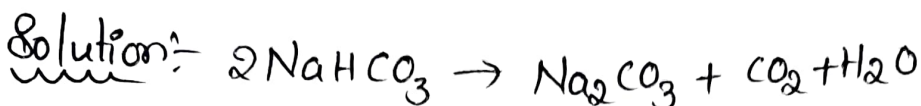


Class: VIII

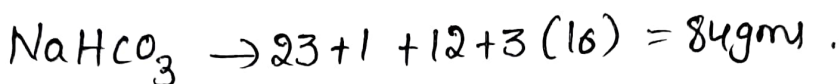
Stoichiometric Calculations

Teaching Task

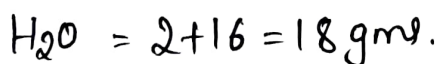
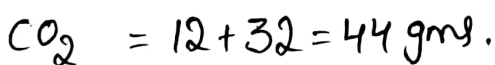
Q1) Ans:- 2



The loss of baking soda is due to release of CO_2 and H_2O .



2 moles of NaHCO_3 it loses 1 mole of CO_2 & H_2O .



For 2 moles of NaHCO_3 it loses 62 gms.

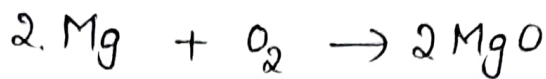
weight	loss.
168	62.
x	3.1

$$x = \frac{168 \times 3.1}{62} = \frac{520.8}{62} = 8.4 \text{ gms.}$$

The mass of baking soda for 3.1 gms of loss is 8.4 gms.

Q21 Ans:- 1

Solution:-



$$2 \times 24 = 48 \quad 32 \text{gms.}$$

For 48gms of Mg, 32gms of O_2 is required.

For Mg = 1gm.

$$\begin{array}{cc} \text{Mg} & \text{O}_2 \\ 48 & 32 \\ 1 & x \end{array}$$

$$x = \frac{32}{48} = 0.666 \text{gms.}$$

For 1gm Mg, 0.66gms of O_2 required.

So, Mg is excess here because they are giving only 0.5gms of O_2

$$\begin{array}{cc} \text{Mg} & \text{O}_2 \\ 48 & 32 \\ x & 0.5 \end{array}$$

$$x = \frac{48 \times 0.5}{32}$$

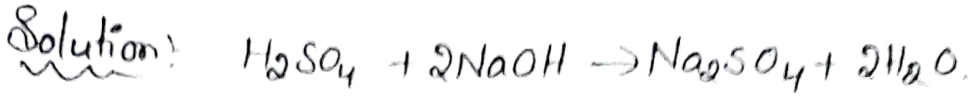
$$= 0.75 \text{gms of Mg.}$$

We have 1gm of Mg but 0.75gms of Mg is used.

$$\begin{aligned} \text{Remaining Mg} &= 1 - 0.75 \\ &= 0.25 \text{gms of Mg.} \end{aligned}$$

Q3)

Ans:- 1



For 1 mole of H_2SO_4 , 2 moles of NaOH required.

$$\text{H}_2\text{SO}_4 = 2(1) + 32 + 4(16) = 98 \text{ gms.}$$

$$\text{NaOH} = 23 + 16 + 1 = 40 \text{ gms.}$$

$$2 \text{ moles of NaOH} = 80 \text{ gms.}$$

Given,
 $\text{NaOH} = 60 \text{g.}$

H_2SO_4		NaOH
98	\rightarrow	80
x	\rightarrow	60

$$x = \frac{60 \times 98}{80} = \frac{588}{8} = 73.5 \text{ gms.}$$

Pure H_2SO_4 is 73.5 gms mixed with 60 gms NaOH .

But they are telling 80% pure H_2SO_4 . So add impure H_2SO_4 to get 80% pure H_2SO_4 .

$$80\% \rightarrow 73.5$$

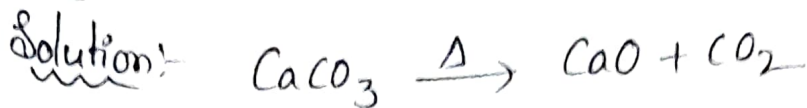
$$100\% \rightarrow x$$

$$80x = 73.5 \times 100$$

$$x = \frac{73.5 \times 100}{80}$$

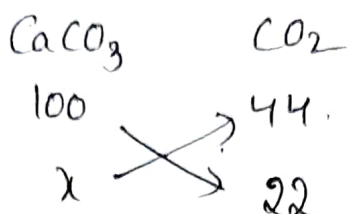
$$= 91.875 \text{ gms}$$

Q4)

Ans: 3.

$$\text{CaCO}_3 = 40 + 12 + 48 = 100 \text{ gms}$$

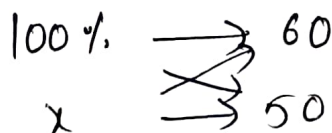
$$\text{CO}_2 = 12 + 2(16) = 44 \text{ gms}$$



$$x = \frac{22 \times 100}{44} = 50 \text{ gms.}$$

To produce 22 gms of CO_2 , 50 gms CaCO_3 required.

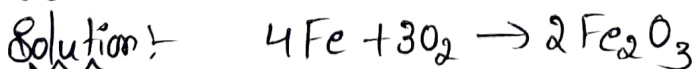
But they are giving 60 gms.



$$x = \frac{100 \times 50}{60} = \frac{500}{6} = 83.33\%$$

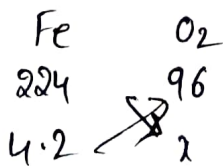
83.33% of CaCO_3 is used produce 22 gms of CO_2 .

