HEATING EFFECT

1. HEATING EFFECT OF CARBONATE & BICARBONATE SALTS :

(a) Heating effect of carbonate salts :

Metal carbonate $\xrightarrow{\Delta}$ metal oxide + $CO_2\uparrow$

(i) $MCO_3 \xrightarrow{\Delta} MO + CO_2$ [M = Be, Mg, Ca, Sr, Ba]

(ii) $MgCO_3 \xrightarrow{\Delta} MgO + CO_2$

(iii) $\underbrace{Cu(OH)_2.CuCO_3}_{\text{Basic Cu(II) carbonate}} \xrightarrow{\Delta} \underset{\text{(black)}}{2CuO} + CO_2 + H_2O$

$\downarrow$ high temperature

$\underset{\text{(red)}}{Cu_2O} + O_2$

(iv) $\underset{\text{white}}{ZnCO_3} \xrightarrow{\Delta} \underset{\substack{\text{Yellow(hot)}\\ \text{white(cold)}}}{ZnO} + CO_2$

(v) $PbCO_3 \xrightarrow{\Delta} \underset{\text{Yellow}}{PbO} + CO_2$

(vi) $Li_2CO_3 \xrightarrow{\Delta} Li_2O + CO_2$

(vii) $\boxed{(NH_4)_2CO_3 \xrightarrow{\Delta} 2NH_3 + H_2O + CO_2}$ **Very Important**

(viii) $Pb(OH)_2.2PbCO_3$ (White lead)

- $\xrightarrow{350^oC} Pb_3O_4 + CO\uparrow + CO_2\uparrow + H_2O\uparrow$
- $\xrightarrow[\text{Bunsen burner temperature}]{700–800^oC} 3PbO + 2CO_2\uparrow + H_2O\uparrow$

(ix) All carbonates **except** (Na, K, Rb, Cs) decompose on heating giving CO_2

(x) Carbonates salts of (Na, K, Rb, Cs) do not decompose on heating, they are melt on high temperature.

(xi) Oxides of heavier metals are less stable so further decompose into metal & oxygen

(xii) $\underset{\substack{\text{white}\\ \text{(yellowish white)}}}{Ag_2CO_3} \xrightarrow{\Delta} \underset{\text{Black}}{2Ag} + CO_2 + \frac{1}{2}O_2$

(xi) $HgCO_3 \xrightarrow{\Delta} Hg + \frac{1}{2}O_2\uparrow + CO_2$

(b) Heating effect of bicarbonate :

(i) Metal bicarbonate $\xrightarrow{\Delta}$ metal carbonate + $CO_2\uparrow$
(except (Na, K, Rb, Cs))

$\downarrow$

metal oxide + CO_2

(ii) [General reaction $2HCO_3^- \xrightarrow{\Delta} CO_3^{2-} + H_2O + CO_2$]

(iii) All bicarbonates decompose to give carbonates and CO_2. eg.

(iv) $2NaHCO_3 \xrightarrow{\Delta} Na_2CO_3 + CO_2 + H_2O$

(v) $Mg(HCO_3)_2 \xrightarrow{\Delta} MgO + 2CO_2 + H_2O$

2. HEATING EFFECT OF HYDRATED SULPHATE SALTS :

(i) Metal Sulphate $\xrightarrow{\Delta}$ Metal Oxide + SO_3
(M=Be,Zn,Mg,Ca,Cu,Pb)

SO_3 $\xrightarrow{T > 800^\circ C}$ $SO_2 + \frac{1}{2}O_2$

Metal Oxide $\xrightarrow{1100^\circ C}$ $\frac{1}{2}Cu_2O + \frac{1}{2}O_2$

(ii) $CuSO_4.5H_2O \xrightarrow[-4H_2O]{100^\circ C} CuSO_4.H_2O \xrightarrow[-H_2O]{220^\circ C} CuSO_4 \xrightarrow{>800^\circ C} CuO + SO_2 + \frac{1}{2}O_2$
Blue vitriol; Bluish White; White

$CuSO_4 \xrightarrow{750^\circ C}$ $CuO + SO_3$ (Black)

