Class:- VIII

Stoichiometric Calculations

Teaching Task

Q1) Ans:- 2

Solution:- $2NaHCO_3 \rightarrow Na_2CO_3 + CO_2 + H_2O$

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

$NaHCO_3 \rightarrow 23+1+12+3(16) = 84$ gms.

$2NaHCO_3 \rightarrow 2 \times 84 = 168$ gms.

2 moles of $NaHCO_3$ it looses 1 mole of CO_2 & H_2O.

$CO_2 = 12+32 = 44$ gms.

$H_2O = 2+16 = 18$ gms.

For 2 moles of $NaHCO_3$ it looses 62gms.

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.

Q2) Ans:- 1

Solution:-

$$2.Mg + O_2 \rightarrow 2MgO$$

$2 \times 24 = 48$ 32 gms.

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

For Mg = 1 gm.

Mg	O_2
48	32
1	x

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

For 1gm Mg, 0.66 gms of O_2 required.

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

Mg	O_2
48	32
x	0.5

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

$= 0.75$ gms of Mg.

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

Remaining Mg $= 1 - 0.75$

$= 0.25$ gms of Mg.

Q3) Ans:- 1

Solution: $H_2SO_4 + 2NaOH \rightarrow Na_2SO_4 + 2H_2O$.

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

$H_2SO_4 = 2(1) + 32 + 4(16) = 98$ gms.

$NaOH = 23 + 16 + 1 = 40$ gms.

2 moles of $NaOH = 80$ gms.

Given,
$NaOH = 60g$.

H_2SO_4	NaOH
98	80
x	60

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

Pure H_2SO_4 is 73.5 gms mixed with 60gms NaOH.

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

80%	73.5
100%	x

$$80x = 73.5 \times 100$$

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

$$= 91.875 \text{ gms}$$

Q4) Ans:- 3.

Solution:- $CaCO_3 \xrightarrow{\Delta} CaO + CO_2$

$CaCO_3 = 40+12+48 = 100$ gms

$CO_2 = 12+2(16) = 44$ gms

$CaCO_3$	CO_2
100	44
x	22

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

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

But they are giving 60gms.

100%	60
x	50

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

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

Q5) Ans:- 2

Solution:- $4Fe + 3O_2 \rightarrow 2Fe_2O_3$

4 moles of Fe required for 3 moles of O_2

$4Fe \rightarrow 4 \times 56$, $3O_2 = 3 \times 32 = 96$ gms

Fe	O_2
224	96
4.2	x

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

Q6) Ans:- 1

Solution:- $2\,NaHCO_3 \longrightarrow Na_2CO_3 + CO_2 + H_2O$.

On heating baking soda it loses CO_2 & H_2O

$2\,NaHCO_3 \rightarrow 2[23+1+12+48] = 2\times 84 = 168$ gms

$Na_2CO_3 \rightarrow 46+12+48 = 106$ gms.

$NaHCO_3$	Na_2CO_3
168	106
4.2	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
	n gm	m gm	P gms	q gms.

Given relation

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

$$n + m = P + q$$

Q8) Ans:- 1

Solution:-

$$KMnO_4 + H_2SO_4 + FeSO_4 \rightarrow K_2SO_4 + MnSO_4 + H_2O + Fe_2(SO_4)_3.$$

	LHS	RHS
K	1 2	2
Mn	1 2	1 2
O	12 16 20 32	21 24 32
H	2 8 16	2 16
S	1 3 6 18	5 6 18
Fe	1 2 10	2 10

$$2KMnO_4 + H_2SO_4 + FeSO_4 \rightarrow K_2SO_4 + 2MnSO_4 + H_2O + Fe_2(SO_4)_3.$$

$$2KMnO_4 + H_2SO_4 + 2FeSO_4 \rightarrow K_2SO_4 + 2MnSO_4 + H_2O + Fe_2(SO_4)_3.$$

$$2KMnO_4 + 4H_2SO_4 + 2FeSO_4 \rightarrow K_2SO_4 + 2MnSO_4 + 8H_2O + Fe_2(SO_4)_3.$$

$$2KMnO_4 + 8H_2SO_4 + 10FeSO_4 \rightarrow K_2SO_4 + 2MnSO_4 + 8H_2O + 5Fe_2(SO_4)_3$$

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

Q9) Ans:- 4

Solution:- $HgCl_2 + 4KI \longrightarrow 2KCl + K_2HgI_4$.