Q5)

Ans: 2

4 moles of Fe required for 3 moles of O_2

$$4\text{Fe} \rightarrow 4 \times 56, \quad 3\text{O}_2 = 3 \times 32 = 96 \text{ gms}$$

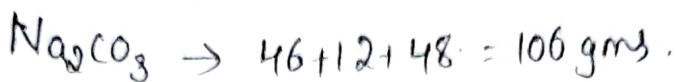
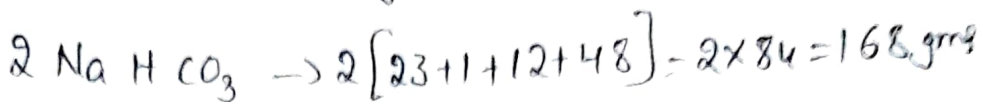


$$x = \frac{96 \times 4.2}{224} = 1.8 \text{ gms.}$$

Q6)

Ans:- 1

On heating baking soda it loses CO_2 & H_2O



$$168 \quad \quad \quad 106$$

$$4.2 \quad \quad \quad x$$

$$x = \frac{106 \times 4.2}{168} = \frac{445.2}{168} = 2.65 \text{ gms}$$

On strong heating of 4.2gms of NaOH ,
2.65gms of Na_2CO_3 is remained.

Q7)

Ans:- 2

Solution:-

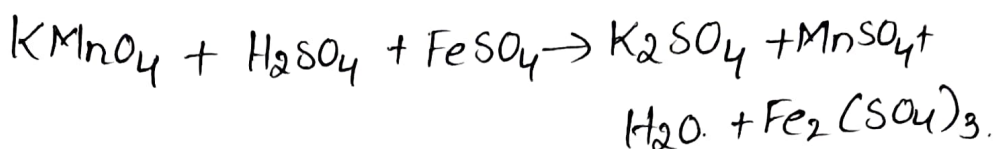
Substance	X	Y	R	S
	ngm	m gm	P gm	q gm.

Given relation

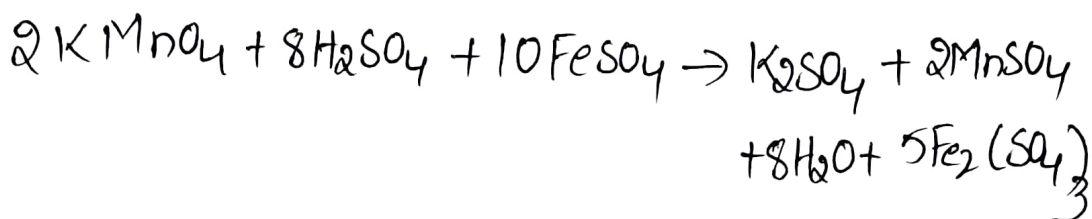
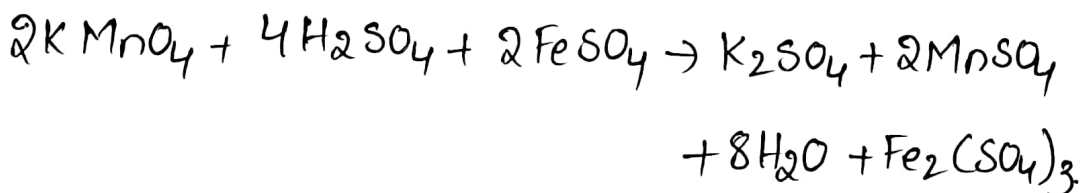
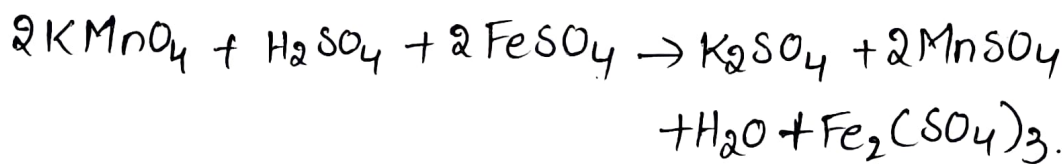
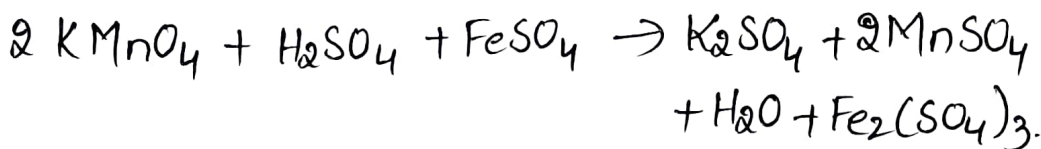
$$X + Y = R + S.$$

$$n + m = P + q$$

Q8)

Ans:- 1Solution:-

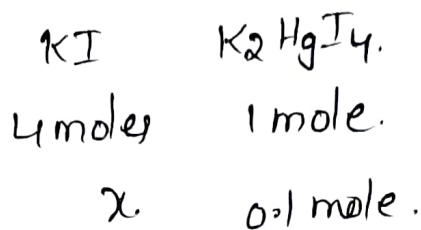
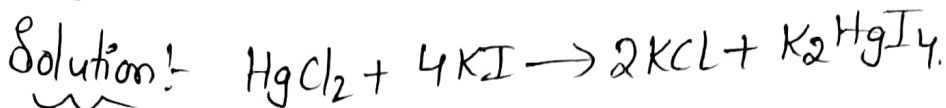
	LHS	RHS
K	① 2	2
Mn	① 2	① 2
O	① 2 ① 16 ① 20 32	② ① 24 32
H	② ① 8 ① 16	② 16
S	① ① 3 ① 6 18	⑤ ① 6 18
Fe	① ① 2 10	⑤ 10



$$a = 2, \quad b = 8, \quad c = 10$$

Q9)

Ans:- 4

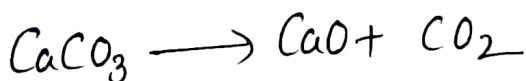


$$x = \frac{4 \times 0.1}{1} = 0.4 \text{ moles}$$

Q10)

Ans:- 1

Solution:-



$$\text{CaCO}_3 \rightarrow 40 + 12 + 48 = 100 \text{ gms.}$$

$$\text{CaO} \rightarrow 40 + 16 = 56 \text{ gms.}$$

Given $\text{CaO} = 28 \text{ gms}$, $\text{CaCO}_3 = x$.



