \times 0.2$

$= 0.0273 \times 10^{23}$

If 10^{21} molecules are removed then number of molecules

$= 1.73 \times 10^{21}$

$\because 6.023 \times 10^{23}$ molecules $= 1$ mol

$\therefore 1.73 \times 10^{21}$ molecules $= \frac{1}{6.023 \times 10^{23}} \times 1.73 \times 10^{21}$

$= 0.0028$ mol

10 **(a)**

24 g carbon has $2N$ atoms. Rest all have I mole atoms.

11 **(b)**

$CuSO_4\ 5H_2O$ has 1 mole of copper and 9 moles of oxygen atoms,

63.5 g Cu $= 9 \times 16\ g$ of oxygen

8.64 g of oxygen $= \frac{63.5 \times 8.64}{9 \times 16}$

$= 3.81g$

12 **(c)**

Meq.of H_3PO_3 = Meq.of KOH

$20 \times 0.1 \times 2 = 0.1 \times 1 \times V$

(H_3PO_3 is dibasic, KOH is monobasic)

$\therefore \quad V = 40$ mL

13 **(a)**

Given mass of $O_2 = 2$ g at 0°C and 760 mm Hg

32 g of $O_2 = 22.4$ L at STP

$\therefore \quad 2 \text{ g of } O_2 = \frac{22.4}{32} \times 2 = 1.4 \text{ L}$

14 **(a)**

Ratio of atoms

$$C{:}H{:}N{:}O :: \frac{20.0}{12} : \frac{6.66}{1} : \frac{47.33}{14} : \frac{26.01}{16}$$

$= 1.67{:}6.66{:}3.38{:}1.63$

$= 1{:}4{:}2{:}1$

Empirical formula $= CH_4N_2O$

Molar empirical formula mass $= 60$g

Molecular formula $= CH_4N_2O$

15 **(b)**

Molarity $= \frac{\text{moles of solute}}{\text{volume of solution}}; V_{\text{solution}} > 1$ *litre water*.

17 **(d)**

Number of atoms $=$ moles $\times N_A \times$ atomicity

Here, N_A= Avogadro's number

(a) Number of oxygen atoms in 1 g of O

$$= \frac{1}{16} \times N_A \times 1$$

$$= \frac{N_A}{16}$$

(b)Number of oxygen atoms in 1 g of O_2

$$= \frac{1}{32} \times N_A \times 2$$

$$= \frac{N_A}{16}$$

(c) Number of oxygen atoms in 1 g of O_3

$$= \frac{1}{48} N_A \times 3 = \frac{N_A}{16}$$

Hence, all have the same number of oxygen atoms.

18 **(b)**

$$N = \frac{4 \times 1000}{40 \times 100} = 1.0$$

19 **(c)**

Mohr's salt is $FeSO_4.(NH_4)_2SO_4.6H_2O$

Only oxidizable part is Fe^{2+}.

$[Fe^{2+} \rightarrow Fe^{3+} + e^-] \times 6$

$Cr_2O_7^{2-} + 14H^+ + 6e^- \rightarrow 2Cr^{3+} + 7H_2O$

$6Fe^{2+} + Cr_2O_7^{2-} + 14H^+ \rightarrow 6Fe^{3+} + 2Cr^{3+} + 7H_2O$

Millimoles of $Fe^{2+} = 750 \times 0.6 = 450$

Moles of $Fe^{2+} = \frac{450}{1000} = 0.450$ mol

6 mol Fe^{2+}=1 mol $Cr_2O_7^{2-}$

$\therefore$ 0.450 mol $Fe^{2+} = \frac{0.450}{6}$

$= 0.075$ mol $Cr_2O_7^{2-}$

$= 0.075 \times 294$ g

$= 22.05$ g

20 **(d)**

$3BaCl_2 + 2Na_3PO_4 \longrightarrow Ba_3(PO_4)_2 + 6NaCl$

See mole ratio from stoichiometry.

$BaCl_2$:Na_3PO_4:$Ba_3(PO_3)_2$: NaCl ::3 :2 :1: 6

ANSWER-KEY										
Q.	1	2	3	4	5	6	7	8	9	10
A.	D	B	A	A	A	D	B	C	A	A
Q.	11	12	13	14	15	16	17	18	19	20
A.	B	C	A	A	B	C	D	B	C	D