KI	K_2HgI_4.
4 moles	1 mole.
x.	0.1 mole.

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

Q10) Ans:- 1

Solution:-

$$CaCO_3 \longrightarrow CaO + CO_2$$

$CaCO_3 \rightarrow 40+12+48 = 100$ gms.

$CaO \rightarrow 40+16 = 56$ gms.

Given $CaO = 28$ gms, $CaCO_3 = x$.

$CaCO_3$	CaO.
100	56.
x	28

$$x = \frac{28 \times 100}{56_2} = 50 \text{ gms.}$$

Q11) Ans:- 4.

Solution:- $2KClO_3 \rightarrow 2KCl + 3O_2$

$2KClO_3 \rightarrow 2[39+35.5+48] = 2(122.5) = 245$

$2KCl \rightarrow 2[39+35.5] = 2(74.5) = 149.$

$3O_2 \rightarrow 3[32] = 96$

For 2 moles of $KClO_3$ it looses 3 moles of O_2

$KClO_3$	O_2
245	96
x	0.384 g

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

0.98 gms of $KClO_3$ looses 0.384 gms of O_2

Given 100% of $KClO_3$ is 4.9 gms which loss 0.384 gms.

100	4.9
x	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:-

$$2Ca_3(PO_4)_2 + 6SiO_2 + 10C \rightarrow 6CaSiO_3 + 10CO + P_4$$

i) 2 moles of $Ca_3(PO_4)_2$ form 1 mole of P_4.

1 mole of $Ca_3(PO_4)_2$ = 0.5 of P_4.

1 mole = $4 \times 31 = 124$.

0.5 moles of P_4 = $\frac{124}{2}$ = 62 gms.

ii) $2Ca_3(PO_4)_2 = 2[3 \times 40 + 2(31 + 64)]$

$= 2 \times 310 = 620$ gms.

1 mole of P_4 = 124 gms.

$Ca_3(PO_4)_2$	P_4
620	124
1	x

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

iii) For each ton of $Ca_3(PO_4)_2$

$Ca_3(PO_4)_2$	P_4
620 ton	124 ton
1 ton	x.

$x = 0.2$.

Q13) Ans:- 1

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

$$C_{12}H_{22}O_{11} + 12O_2 \rightarrow 12CO_2 + 11H_2O$$

1 mole of Sucrose $= (12\times12)+22(1)+11(16)$

$= 144+22+176 = 342$

1 mole $\rightarrow$ 342 grms.

$x \rightarrow$ 34.2 grms

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

1 mole $C_{12}H_{22}O_{11} \rightarrow$ 12 moles of O_2

0.1 moles $\rightarrow$ 1.2 of O_2

Mass of oxygen $= 1.2\times32 = 38.4$ grms.

1 Hour = 38.4 grms of O_2

24 hours $= 24\times38.4 = 921.6$ g.

Q14) Ans:- 3.

Solution:- $4A + 2B + 3C \rightarrow A_4B_2C_3$.

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:-

$4Ag + 8KCN + O_2 + 2H_2O \rightarrow 4K[Ag(CN)_2] + 4KOH$

Ag = 108 gms. KCN = 65 gms.

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

Ag	KCN
432	520
100	x

$x = 120$ gms.

2) 4 moles of Ag with 1 mole O_2

1 mole of Ag = 108 gms.

x moles of Ag = 100 gms.

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

Ag	O_2
4	1
0.925	x

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

1 mole of O_2 → 22.4.

0.23 → x

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

for 0.23 moles,

0.23 moles → 32.

1 mole → 32

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

Q16) Ans:- 2, 3

Solution:- $2P + Q \rightarrow R$.