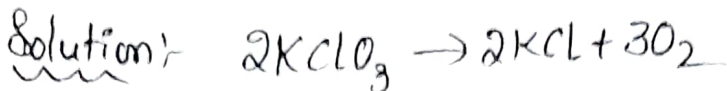
100	\rightarrow	56.
-----	---------------	-----

x	\rightarrow	28
-----	---------------	----

$$x = \frac{28 \times 100}{56} = 50 \text{ gms.}$$

Q112

Ans: 4.



$$2\text{KClO}_3 \rightarrow 2[39 + 35.5 + 48] = 2(122.5) = 245$$

$$2\text{KCl} \rightarrow 2[39 + 35.5] = 2(74.5) = 149$$

$$3\text{O}_2 \rightarrow 3[32] = 96$$

For 2 moles of KClO_3 it loses 3 moles of O_2

KClO_3	O_2
245	96
x	0.384 g

$$x = \frac{245 \times 0.384}{96} = 0.98 \text{ gm}$$

0.98 gm of KClO_3 loses 0.384 gm of O_2

Given 100% of KClO_3 is 4.9 gm which loses 0.384 gm.

100	\rightarrow	4.9
x	\rightarrow	0.98

$$4.9x = 100 \times 0.98$$

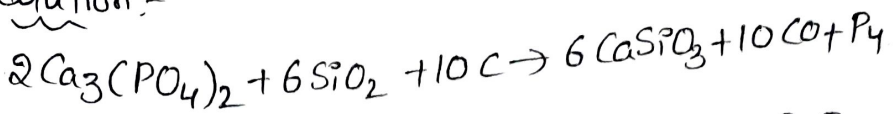
$$x = \frac{100 \times 0.98}{4.9} = \frac{98}{4.9} = 20\%$$

20% KClO_3 is present.

Q12)

Ans:- 1

Solution:-



i) 2 moles of $\text{Ca}_3(\text{PO}_4)_2$ form 1 mole of P_4 .

1 mole of $\text{Ca}_3(\text{PO}_4)_2 = 0.5$ of P_4 .

$$1 \text{ mole} = 4 \times 31 = 124.$$

$$0.5 \text{ moles of } \text{P}_4 = \frac{124}{2} = \underline{62 \text{ gms.}}$$

$$\text{ii) } 2\text{Ca}_3(\text{PO}_4)_2 = 2[3 \times 40 + 2(31 + 64)] \\ = 2 \times 310 = 620 \text{ gms.}$$

1 mole of $\text{P}_4 = 124 \text{ gms.}$

$\text{Ca}_3(\text{PO}_4)_2$		P_4
620	\searrow	124
1	\swarrow	x

$$x = \frac{124}{620} = \underline{0.2 \text{ gms}}$$

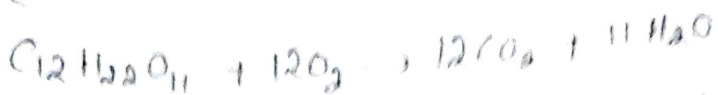
iii) For each ton of $\text{Ca}_3(\text{PO}_4)_2$

$\text{Ca}_3(\text{PO}_4)_2$	P_4
620 ton	124 ton
1 ton	x.

$$x = 0.2.$$

Q13) Ans: 1

Solution: Sucrose $\rightarrow C_{12}H_{22}O_{11}$

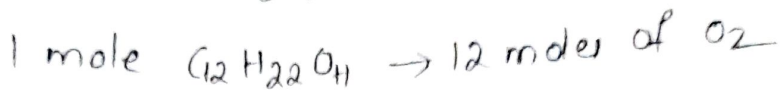


$$\begin{aligned} 1 \text{ mole of Sucrose} &= (12 \times 12) + 22(1) + 11(16) \\ &= 144 + 22 + 176 = 342 \end{aligned}$$

$$1 \text{ mole} \rightarrow 342 \text{ gms.}$$

$$x \rightarrow 34.2 \text{ gms}$$

$$x = \frac{34.2}{342} = 0.1 \text{ mole.}$$

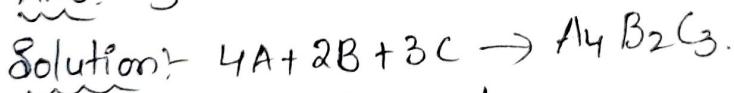


$$\text{Mass of Oxygen} = 1.2 \times 32 = 38.4 \text{ gms.}$$

$$1 \text{ Hour} = 38.4 \text{ gms of } O_2$$

$$24 \text{ hours} = 24 \times 38.4 = \underline{\underline{921.6 \text{ g.}}}$$

Q14) Ans: 3.



4 moles of A, B = 2 moles.

2 moles of A, B = 1 moles.