(iii) $FeSO_4.7H_2O \xrightarrow[-7H_2O]{300^\circ C} FeSO_4 \xrightarrow[\text{Strongly}]{\Delta} Fe_2O_3 + SO_2 + SO_3$ (very important)
Green vitriol

(iv) $Fe_2(SO_4)_3 \xrightarrow{\Delta} Fe_2O_3 + 3SO_3$

(v) $CaSO_4.2H_2O \xrightarrow{120^\circ C - 150^\circ C} (CaSO_4.\frac{1}{2}H_2O) + 1\frac{1}{2}H_2O$
gypsum; (Plaster of paris) or calcium sulphate hemihydrate

$(CaSO_4.\frac{1}{2}H_2O) \xrightarrow{1\frac{1}{2}H_2O} CaSO_4.2H_2O$
another crystallographic form of gypsum hard & porous

$(CaSO_4.\frac{1}{2}H_2O) \xrightarrow{\Delta} CaSO_4 + \frac{1}{2}H_2O$
Dead burnt

$CaSO_4 \xrightarrow{1100^\circ C} CaO + SO_3$

(vi) $ZnSO_4.7H_2O \xrightarrow[-H_2O]{70^\circ C} ZnSO_4.6H_2O \xrightarrow[-5H_2O]{70^\circ - 200^\circ C} ZnSO_4.H_2O \xrightarrow[-H_2O]{>200^\circ C} ZnSO_4 \xrightarrow{\Delta > 800^\circ C} ZnO + SO_2 + \frac{1}{2}O_2$

(vii) $MgSO_4.7H_2O \xrightarrow[-7H_2O]{\Delta} MgSO_4 \downarrow$ [Same as $ZnSO_4$]
epsom salt

(viii) $2NaHSO_3 \xrightarrow{\Delta} Na_2S_2O_5 + H_2O$

$2NaHSO_3 \xrightarrow{\Delta} Na_2SO_3 + SO_2$

$Na_2SO_3 + SO_2 \rightarrow Na_2S + Na_2SO_4$

(ix) $2NaHSO_4 \xrightarrow{\Delta} Na_2SO_4 + H_2O + SO_3$

(x) $Na_2S_2O_3.5H_2O \xrightarrow{220^\circ C} Na_2S_2O_3 + 5H_2O$

$\xrightarrow[\text{(From 4 moles)}]{\Delta} 3Na_2SO_4 + Na_2S_5.$

3. HEATING EFFECT OF NITRATE SALTS

(i) Metal nitrate $\xrightarrow{\Delta}$ metal oxide + NO_2 + O_2

(ii) $2M(NO_3)_2 \xrightarrow{\Delta} 2MO + 4NO_2 + O_2$

[M = all bivalent metals eg. Zn^{+2}, Mg^{+2}, Sr^{+2}, Ca^{+2}, Ba^{+2}, Cu^{+2}, Pb^{+2}]

(iii) $2LiNO_3 \xrightarrow{\Delta} Li_2O + 2NO_2 + \frac{1}{2}O_2$

(iv) $MNO_3 \xrightarrow{\Delta} MNO_2 + \frac{1}{2}O_2$

[M=Na,K,Rb,Cs]

$\downarrow$ high temperature

$M_2O + N_2 + \frac{3}{2}O_2$

(v) $NaNO_3 \xrightarrow{500°C} NaNO_2 + \frac{1}{2}O_2$

(vi) $NaNO_2 \xrightarrow{800°C} Na_2O + N_2 + \frac{3}{2}O_2$

(vii) $BeCl_2 \xrightarrow{N_2O_4} Be(NO_3)_2.2N_2O_4 \xrightarrow[\text{under vaccum}]{\text{Warm to 50°C}} Be(NO_3)_2$ → (700–800°C) $BeO + 2NO_2 + 1/2\ O_2$; → (125°C) $[Be_4O(NO_3)_6]$ basic beryllium nitrate

Exception : If formed oxide is of heavier metal then it being less stable and further decomposed in to metal and oxygen.

(viii) $Hg(NO_3)_2 \xrightarrow{\Delta} Hg + 2NO_2 + O_2$

(ix) $2AgNO_3 \xrightarrow{\Delta} 2Ag + 2NO_2 + O_2$

4. HEATING EFFECT OF AMMONIUM SALTS :

If anionic part is oxdising in nature, then N_2 will be the product (some times N_2O).

