MARKING SCHEME.

233/1

CHEMISTRY

PAPER 1 THEORY.

1. a) -Components in air can be separated by physical means. √ 1
   -Components in air are not in fixed proportions.

   b, i. common salt/ sodium chloride √ 1

   ii. Water. √ 1.

   iii) Brine / conc sodium chloride. √ 1

2. – Red brown //brown fumes due to NO2. √
   - Red solid residue due to PbO.

3.

	Na	O
%	59	41
RAM	23	16
Mole	59/23	41/16
	2.57	2.56
Mole ratio	2.57/2.56 = 1	2.56/2.56 = 1

   E.F NaO

   RFM of NaO. 23+16= 39

   MM = (EF)n

   78 = 39n

   n = 2

   M.F Na_2O_2.

4. a) i) Cl^-

ii. Fe^{2+}

b. The white precipitate will dissolve. √ 1

5. – Raising the pressure. √ 1

- lowering the temperature/ cooling. √ 1

6. a) Ammonium Chloride/ NH4Cl (accept either name or formula). √ 1

b) Sublimation. √ 1

7. Add a soluble carbonate √ 1 (e.g Na_2CO_3, K_2CO_3, $(NH_4)_2CO_3$

Filter the mixture wash the residue with distilled water √ 1 dry the residue between two filters.

8. a) Salt bridge. √ 1

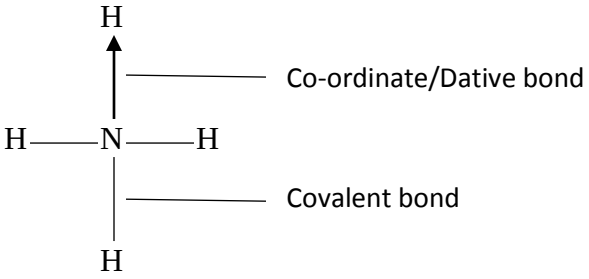
b) E reduced – E oxidized.

+0.80 - -0.13 √ 1 = 0.93V √ 1

9. I) H_2O

II) C_2H_4.

III)



10. Aluminium is more reactive than zinc √ 1 hence offers a better sacrificial protection to iron against rusting. √ 1

11. The volume of a fixed mass of gas is directly proportional to its absolute temperature at constant pressure. √ 1

b) V1/T1 =V2/V2

480/293 =960/T2 √ 1

T2 = 960X293/480

= 580K or 3130c

12. a) Existence of an element in two or more forms in the same physical states. √ 1

b)

ELEMENT	ALLOTROPES
(i) Carbon	Diamond/ graphite
(ii) Sulphur	Rhombic /monoclinic

13. (a) Water molecules are losing heat their kinetic energy decreases and thee molecules move closer to each other. √ 1

(b) Solid state. √ 1

14. $AlCl_3$ (RMM 133.5) dimerizes √ 1 at 186^0c to form Al_2Cl_6 √ 1 (RMM 267).

15. a) iron catalyst √ 1

b) $4\ NH_{3(g)} + 5\ O_{2(g)} \quad 4\ NO_{(g)} + 6H_2O_{(l)}$ √ 1

c. - As a fertilizer

- Making explosives

16. a) Minimum amount of energy required to remove an electron from the outermost energy level of an atom in gaseous state.

b) II, IV, III, I. √ 1

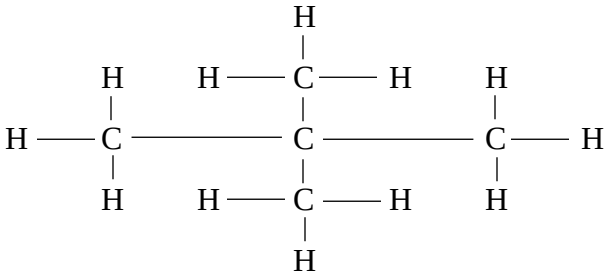
For metals the lower the ionization energy the more reactive the element. √ 1

17. a) i) Carbon √ 1

ii) Hydrogen √ 1

b) Carbon (iv) oxide and water.

18. a)



b) 2 – methyl butan -1 – ol.

c) i) Chlorofluorocarbon. √ 1

ii) Causes skin cancer √ 1 when high energy U.V radiations reach the earth.

19. a) Anhydrous (fused) calcium chloride / calcium oxide /silica gel. √ 1

b. Colour change from black to brown /

Colour of CuO change to brown. √ 1

- Colourless liquid formed on the cooler parts of the combustion tube. √ 1

c. $CuO_{(s)}$ + $H_{2(g)}$ $Cu_{(s)}$ + $H_2O_{(l)}$ √ 1

d. moles of copper = 2.5/64 =0.0390625moles

moles of CuO equals moles of Cu = 0.0390625

mass of CuO = 0.0390625 x 80 = 3.125g

20. a) Q molten sulphur/ mixture of molten sulphur and water.

R super heated water / hot water at 170^0c.

b. To increase pressure √ 1 in the sulphur beds hence forcing out the molten sulphur.

c. Sulphur (iv) oxide bleaches by reducing √ 1 the dyes while chlorine bleaches by oxidizing dyes. √ 1

21. a) $ZnSO_4$ √ 1 at 40^0c only26^0c will dissolve leaving the rest undissolved /while all $Pb(NO_3)_2$ will dissolve.

b) 34 -26 = 8g √ 1

22. a. A Bauxite /$Al_2O_3.2H_2O$

C solid Aluminium.

b. Seeding process √ 1. Adding $Al(OH)_3$ √ 1 crystals into the solution containing complex ion $Al(OH)_4$ to enhance precipitation of $Al(OH)_3$ // bubbling CO_2 gas through the solution containing $Al(OH)_4$.

c. Oxygen gas produced at the anode reacts with the hot carbon anode forming CO_2 gas, the reaction erodes the anode hence need to replace from time to time.

23. a) Hydrogen gas √ 1

b) To increase surface area for absorption of hydrogen chloride gas. √ 1

c) – pickling /removing rust on metals.

- making drugs

- Regulation of pH in beer industry. (Any one correct) √ 1

24. When temperatures in the ice –cream box increases the dry ice sublimes causing a cooling effect. √ 1

25. a) $Cu^{2+}_{(aq)}$ + 2e $Cu_{(s).}$ √ 1

b) 63.5 g requires 2(96500) coulombs

1.184g ?

1.184 x2 x 96500/63.5 = 3598.6c

Q = It

Time = 3598.6/2 = 1799.3 secs

1799.3/60 = 29.988 secs.

26. Argon is unreactive / it provides an inert atmosphere hence preventing oxidation of the filament. √ 1

27. a) Tetra – ammine Zinc (ii) ions. √ 1

b)[$Zn(NH_3)_4$] √ 1]