2 moles of A, C = $\frac{3}{2}$ moles = 1.5 moles

But they are giving C = 1.44 moles only. So it a limiting reagent

For C,	Product.
3 moles	1 mole.

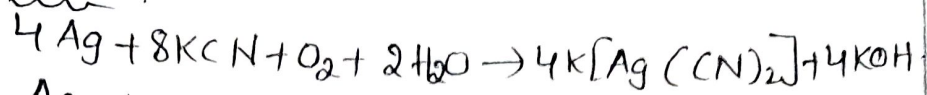
$$1.44 \rightarrow x$$

$$x = \frac{1.44}{3} = 0.48 \text{ moles}$$

Q15)

Ans: 1, 3, 4.

Solution:-



Ag = 108 gms, KCN = 65 gms.

1) 4 moles of Ag with 8 moles of KCN.

Ag	KCN
432	520
100	x

$$x = 120 \text{ gms.}$$

2) 4 moles of Ag with 1 mole O₂

1 mole of Ag = 108 gms.

x moles of Ag = 100 gms.

$$x = \frac{100}{108} = 0.925 \text{ moles.}$$

Ag	O ₂
4	1
0.925	x

$$x = \frac{0.925}{4} = 0.23 \text{ moles.}$$

1 mole of O₂ → 22.4.

0.23	x
------	---

$$x = \frac{22.4 \times 0.23}{1} = 5.152 \text{ litres.}$$

For 0.23 moles,

0.23 moles → 32.

1 mole → 32

$$x = \frac{32 \times 0.23}{1} = 7.36 \text{ gms}$$

Q16) Ans: 2, 3.

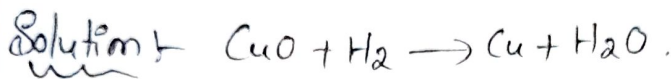


2 moles of P, 1 mole of Q & 1 mole of R.

For 12 moles of P, 6 moles of Q & 6 moles of R.

They are giving 8 moles of Q, but 6 moles is used, remaining 25%.

Q17) Ans: A



$$CuO = 63.55 + 16 = 79.55 \text{ g/mol.}$$

$$H_2 = 2 \text{ gms.}$$

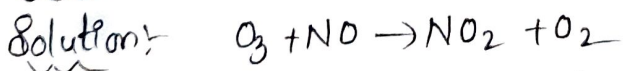
CuO,

$$1 \text{ mole } 79.55$$

$$0.1 \text{ mole } 7.955$$

0.1 moles of H_2 is 0.2 gms.

Q18) Ans: 1



$$O_3 \rightarrow 3 \times 16 = 48 \text{ gms, } NO = 14 + 16 = 30 \text{ gms.}$$

$$NO_2 = 14 + 32 = 46 \text{ gms}$$

Given, $O_3 = 0.740$, $NO = 0.670$.

But NO is excess reagent here, So consider limiting reagent O_3 .

O_3 NO_2

$$0.740$$

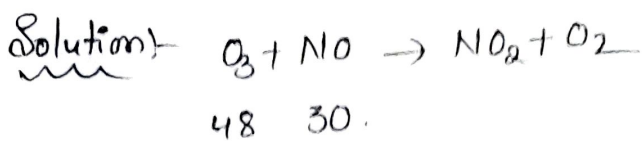
$$48$$

x.

$$46$$

$$\left| \begin{array}{l} x = \frac{46 \times 0.740}{48} \\ = 0.709 \text{ gms.} \end{array} \right.$$

Q19) Ans:- 2.



Given $O_3 = 0.740$, $NO = 0.670$.

O_3 NO .

48 30.

0.740 ~~x~~ x

$$\Rightarrow x = 0.4625 \text{ gms.}$$

Here, for 0.740 gms of O_3 , only 0.4625 gms of NO is used, So NO is excess reagent & O_3 is limiting reagent.

Q20) Ans:- 3.

Solution:- Excess reagent NO .

Used is 0.4625

Given 0.670 .

$$\begin{aligned} \text{Remaining } NO &= 0.670 - 0.4625 \\ &= 0.20705 \end{aligned}$$

NO

1 mole \rightarrow 30 gms.

x ~~x~~ \rightarrow 0.20705

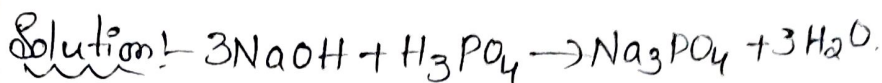
$$x = \frac{0.20705}{30}$$

$$= 0.0069$$

$= 0.007$ moles of NO .

Integer Type

Q21) Ans: 12



3 moles of NaOH and 1 mole of H_3PO_4 .

$$3\text{NaOH} \rightarrow 3[23+16+1] = 3[40] = 120 \text{ gms.}$$

$$\text{H}_3\text{PO}_4 \rightarrow 3+31+64 = 98 \text{ gms.}$$

NaOH H_3PO_4

120

98

x

\rightarrow 9.8

$$x = \frac{9.8 \times 120}{98} = 12 \text{ gms.}$$

Q22) Ans: 4.



Matrix Matching

Q23) Ans: 1 - P, Q, S, T, 2 - R, Q, S, 3 - R, S, T, 4 - P, Q.

Solution:

1) $\text{A} + 2\text{B} \rightarrow 3\text{C} + 4\text{D}$ \rightarrow A is limiting reagent, 6 moles of C formed, 8 moles of D, Excess reagent 2 moles.

2) $2\text{A} + 4\text{B} \rightarrow \text{C} + \frac{4}{3}\text{D}$ \rightarrow B is limiting reagent, 6 moles of C, 8 moles of D.