(i) $(NH_4)_2Cr_2O_7 \xrightarrow{\Delta} N_2 + Cr_2O_3 + 4H_2O$ {This reaction is used for making artificial volcano}

(orange solid) (green)

(ii) $NH_4NO_2 \xrightarrow{\Delta} N_2 + 2H_2O$

(iii) $NH_4NO_3 \xrightarrow{\Delta} N_2O + 2H_2O$

(iv) $2NH_4ClO_4 \xrightarrow{\Delta} N_2 + Cl_2 + 2O_2 + 4H_2O$

(v) $2NH_4IO_3 \xrightarrow{\Delta} N_2 + I_2 + O_2 + 4H_2O$

If anionic part weakly oxidising or non oxidising in nature then NH_3 will be the product.

(i) $(NH_4)_2HPO_4 \xrightarrow{\Delta} HPO_3 + H_2O + 2NH_3$

(ii) $(NH_4)_2SO_4 \xrightarrow{\Delta} NH_3 + H_2SO_4$

(iii) $2(NH_4)_3PO_4 \xrightarrow{\Delta} 2NH_3 + P_2O_5 + 3H_2O$

(iv) $(NH_4)_2CO_3 \xrightarrow{\Delta} 2NH_3 + H_2O + CO_2$

(v) $NH_4Cl \xrightarrow{\Delta} NH_3\uparrow + HCl\uparrow$

(vi) $(NH_4)_2S \xrightarrow{\Delta} NH_3\uparrow + H_2S\uparrow$

(vii) $NH_4F \xrightarrow{\Delta} NH_3 + HF$

(viii) $(NH_4)_2MoO_4 \xrightarrow{\Delta} NH_3\uparrow + MoO_3 + H_2O$

5. HEATING EFFECT OF PHOSPHATE SALTS :

(i) 1º Phosphate salts gives metaphosphate salt on heating.

$NaH_2PO_4 \xrightarrow{\Delta} H_2O + NaPO_3$

(ii) 2º Phosphate salts gives pyrophosphate

$Na_2HPO_4 \xrightarrow{\Delta} H_2O + Na_4P_2O_7$

(iii) 3º Phosphate salt have no heating effect

$Na_3PO_4 \xrightarrow{\Delta}$ No effect

(iv) $\underset{\text{microcosmic salt}}{Na(NH_4)HPO_4.4H_2O} \xrightarrow[-4H_2O]{\Delta} NaNH_4HPO_4 \xrightarrow{\text{High temp.}} NaPO_3 + NH_3 + H_2O$

(v) $2Mg(NH_4)PO_4 \xrightarrow{\Delta} Mg_2P_2O_7 + 2NH_3 + H_2O$

6. HEATING EFFECT OF HALIDES SALTS :

(i) $2FeCl_3 \xrightarrow{\Delta} 2FeCl_2 + Cl_2$

(ii) $AuCl_3 \xrightarrow{\Delta} AuCl + Cl_2$

(iii) $Hg_2Cl_2 \xrightarrow{\Delta} HgCl_2 + Hg$

(iv) $NH_4Cl \xrightarrow{\Delta} NH_3 + HCl$

(v) $Pb(SCN)_4 \xrightarrow{\Delta} Pb(SCN)_2 + (SCN)_2$

(vi) $PbCl_4 \xrightarrow{\Delta} PbCl_2 + Cl_2$

(vii) $PbBr_4 \xrightarrow{\Delta} PbBr_2 + Br_2$ **[PbI_4 does not exists]**

(viii) $\underset{\text{scarlet red}}{HgI_2} \underset{\text{On Rubbing}}{\overset{127°C}{\rightleftharpoons}} \underset{\text{yellow}}{HgI_2}$

7. HEATING EFFECT OF HYDRATED CHLORIDE SALTS

(i) $MgCl_2 . 6H_2O \xrightarrow{\Delta} MgO + 2HCl + 5H_2O$

(ii) $2FeCl_3 . 6H_2O \xrightarrow{\Delta} Fe_2O_3 + 6HCl + 9H_2O$

(iii) $2AlCl_3 . 6H_2O \xrightarrow{\Delta} Al_2O_3 + 6HCl + 9H_2O$

(iv) $\underset{\text{Pink}}{CoCl_2.6H_2O} \xrightarrow[-2H_2O]{50°C} CoCl_2.4H_2O \xrightarrow[-2H_2O]{58°C} \underset{\text{Red violet}}{CoCl_2.2H_2O} \xrightarrow[-2H_2O]{140°C} \underset{\text{Blue}}{CoCl_2}$