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

Solution:- $CuO + H_2 \rightarrow Cu + H_2O$.

$CuO = 63.55 + 16 = 79.55 g/mol$.

$H_2 = 2$ gms.

CuO,

1 mole 79.55

0.1 mole 7.955

0.1 moles of H_2 is 0.2 gms.

Q18) Ans:- 1

Solution:- $O_3 + NO \rightarrow NO_2 + O_2$

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

$NO_2 = 14 + 32 = 46$ 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	x.
48.	46

$x = \frac{46 \times 0.740}{48.}$

$= 0.709$ gms.

Q19) Ans:- 2.

Solution:- $O_3 + NO \rightarrow NO_2 + O_2$

48 30.

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

O_3 NO.

48 30.

0.740 x

$\Rightarrow x = 0.4625$ 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.

Remaining NO = 0.670 − 0.4625

= 0.20705.

NO

1 mole → 30 gms.

x → 0.20705

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

= 0.0069

= 0.007 moles of NO.

Integer Type

Q21) Ans:- 12

Solution:- $3NaOH + H_3PO_4 \rightarrow Na_3PO_4 + 3H_2O$.

3 moles of NaOH and 1 mole of H_3PO_4.

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

$H_3PO_4 \rightarrow 3+31+64 = 98$ gms.

NaOH	H_3PO_4
120	98
x	9.8

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

Q22) Ans:- 4.

Solution:- $HgCl_2 + 4KI \rightarrow K_2HgI_4 + 2KCl$

Matrix Matching

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

Solution:-

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

2) $2A + 4B \rightarrow C + \frac{4}{3}D$ (16 moles) (24 moles) → B is limiting reagent, 6 moles of C, 8 moles of D.

3) $3A + 2B \rightarrow 2C + D$ (26 moles) (16 moles) → B is limiting reagent, 8 moles of D, Excess reagent 2 moles.

4) $4A + 5B \rightarrow 2C + 3D$ (12 moles) (17 moles). → Limiting reagent A, 6 moles of C formed.

Learners Task

Q1) Ans:- 3.

Solution:-

$H_2SO_4 + xHI \rightarrow H_2S + yI_2 + zH_2O$.

$H_2SO_4 + 2HI \rightarrow H_2S + I_2 + H_2O$.

	L.H.S	R.H.S
H	3 4 8 10	4 10
S	1	1
O	4	2 4
I	1 2 8	2 6

$H_2SO_4 + 2HI \rightarrow H_2S + I_2 + 4H_2O$

$H_2SO_4 + 8HI \rightarrow H_2S + 4I_2 + 4H_2O$.

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

Q2) Ans:- b.

Solution:-

$HNO_3 + H_2S \rightarrow NO + H_2O + 3S$.

$HNO_3 + 3H_2S \rightarrow NO + H_2O + 3S$.

	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

$2HNO_3 + 3H_2S \rightarrow 2NO + 4H_2O + 3S$

$x = 2$, $y = 3$, $a = 2$, $b = 4$.

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 $Ba(OH)_2$ will exactly neutralize. Trial & error method

In $Ba(OH)_2$ → 2 (OH) are there.

Two neutralize that we need 2 H^+.

2 moles of HCl = 2×1 = Dibasic.

1 mole of H_2SO_4 = 2 = Dibasic.

1 mole of H_3PO_3 = 2 = dibasic.

2 moles of H_3PO_2 = monobasic

2×1 = 2 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.

Solution:- $CaCO_3 \rightarrow CaO + CO_2$

$40+12+48 = 100gms$ $\quad 40+16 = 56$ $\quad 12+32 = 44gms$

Given, $CaCO_3 = 2g$, $CO_2 = ?$

$CaCO_3$	CO_2
100	44
2	x

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

Q7) Ans:- 2

Solution:- $Ag_2CO_3 \longrightarrow 2Ag + CO_2 + \frac{1}{2} O_2$

Molecular weight of $Ag_2CO_3 = 2\times108 + 12 + 3(16)$
$= 276\,g.$

2 moles of $Ag = 2\times108 = 216\,g.$

Ag_2CO_3	Ag
276	216
2.76	x

$$x = \frac{216 \times 2.76}{276_{100}} = 2.16\,g$$

Q8) Ans:- 4.

