MARKING SCHEME CHEMISTRY PAPER 233/1

1. It is unreactive

2. Oxygen exists as discrete molecules (O_2) with only weak Van der Waals forc between them. While Sulphur exists as S_8 rings and chains which are bulky. (2 marks)

3. (a) Sulphur, carbon, nitrogen (1)
   (b) Sodium potassium, lithium (1) (2 marks)

4. (a) The Hypochlorous acid decomposes to form (atomic oxygen) (1)
   The atomic oxygen attacks and bleaches the blue flower (1)
   (b) $2HOCL_{(aq)} \longrightarrow O_{2\,(g)} + 2HCL_{(aq)}$ (1) (3 marks)

5. (a) Calcium 2.8.8.2. (½)
   Beryllium 2.2 (½)

   (b) Both elements are in the same group but the two valence electrons of calcium are further away (1).
   They are not strongly held by the nucleus, hence are readily released. (1)
   (3 marks).

6. (a) Oxygen (1)
   (b) Decomposition (1) (2 marks)

7. Use zinc powder (1) which has a larger surface area (1) (2 marks)

8. (a) C2 = Fes, Zns (1)
   (b) It is soluble in cold water (1)
   (c) It turns black (1) (3 marks)

9. (a) Displacement (1)
   (b)
   (c) DGEF (1) (3 marks)

10. (a) Alpha or He (1)
    (b) $^{210}_{81}L \rightarrow {}^{210}_{82}K + {}^{0}_{-1}e$
    (c) K and M (1) (3 marks)

11. SO_2 reacts with water to from $SO^{2-}{}_3$ /sulphurous acid (10 which then is oxidized by chlorine to $SO^{2-}{}_4$ /sulphur acid (1). $SO^{2-}{}_4$ react with Ba^{2+} to from insoluble $BaSO_4$ (1). (3 marks)

12 Concentrated nitric acid is a strong oxidizing agent (½). It oxidizes pale iron (II) (½) to yellow iron (III)(½) and it is reduced to nitrogen dioxide (1) which is brown (½)
(3 marks)

13. (a) Lattice energy (a)
(b) Let the heat be ΔH3
$\Delta H_3 - -701 = 15$ (1)
$\Delta H_3 = -686$ kJ mol^{-1} (2 marks)

14. (a) Fe_2O_3, Fe_3O_4 (1)
(b) $CaO_{(s)} + SiO_{2(s)} \longrightarrow CaSiO_{3(S)}$ (1) (2 marks)

15. (a) $Ca(OH)_{2(aq)} + CO_{2(g)} \longrightarrow CaCo_{3(s)} + H_2O_{(1)}$ (1)
(b) White PPt dissolves (1) because the insoluble $CaCO_3$ (½) is changed into soluble calcium hydrogen carbonate. (½)

16. Covalent bonds exist between two iodine atoms(½) in an iodine molecule (1)
While Van der Waals forces exist between two or more molecules of iodine (1)
Covalent bonds are strong than Van der Waals forces. (3 marks)

17. (a) Perspex (1)
(b) As a substitute for glass in the manufacture of
- Safety screens
- Plastic lenses
- Wind screens

Accept any other correct use. (2 marks)

18. Add excess zinc oxide(½) to dilute HCl, H_2SO_4 HNO_3(½) Filter(½) to the filtrate, add aqueous Na_2CO_3 K_2CO_3(½) to precipitate ZnCO3(½) filter(½) (3 marks)

19. (a) The quantity of white PPt decreases (1)
(b) Some of the BiOCl reacts (½) with the extra acid pushing the equilibrium to the Left (½) (2 marks).

20. I. Conducts (1)
II. Ionic (1)
III. Covalent (1) (3 marks)

21. (a) $2NaOH_{(aq)} + H2SO4_{(aq)} \longrightarrow Na_2SO_{4(aq)} + H_2O_{(l)}$ (1)
(b) Blue litmus paper turns red
Red litmus paper remains red
(c) The acid was in excess (1) (3 marks)

22. (a) Manganese (IV) oxide (1)
(b) $H_2O_{2(l)}, O_{2(g)} + H_2O_{(l)}$ (1)
(c) - Welding (1)
- Fuel in rockets
- Breathing aid/hospitals
- Steel making
Accept any other correct us (3 marks)

23 Pb (xo3 (aq) + 2Nacl (aq) Pbcl2(s) + 2 NaNo3 (aq) (1)

R.F.M. Nacl = 58.5
R.F.M. $Pbcl_2$ = $278^{(1/2)}$
Moles of $Pbcl_2$ = $\frac{2.56}{278}$
Moles of Nacl = $\frac{2.56}{278} \times 2^{(1/2)}$
Mass of Nacl = 0.04×58.5
= $2.34g^{(1/2)}$ (3 marks)

24. (a) Being acidic, it would react with the basic ammonia (1)
(b) CaO (1) (2 marks)

25. (a) Butane (1)
(b) Hardening of oils in the (a) manufacture of margarine (2 marks)

26. (a) $Aq^{+}_{(aq)} + e \longrightarrow Ag_{(s)}$ (1)
(b) Anode decreases in size/mass (1)
It dissolves/ionizes to release electrons (1) (3 marks)

27. (a) Pb^{2+} or Ag^{+} Hg^{2+} Absent (1)
(b) Zn^{2+} (1)
(c) $Zn^{2+}_{(aq)} + CO_3^{2-}{}_{(aq)} \longrightarrow ZnCO_{3(S)}$ (1) (3 marks)
(d)