Hydrated Co^{2+} salt - Pink Anhydrous Co^{2+} salt - Blue

8. HEATING EFFECT OF OXIDE :

(i) $2Ag_2O \xrightarrow[300°C]{\Delta} 4Ag + O_2$

(ii) $\underset{\text{white}}{ZnO} \underset{\text{Cold}}{\overset{\text{Hot}}{\rightleftharpoons}} \underset{\text{yellow}}{ZnO}$

(iii) $PbO_2 \xrightarrow{\Delta} PbO + \frac{1}{2}O_2$

(iv) $\underset{\text{yellow}}{PbO}$ (Massicot) $\xrightarrow[\text{Cooled \& powdered}]{\text{Fused}} \underset{\text{Litharge (red)}}{PbO}$

(v) $3MnO_2 \xrightarrow{900°C} Mn_3O_4 + O_2$

(vi) $\underset{\text{Red lead}}{Pb_3O_4} \underset{350°C}{\overset{500°C}{\rightleftharpoons}} \underset{\text{Litharge}}{6PbO} + O_2$

(vii) $2CrO_5 \xrightarrow{\Delta} Cr_2O_3 + \frac{7}{2}O_2$

(viii) $\underset{\text{(White)}}{K_2O} \underset{\text{cold}}{\overset{\Delta}{\rightleftharpoons}} \underset{\text{(yellow)}}{K_2O}$

(ix) $I_2O_5 \xrightarrow{\Delta} I_2 + \frac{5}{2}O_2$

(x) $\underset{\text{yellow}}{HgO} \xrightarrow{\Delta} \underset{\text{red}}{HgO} \xrightarrow[\text{strong heating}]{400°C} Hg + \frac{1}{2}O_2$

(xi) $2CrO_3 \xrightarrow{420°C} Cr_2O_3 + \frac{3}{2}O_2$

9. HEATING EFFECT OF PERMANGANATE :

$\underset{\text{dark puple (almost black)}}{2KMnO_4} \xrightarrow{513K} \underset{\text{(green)}}{K_2MnO_4} + \underset{\text{(black)}}{MnO_2} + O_2$

10. HEATING EFFECT OF DICHROMATE & CHROMATE SALTS :

$\underset{\text{orange}}{2K_2Cr_2O_7} \xrightarrow{\Delta} \underset{\text{yellow}}{2K_2CrO_4} + \underset{\text{green}}{Cr_2O_3} + \frac{3}{2}O_2\uparrow$

11. HEATING EFFECT OF ACIDS :

(i) $2HNO_3 \xrightarrow{\Delta} H_2O + 2NO_2 + \frac{1}{2}O_2$ (conc.)

(ii) $H_2SO_4 \xrightarrow{444°C} H_2O + SO_3$

(iii) $H_2SO_4 \xrightarrow{>800°C} H_2O + SO_2 + \frac{1}{2}O_2$

(iv) $3H_2SO_3 \longrightarrow 2H_2SO_4 + S\downarrow + H_2O$

(v) $3HNO_2 \longrightarrow HNO_3 + 2NO + H_2O$

(vi) $HClO_3 \longrightarrow HClO_4 + ClO_2 + H_2O$

(vii) $3HOCl \longrightarrow 2HCl + HClO_3$

(viii) $4H_3PO_3 \xrightarrow[200°C]{\Delta} 3H_3PO_4 + PH_3$

(ix) $2H_3PO_2 \longrightarrow H_3PO_4 + PH_3$

(x) $2NaH_2PO_2 \longrightarrow Na_2HPO_4 + PH_3$

(xi) $H_2C_2O_4 \xrightarrow{\Delta} H_2O + CO + CO_2$

} Undergoes dispropor--tionation reaction

(xii) $H_3PO_4 \xrightarrow{220°C} H_4P_2O_7 \xrightarrow{320°C} 4HPO_3 \xrightarrow{>320°C} 2P_2O_5 + 2H_2O$