3) $3\text{A} + 2\text{B} \rightarrow 2\text{C} + \text{D}$ \rightarrow B is limiting reagent, 5 moles of D, Excess reagent 2 moles.

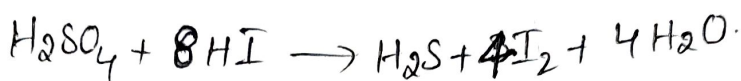
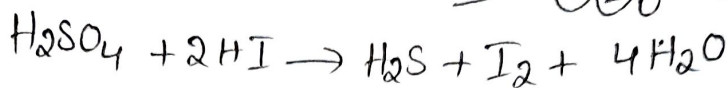
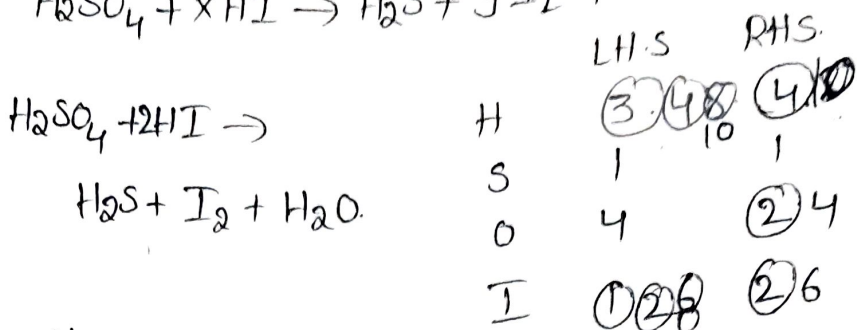
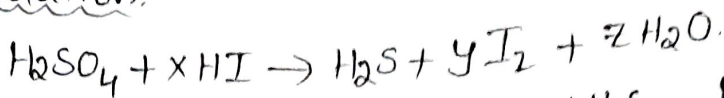
4) $4\text{A} + 5\text{B} \rightarrow 2\text{C} + 3\text{D}$ \rightarrow Limiting reagent A, 6 moles of C formed.

Learners Task

Q1)

Ans:- 3.

Solution:-

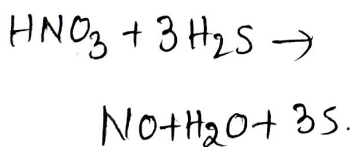


$$x = 8, \quad y = 4, \quad z = 4$$

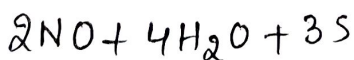
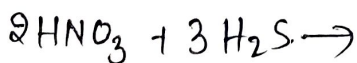
Q2)

Ans:- b.

Solution:-



	L.H.S	R.H.S
H	(3) (7) 8	(2) 8
N	(1) 2	(1) 2
O	(3) 6	(2) 6
S	(1) 3	3



$$x = 2, \quad y = 3, \quad a = 2, \quad b = 4$$

Q3)

Ans:- 1, 2, 3.

Solution:- A balanced chemical reaction tells about no. of reactants & products, no. of moles, and mass of reactants and products.

Q4) Ans:- 1, 2, 3, 4.

Solution:- 1 mole of $\text{Ba}(\text{OH})_2$ will exactly neutralize. Trial & error method

In $\text{Ba}(\text{OH})_2 \rightarrow 2 (\text{OH})$ are there.

Two neutralize that we need 2H^+ .

2 moles of $\text{HCl} = 2 \times 1 = \text{Dibasic}$

1 mole of $\text{H}_2\text{SO}_4 = 2 = \text{Dibasic}$.

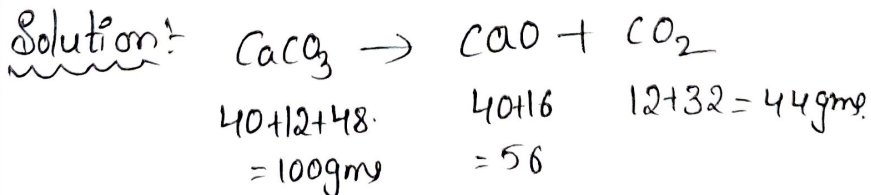
1 mole of $\text{H}_3\text{PO}_3 = 2 = \text{dibasic}$.

2 moles of $\text{H}_3\text{PO}_2 = \text{monobasic}$
 $2 \times 1 = 2 \text{ equivalents}$.

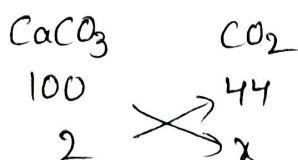
Q5) Ans:- 3.

Solution:- Ozone reacts with SO_2 to form SO_3 . As there is no oxygen formed here the no. of moles of oxygen formed is zero.

Q6) Ans:- 3.



Given, $\text{CaCO}_3 = 2 \text{g}$, $\text{CO}_2 = ?$



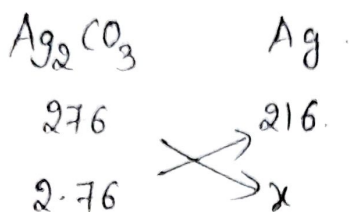
$$x = \frac{44 \times 2}{100} = \frac{88}{100} = 0.88 \text{ gms}$$

Q7) Ans:- 2



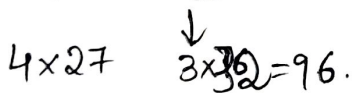
Molecular weight of $\text{Ag}_2\text{CO}_3 = 2 \times 108 + 12 + 3(16)$
 $= 276\text{g}$.

2 moles of Ag = $2 \times 108 = 216\text{g}$.