Solution:- $4AL + 3O_2 \rightarrow 2AL_2O_3$

$4\times27 \quad 3\times32 = 96.$

4 moles of Al react with 3 moles of O_2

AL	O_2
108	96
27	x.

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

Q9) Ans:- 1

Solution:- $MgCO_3 + H_2SO_4 \rightarrow MgSO_4 + H_2O + CO_2\uparrow$

$MgCO_3 = 24+12+48 = 84g \qquad MgSO_4 = 24+32+64 = 120$ gms.

Given $MgSO_4 = 12g.$

$MgCO_3$	$MgSO_4$.
84	120
x	12.

$$x = \frac{12\times84}{120\,10} = 8.4\,g$$

Q10) Ans:- 2

Solution:-

$$CaCl_2 + 2AgNO_3 \rightarrow 2AgCl + Ca(NO_3)_2$$

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

1 Mole $AgCl = 108 + 35.5 = 143.5$ gm.

$$1 \rightarrow 143.5$$
$$x \rightarrow 4.31$$

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

1 mole of $CaCl_2$ with 2moles of AgCl.

$CaCl_2$	AgCL
1	2
x	0.03

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

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

JEE Main Level

Q11) Ans:- 1

Solution:- $2KClO_3 \rightarrow 2KCl + 3O_2$

$2[39+35.5+48]$ $\quad 3 \times 32$

$2(122.5) = 245g.$ $\quad = 96$ gms.

$KClO_3$	O_2
245	96
x	0.96

$$x = \frac{245 \times 0.96}{96}$$

$$= 2.45g.$$

Q12) Ans:- 1

Solution:- $Mg + 2HCl \rightarrow MgCl_2 + H_2\uparrow$

24. 2 gms.

1 mole of Mg produce 1 mole of H_2

Given $Mg = 6g$

Mg	O_2
24	2
6	x.

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

Q13) Ans:- 2

Solution:- $2AL + 1.5O_2 \rightarrow AL_2O_3$.

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

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

Q14) Ans:- 3.

Solution:- $Zn + H_2SO_4 \rightarrow ZnSO_4 + H_2\uparrow$.

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

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

$= 161.5g$.

Given $Zn = 6.5$ gms.

Zn	$ZnSO_4$
65.5	161.5
6.5	x.

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

$= 16.15$ gms.

Q15) Ans:- 2

Solution:-

$MgCO_3 \rightarrow MgO + CO_2$

$24+12+48$ $\quad$ $12+2\times16$

$= 84gms$ $\quad$ $= 44gms.$

1 mole $MgCO_3$ looses 1 mole of CO_2

Given $CO_2 = 10g.$

$MgCO_3$	CO_2
84	44
x	10

$$x = \frac{84\times10}{44} = 19.09\ gms$$

Q16) Ans:- 3.

Solution:- $4HCl + MnO_2 \rightarrow 2H_2O + MnCl_2 + Cl_2$

$4[1+35.5]$

4 Moles of $HCl = 146gms.$

1 Mole of $MnO_2 = 55+32 = 87\ gms.$

Given, $MgO_2 = 5gms$, $HCl = ?$

HCl	MgO_2
146	87
x	5

$$x = \frac{5\times146}{87} = \frac{730}{87} = 8.39\ gms.$$

$= 8.4\ g.$

7) Ans:- 1

Solution:- $3Fe + 4H_2O \rightarrow Fe_3O_4 + 4H_3$.

3 moles of Fe required 4 moles of H_2O.

3 moles of Fe = $3 \times 56 = 168$.

4 moles of H_2O = $4 \times 18 = 72$

Given steam = 18 gms., Fe = ?

Fe	H_2O.
168	72
x	18.

$$x = \frac{168 \times 18}{72} = \frac{168 \times 18}{4} = 42 \text{ gms.}$$

Near by option 37.3 gm

Advanced Level Questions

Ans:- 1.4.