(xiii) $H_3BO_3 \xrightarrow{100°C} 4HBO_2 \xrightarrow{140°C} H_2B_4O_7 \xrightarrow[hot]{Red} 2B_2O_3 + H_2O$

12. HEATING EFFECTS OF ACETATE SALTS

Metal acetate $\xrightarrow{\Delta}$ Metal Carbonate (M = LiBe Mg) + CH_3COCH_3

Metal Carbonate $\xrightarrow{\Delta}$ Metal oxide + CO_2

(i) $Pb(OAc)_2 \xrightarrow{\Delta} PbO + CO_2 + CH_3COCH_3$

(ii) $Mg(OAc)_2 \xrightarrow{\Delta} MgO + CO_2 + CH_3COCH_3$

(iii) $Be(OAc)_2 \xrightarrow{\Delta} BeO + CO_2 + CH_3COCH_3$

(iv) $Ca(OAc)_2 \xrightarrow{\Delta} CaCO_3 + CH_3COCH_3$

(v) $Ba(OAc)_2 \xrightarrow{\Delta} BaCO_3 + CH_3COCH_3$

(vi) $CH_3CO_2K \xrightarrow{\Delta} K_2CO_3 + CH_3COCH_3$

13. HEATING EFFECTS OF OXALATE SALTS

$$\text{Metal oxalate} \xrightarrow{\Delta} \underset{\text{(M = LiBe Mg)}}{\text{Metal Carbonate}} + CO + CO_2$$

$$\text{Metal carbonate} \xrightarrow{\Delta} \text{Metal oxide} + CO_2$$

(i) $7Na_2C_2O_4 \xrightarrow{\Delta} 7Na_2CO_3 + 2CO_2 + 3CO + 2C$

(ii) $SnC_2O_4 \xrightarrow{\Delta} SnO + CO_2 + CO$

(iii) $FeC_2O_4 \xrightarrow{\Delta} FeO + CO + CO_2$

(iv) $Ag_2C_2O_4 \xrightarrow{\Delta} 2Ag + 2CO_2$

(v) $HgC_2O_4 \xrightarrow{\Delta} Hg + 2CO_2$

14. HEATING EFFECTS OF FORMATE SALTS

(i) $HCO_2Na \xrightarrow{350°C} Na_2C_2O_4 + H_2\uparrow$

(ii) $HCOOAg \xrightarrow{\Delta} HCOOH + 2Ag + \frac{1}{2}\underbrace{O_2 + CO}_{\downarrow\ CO_2}$

(iii) $(HCOO)_2Hg \longrightarrow HCOOH + Hg + \frac{1}{2}\underbrace{O_2 + CO}_{\downarrow\ CO_2}$

EXERCISE

Single correct

1. Which of the following does not give metal oxide on heating

(A) $NaCO_3$ (B) K_2CO_3 (C) Rb_2CO_3 (D) All of these

HE0001

2. Which of the following metal bicarbonate will give metal oxide and CO_2 on heating

(A) $NaHCO_3$ (B) $Mg(HCO_3)_2$ (C) $KHCO_3$ (D) Rb_2CO_3

HE0002

3. Which of the following metal nitrate will give metal and oxygen on heating :

(A) KNO_3 (B) $NaNO_3$ (C) $AgNO_3$ (D) $RbNO_3$

HE0003

4. Which of the following nitrate will give N_2O on heating :

(A) NH_4NO_3 (B) NH_4NO_2 (C) $NaNO_3$ (D) $AgNO_3$

HE0004

5. Which of the following ammonium salt will not give acid on heating :

(A) $(NH_4)_2HPO_4$ (B) $(NH_4)_2MoO_4$ (C) $(NH_4)_2SO_4$ (D) NH_4Cl

HE0005

6. Which of the following halide will not give halogen gas on heating :

(A) $PbCl_4$ (B) $PbBr_4$ (C) Hg_2Cl_2 (D) All of these

HE0006

7. Select the correct statements

(A) Hydrated Co^{+2} salt is pink (B) Anhydrous Co^{+2} salt is of blue colour

(C) Hybridisation of $CoCl_2.6H_2O$ is sp^3d^2 (D) All of these

HE0007

8. Which of the following metal sulphate will give SO_2 and SO_3 both gaseous product on heating :

(A) $CuSO_4$ (B) $FeSO_4$ (C) $Fe_2(SO_4)_3$ (D) $CaSO_4$

HE0008

9. Which of the following compound is called dead burnt plaster :

(A) $CaSO_4.\frac{1}{2}H_2O$ (B) $CaSO_4.2H_2O$ (C) $CaSO_4$ (anhy.) (D) None of these