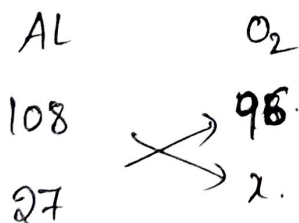


$$x = \frac{216 \times 2.76}{276} = 2.16\text{g}$$

Q8) Ans:- 4.

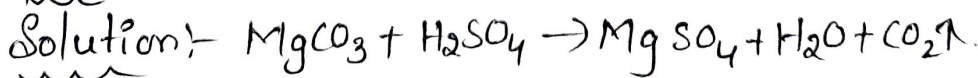


4 moles of Al react with 3 moles of O_2



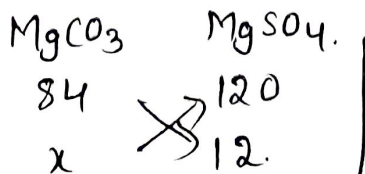
$$x = \frac{96 \times 27}{108} = 24\text{g}$$

Q9) Ans:- 1



$\text{MgCO}_3 = 24 + 12 + 48 = 84\text{g}$ $\text{MgSO}_4 = 24 + 32 + 64 = 120\text{gms}$.

Given $\text{MgSO}_4 = 12\text{g}$.



$$x = \frac{12 \times 84}{120} = 8.4\text{g}$$

Q10) Ans:- 2

Solution:-



For 1 mole of CaCl_2 , 2 moles of AgNO_3 required.

$$1 \text{ Mole AgCl} = 108 + 35.5 = 143.5 \text{ gm.}$$

$$\begin{array}{l} 1 \rightarrow 143.5 \\ \times \\ x \rightarrow 4.31 \end{array}$$

$$x = \frac{4.31}{143.5} = 0.03 \text{ moles.}$$

1 mole of CaCl_2 with 2 moles of AgCl .

$$\begin{array}{l} \text{CaCl}_2 \quad \text{AgCl} \\ 1 \quad \quad 2 \\ x \cdot \quad \times \quad 0.03 \end{array}$$

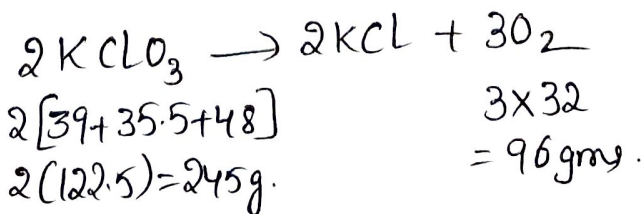
$$x = \frac{0.03}{2}$$

$$x = 0.015 \text{ moles.}$$

JEE Main Level

Q11) Ans:- 1

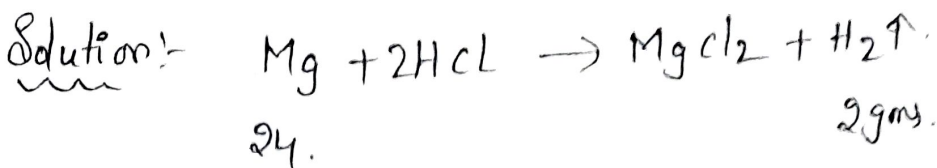
Solution:-



$$\begin{array}{l} 245 \quad \times \quad 96 \\ x \quad \times \quad 0.96 \end{array}$$

$$x = \frac{245 \times 0.96}{96} = 2.45 \text{ g.}$$

Q12) Ans:- 1



1 mole of Mg produce 1 mole of H_2

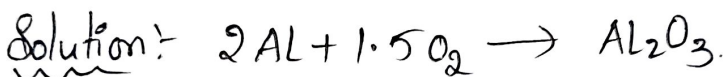
Given Mg = 6g

Mg \quad O_2

24 $\xrightarrow{\quad}$ 2
6 $\xrightarrow{\quad}$ x

$$x = \frac{6 \times 2}{24 \times 2} = \frac{1}{2} = 0.5g.$$

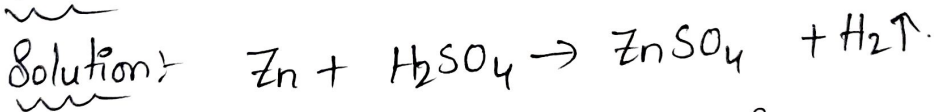
Q13) Ans:- 2



For 2 moles of Al, $1.5O_2$ will react.

2 moles of Al = $2 \times 27 = 54g$.

Q14) Ans:- 3.



1 mole of Zn produces 1 mole of $ZnSO_4$.

Zn = 65.5g, $ZnSO_4 = 65.5 + 32 + 64$
 $= 161.5g$.

Given Zn = 6.5gms.

Zn \quad $ZnSO_4$

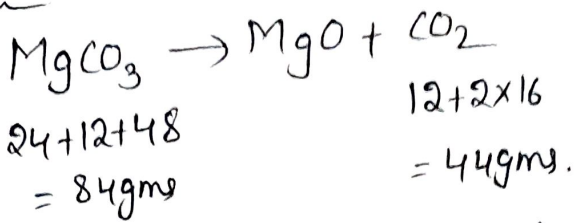
65.5 $\xrightarrow{\quad}$ 161.5
6.5 $\xrightarrow{\quad}$ x

$$x = \frac{6.5 \times 161.5}{65.5}$$

$= 16.15gms$

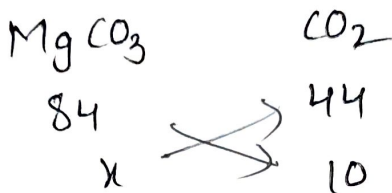
Q15) Ans:- 2

Solution:-



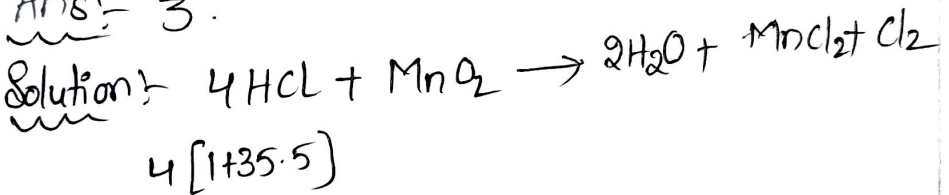
1 mole MgCO_3 loses 1 mole of CO_2

Given $\text{CO}_2 = 10 \text{g}$.