Solution:- $2H_2 + O_2 \rightarrow 2H_2O$.

4g 32g 36 gms.

Given 4g of H_2, 4g of O_2.

→ For 4g of H_2 it requires 32g of O_2.

So O_2 is limiting reagent.

O_2	H_2O.
32	36
4	x

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

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

Solution:- $3BaCl_2 + 2Na_3PO_4 \rightarrow Ba_3(PO_4)_2 + 6NaCl$

$BaCl_2$	Na_3PO_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 Na_3PO_4 → 0.1 Mole of $Ba_3(PO_4)_2$

→ 0.2 moles of Na_3PO_4 = 0.6 moles of NaCl.

→ For 0.2 moles, no. of moles of $BaCl_2$ = ?

$BaCl_2$	Na_3PO_4.
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.

Remaining $BaCl_2$ = 0.4 − 0.3

= 0.1 moles

(Q20) Ans:- 1

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

$$H_2 + Cl_2 \rightarrow 2HCl \text{ is } 1:1:2.$$

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

Solution: $4NH_3 + 5O_2 \xrightarrow{Pt} 4NO + 6H_2O$.

4 Moles of $NH_3 = 4[14+3] = 4 \times 17 = 68$ gms.

5 Moles of $O_2 = 5[32] = 160$ gms.

Given, $NH_3 = 13.6$ g.

NH_3	O_2
68	160
13.6	x

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

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

(Q22) Ans:- 1.2 moles.

Solution:- $4NH_3 + 5O_2 \longrightarrow 4NO + 6H_2O$

1 mole NH_3 = 14+3 = 17 gms.

1 mole ⇒ 17 gms.

x ⇒ 13.6 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.

Solution:- $CaCO_3 \longrightarrow CaO + CO_2$

40+12+48 = 100g 40+16 = 56g.

$CaCO_3$	CaO
100	56.
S	28

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

Q24) Ans:- 1.

Solution:- $3A \rightarrow 2B + 4C$

B C.

2 moles 4 moles.

x → 2 moles

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

Matrix Matching Type

Q25) Ans:- 1 - S, 2 - r, 3 - P, 4 - q.

Solution:-

1) $N_2 + 3H_2 \rightarrow 2NH_3$

3 moles 3 moles.

Here H_2 is limiting reagent.

3 moles of H_2 it produces 2 moles of NH_3

2) $C + 2H_2 \rightarrow CH_4$

2 moles 2 moles

H_2 is limiting reagent.

2 moles of H_2 produces 1 mole of CH_4.

3) $2H_2 + O_2 \rightarrow 2H_2O$.

4 moles 4 moles.

H_2 is limiting reagent.

4 moles of H_2 produces 4 moles of H_2O

4) $CaO + CO_2 \rightarrow CaCO_3$.

0.5 moles 0.5 moles 0.5 moles

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

Solution:-

1) $A + 3B \rightarrow 2C + 4D$.

2moles 6moles. 4moles 8moles.

2) $A + 2B \rightarrow \frac{4}{5}C + 5D$.

16moles 10 moles.

↓

Limiting reagent

B	C
2	$\frac{4}{5}$
10	x

$x = \frac{\frac{4}{5} \times 10}{2} = 4$ moles

B	D.
2	5
10	x

$x = \frac{50}{2}$ 25 moles.

3) $3A + B \rightarrow C + \frac{2}{5}D$.

10moles 20moles

↓

Limiting reagent.

A	B
3	1
10	x

$x = \frac{10}{3}$ 3.3moles.

A	D
3	$\frac{2}{5}$
10	x

$x = \frac{\frac{2}{5} \times 10}{3} = \frac{4}{3}$

4) $4A + 5B \rightarrow 2C + 3D$.

(15) (25moles)

↓

Limiting reagent

A	C
4	2
15	x

$x = \frac{30}{4} = 7.5$ moles.

A	D.
4	3
15	x

$x = \frac{3 \times 15}{4} = \frac{45}{4}$ 11.2 moles