HE0009

10. When NaH_2PO_4 is heated then which of the following compound is formed :

(A) $Na_4P_2O_7$ (B) Na_3PO_4 (C) HPO_3 (D) $NaPO_3$

HE0010

11. When $KMnO_4$ is heated then which of the following compound is formed :

(A) $K_2MnO_4 + MnO_2$ (B) $K_2MnO_4 + MnO$ (C) $MnO_2 + MnO$ (D) No change

HE0011

12. When CrO_3 is heated then ..... + ... are formed :

(A) Cr_2O_3, O_2 (B) CrO_2, O_2 (C) $Cr_2O_7^{-2}$, O_2 (D) None of these

HE0012

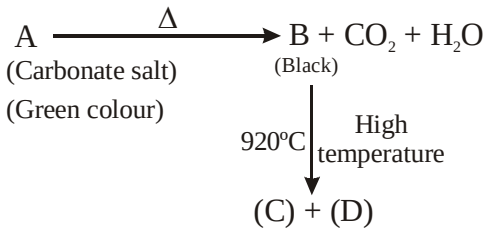
More than one may be correct

13. Which of the following metal carbonate will give of metal and oxyen on heating-

(A) Ag_2CO_3 (B) $HgCO_3$ (C) $(NH_4)_2CO_3$ (D) $PbCO_3$

HE0013

14.



Select the correct statements -

(A) Compound (A) is basic copper carbonate

(B) Compound (B) CuO

(C) Compound (C) is Cu_2O

(D) Compound (D) is paramagnetic in naturue

HE0014

15. When Ag_2CO_3 is heated then product will be -

(A) Ag_2O (B) Ag (C) O_2 (D) CO_2

HE0015

16. When compound A (orange red) is heated then green colour oxide of (B) is formed and inert gas (C) is formed then select the correct statements :

(A) Compound (A) is $(NH_4)_2\ Cr_2O_7$

(B) Compound (B) is used in fire works

(C) Gas C is N_2

(D) Heating effect of (A) is a type of intra molecular redox reaction

HE0016

17. Which of the following hydrated salts will not become anhydrous on heating :

(A) $MgCl_2.6H_2O$ (B) $FeCl_3.6H_2O$ (C) $AlCl_3.6H_2O$ (D) $CoCl_2.6H_2O$

HE0017

18. Which of the following metal nitrate produce NO_2 on heating

(A) $Hg(NO_3)_2$ (B) $RbNO_3$ (C) $Pb(NO_3)_2$ (D) $Cu(NO_3)_2$

HE0018

19. Which of the following oxides turns yellow on heating and becomes white on cooling :

(A) ZnO (B) K_2O (C) PbO (D) Ag_2O

HE0019

Paragraph for Q. No. 20 to Q. No. 21

$$\underset{\text{(Orange solid)}}{(A)} \xrightarrow{\Delta} \underset{\text{(yellow)}}{(B)} + \underset{\text{(green)}}{(C)} + \underset{\text{(Paramagnetic)}}{(D)}$$