$$x = \frac{84 \times 10}{44} = 19.09 \text{gms}$$

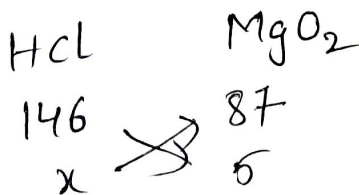
Q16) Ans:- 3.



4 Moles of $\text{HCl} = 146 \text{gms}$.

1 Mole of $\text{MnO}_2 = 55 + 32 = 87 \text{gms}$.

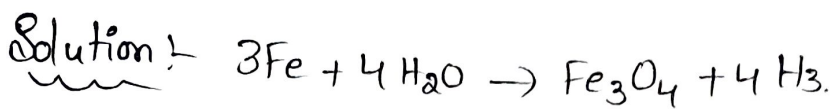
Given, $\text{MgO}_2 = 5 \text{gms}$, $\text{HCl} = ?$



$$x = \frac{5 \times 146}{87} = \frac{730}{87} = 8.39 \text{gms.}$$

$= 8.4 \text{g}$.

7) Ans:- 1

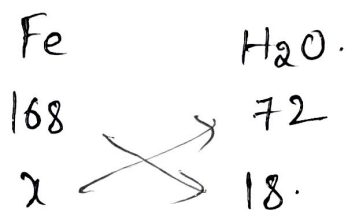


3 moles of Fe required 4 moles of H_2O .

$$3 \text{ moles of Fe} = 3 \times 56 = 168.$$

$$4 \text{ moles of H}_2\text{O} = 4 \times 18 = 72$$

Given steam = 18gms., Fe = ?

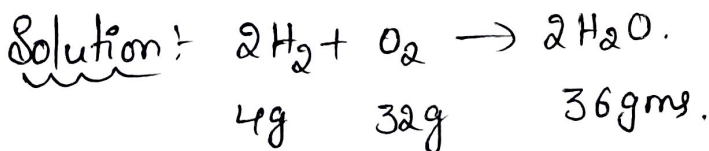


$$x = \frac{168 \times 18}{72} = \underline{42 \text{ gms.}}$$

Near by option 37.3gm

Advanced Level Questions

8) Ans:- 14.



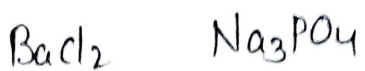
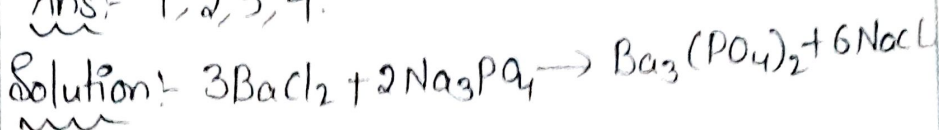
Given 4g of H_2 , 4g of O_2 .

\rightarrow For 4g of H_2 it requires 32g of O_2 .

So O_2 is limiting reagent.

O_2	H_2O .	
32	36	$x = \frac{4 \times 36}{32} = \frac{9}{2} = 4.5\text{g}$
4 \rightarrow	x	

Q19) Ans: 1, 2, 3, 4.



3 moles 2 moles.

0.4 moles x .

$$x = \frac{0.4 \times 2}{3}$$
$$= 0.266 \text{ moles.}$$

For 0.4 moles of BaCl_2 required 0.266 moles of Na_3PO_4 . But they gave only 0.2 moles. So Na_3PO_4 is limiting reagent.

→ 0.2 moles of $\text{Na}_3\text{PO}_4 \rightarrow 0.1$ Mole of $\text{Ba}_3(\text{PO}_4)_2$

→ 0.2 moles of $\text{Na}_3\text{PO}_4 = 0.6$ moles of NaCl .

→ For 0.2 moles, no. of moles of $\text{BaCl}_2 = ?$



3 2.

x 0.2.

$$x = \frac{3 \times 0.2}{2} = 0.3 \text{ moles}$$

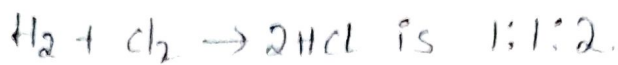
Given 0.4 moles of BaCl_2 , but

0.3 moles is used.

$$\text{Remaining} = 0.4 - 0.3$$
$$\text{BaCl}_2 = 0.1 \text{ moles}$$

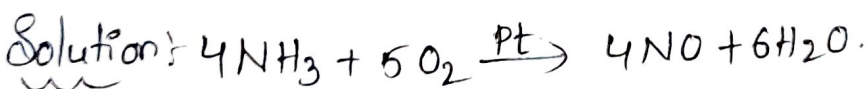
Q20) Ans:- 1

Solution: The volume ratio of H_2 , Cl_2 & HCl in the reaction



This is an example of Gay Lussac's law of volumes of gases which states that, "When gases react together to produce gaseous products, the volumes of reactants and products bear a simple whole-number ratio with each other, provided volumes are measured at same 'temperature & Pressure'."

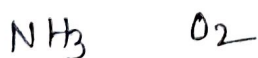
Q21) Ans:- 2



$$4 \text{ Moles of } NH_3 = 4[14+3] = 4 \times 17 = 68 \text{ gm.}$$

$$5 \text{ Moles of } O_2 = 5[32] = 160 \text{ gm.}$$

Given, $NH_3 = 13.6 \text{ g.}$



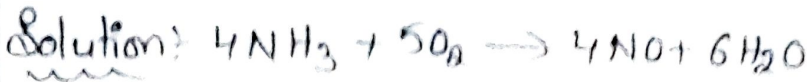
$$68 \quad \rightarrow \quad 160.$$

$$13.6 \quad \rightarrow \quad x$$

$$x = \frac{160 \times 13.6}{68}$$

$$= 32 \text{ gms.}$$

Q22) Ans: 1.2 moles.



1 mole $\text{NH}_3 = 14 + 3 = 17 \text{ gms.}$

1 mole $\rightarrow 17 \text{ gms.}$

$x \rightarrow 13.6 \text{ gms}$

$$x = \frac{13.6}{17} = 0.8 \text{ moles.}$$

For 4 moles of NH_3 , 6 moles of H_2O

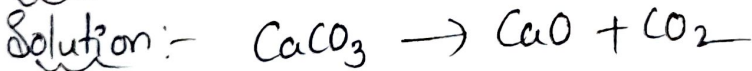
NH_3 H_2O .

4 6

0.8 x

$$x = \frac{6 \times 0.8}{4} = 1.2 \text{ moles}$$

Q23) Ans: 50.



$40 + 12 + 48$ $40 + 16$
 $= 100 \text{g}$ $= 56 \text{g.}$

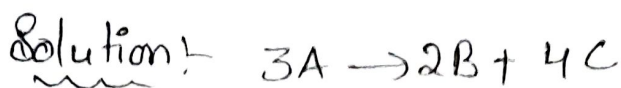
CaCO_3 CaO

100 56.

5 28

$$5 = \frac{100 \times 28}{562} = 50 \text{ gms.}$$

Q24) Ans: 1.



B C.
2 moles 4 moles.

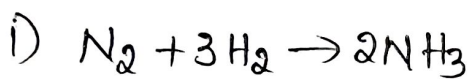
x \rightarrow 2 moles

$$x = \frac{2 \times 2}{4} = \frac{4}{4} = 1 \text{ mole.}$$

Matrix Matching Type

Q25) Ans: 1-S, 2-X, 3-P, 4-Q.

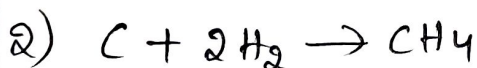
Solution:



3 moles 3 moles.

Here H_2 is limiting reagent.

3 moles of H_2 it produces 2 moles of NH_3



2 moles 2 moles

H_2 is limiting reagent.

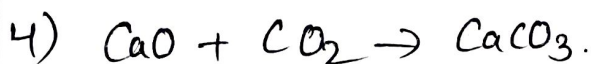
2 moles of H_2 produces 1 mole of CH_4 .



4 moles 4 moles.

H_2 is limiting reagent.

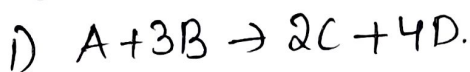
4 moles of H_2 produces 4 moles of H_2O



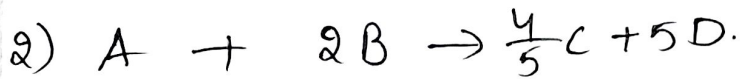
0.5 moles 0.5 moles 0.5 moles

Q26) Ans:- 1-Q, R, 2-S, Q, 3-P, 4-P,

Solution:-



2 moles 6 moles. 4 moles 8 moles.

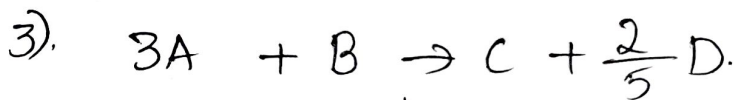


16 moles 10 moles.

↓
Limiting reagent

$$\begin{array}{cc} B & C \\ 2 & \frac{4}{5} \\ 10 & x \end{array} \quad x = \frac{\frac{4}{5} \times 10}{2} = 4 \text{ moles}$$

$$\begin{array}{cc} B & D \\ 2 & 5 \\ 10 & x \end{array} \quad x = \frac{50}{2} = 25 \text{ moles.}$$

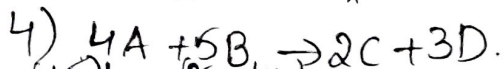


10 moles 20 moles

↓
Limiting reagent

$$\begin{array}{cc} A & B \\ 3 & 1 \\ 10 & x \end{array} \quad x = \frac{10}{3} = 3.3 \text{ moles.}$$

$$\begin{array}{cc} A & D \\ 3 & \frac{2}{5} \\ 10 & x \end{array} \quad x = \frac{\frac{2}{5} \times 10}{3} = \frac{4}{3}$$



(15) ↓ (20 moles)
Limiting reagent

$$\begin{array}{cc} A & C \\ 4 & 2 \\ 15 & x \end{array} \quad x = \frac{30}{4} = 7.5 \text{ moles.}$$

$$\begin{array}{cc} A & D \\ 4 & 3 \\ 15 & x \end{array} \quad x = \frac{3 \times 15}{4} = \frac{45}{4} = 11.2 \text{ moles}$$