20. Compound (A) is :

(A) $K_2Cr_2O_7$ (B) K_2CrO_4 (C) Cr_2O_3 (D) O_2

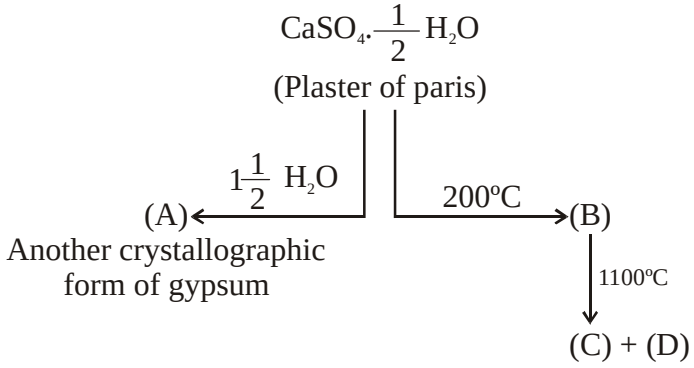
HE0020

21. Compound (C) is also obtained on heating of :

(A) $(NH_4)_2Cr_2O_7$ (B) NH_4ClO_4 (C) NH_4NO_3 (D) None of these

HE0020

Paragarph for Q. No. 22 & 23



22. Compound "A" is :

(A) $CaSO_4.2H_2O$ (B) $2CaSO_4.H_2O$ (C) $CaSO_4.3H_2O$ (D) $CaSO_4.5H_2O$

HE0021

23. Compound "C" and "D" are respectivelly :

(A) $CaO + CaSO_4$ (B) $CaSO_4 + SO_2$ (C) $CaSO_4 + SO_3$ (D) $CaO + SO_3$

HE0021

Matrix match

24. Match the column

Column-I	**Column-II**
(A) $Be(NO_3)_2 \xrightarrow{\Delta}$	(P) Gives H_2O
(B) $HNO_2 \xrightarrow{\Delta}$	(Q) Oxyacid is obtained
(C) $NaH_2PO_4 \xrightarrow{\Delta}$	(R) Gives disproportionation reaction
(D) $H_3PO_3 \xrightarrow{\Delta}$	(S) Oxygen gas is evolved

HE0022

25.

Column-I (Compound)	**Column-II (Products on heating)**
(A) NH_4ClO_4	(P) CO_2 gas is evolved
(B) $Mg(OAc)_2$	(Q) H_2 gas is evolved
(C) HCOONa (above 350ºC)	(R) N_2 gas is evolved
(D) $(NH_4)_2CO_3$	(S) Same gas is evolved which is obtained by heating $(NH_4)_2SO_4$
	(T) Intra molecular redox reaction

HE0023

Integer

26. When calamine is heated then a product (A) is formed then find the total number of following options are correct for compound (A) -

(i) Compound (A) is white in cold conditions

(ii) Compound (A) is yellow in hot conditions

(iii) Compound (A) is called phillosopher's wool

(iv) Compound (A) when combined with CoO, then compound (B) is formed & colour of new compound (B) is green

(v) Compound (B) is called Rinmann's green

HE0024

27. $NaNO_3 \xrightarrow{500°C}$ (A) + (B)

(A) $\xrightarrow{800°C}$ (C) + (D) + (E)

Find the number of correct statements

(1) Compound (B) is paramagnetic in nature

(2) Compound (B) when undergoes dimerisation then dimer product is diamagnetic in nature

(3) Bond order of compound (B) is two

(4) D is N_2 gas

(5) Compound B and E are same gas

HE0025

28. (A) $\xrightarrow{\Delta}$ (B) + (C) + (D)
(dark purple almost black) (green) (black)

Find the number of correct statements

(1) Compound B is K_2MnO_4

(2) Compound C is MnO_2

(3) Compound D is O_2

(4) Compound B is paramagnetic in nature

(5) Compound D has two unpaired electron in bonding molecular orbital

HE0026

29. Total number of compounds undergoes dispropornation redox reaction on heating

MnO_2, HOCl, H_3PO_3, HNO_2, CrO_5, $HClO_3$

HE0027

30. On strong heating of H_3PO_4 and H_3BO_3, sum of oxidation number of P & B in the final product obtained is

HE0028

ANSWER-KEY

Que.	1	2	3	4	5	6	7	8	9	10
Ans.	D	B	C	A	B	C	D	B	C	D
Que.	11	12	13	14	15	16	17	18	19	20
Ans.	A	A	A, B	A,B,C,D	B,C,D	A,B,C,D	A, B, C	A,C,D	A, B	A
Que.	21	22	23	24						
Ans.	A	A	D	(A)→(S);(B)→(P,Q,R);(C)→(P);(D)→(Q,R)						
Que.	25					26	27	28	29	30
Ans.	(A)→(R,T);(B)→(P);(C)→(P,Q,T);(D)→(P,S)					5	4	4	4	8