KENYA NATIONAL EXAMINATION COUNCIL

KCSE 2009

CHEMISTRY

PAPER 1

MARKING SCHEME

1. (a) Energy required to remove 1 mole of electrons from 1 mole of gaseous atoms (1 mk)

(b) B (1) 418???

It loses electrons most readily (l)

Reject lowest i.e. $M_g (HCO_3) 2_{aq} \rightarrow M_gC_S O_3 + H_2O + CO_2 (_g)$

2. (a) $Ca (HCO_3)_2 (aq) \rightarrow CaCO_3(S) + H_2O(l) + CO_2 (g)$

(b) Sodium carbonate (l) Soda ash/ washing soda

Calcium hydroxide (l) / Lime water $_2$ Ammonia Sol;

Sol; Sodium per mutito/ Sodium Duminium Silicate.

3. (i) 2.8.8

(ii) 2.8.2

4. (a) Water (l)

(b) The second / other product of burning candle is carbon (IV) oxide (l). It can be prevented from getting into the environment by passing it though a hydroxide solution/ alkaline solution e.g. K.O.H NaOH or aqueous ammonia (l).

(2 mks)

To form K_2CO_3

5. Oxygen exists as diatomic molecules (½) / Simple Molecular

The forces of attraction between the molecules are very weak (½) therefore less energy is required to separate them. (½)

Atoms are sodium are held by strong metallic bonds (l). These require a lot of energy to break them (½)

6. 60

30^{E+21} wrong/ correct change (- ½)

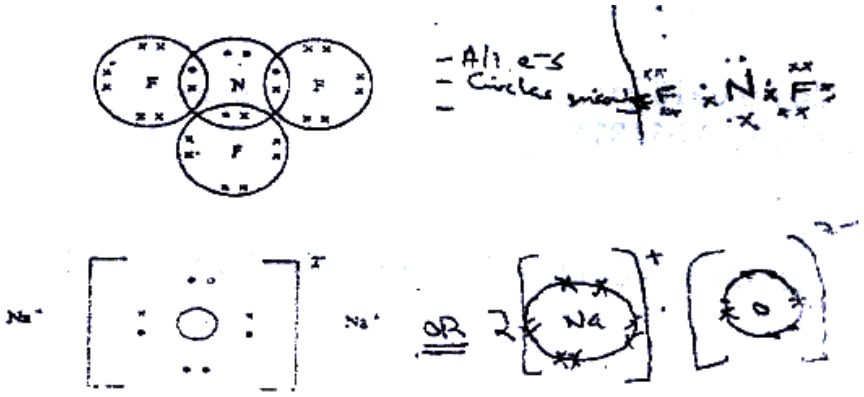
7. (a) Al^{3+} + (l) + $3e^{-}$ → AL (s) (l)

(b) 27 g require 3 faradays (l)

1800 x 1000g requires $\frac{3 \times 1800 \times 1000}{27}$

= 2×10^{5} Faradays (½) = 200, 000 F (3 mks)

8.



9. (a) Heat change when one mole of a solute dissolve in excess of the solvent (l)

(i) ΔH_1 = + 733 kj Mol -1 Until no further Δ in temperature

ΔH_2 = 406 kJ mol -1 / Infinitely dilute solution

ΔH_3= 335 kJ mol -1

(ii) Molar heat of solution

Must be correct (733 – (+ 406 + 335 = 733 – 406 - 335)

= -8 kJ Mol -1 (3 mks)

10. At anode 4OH (aq) → $2H_2O_{(l)} + O_2$ (g) + 4e

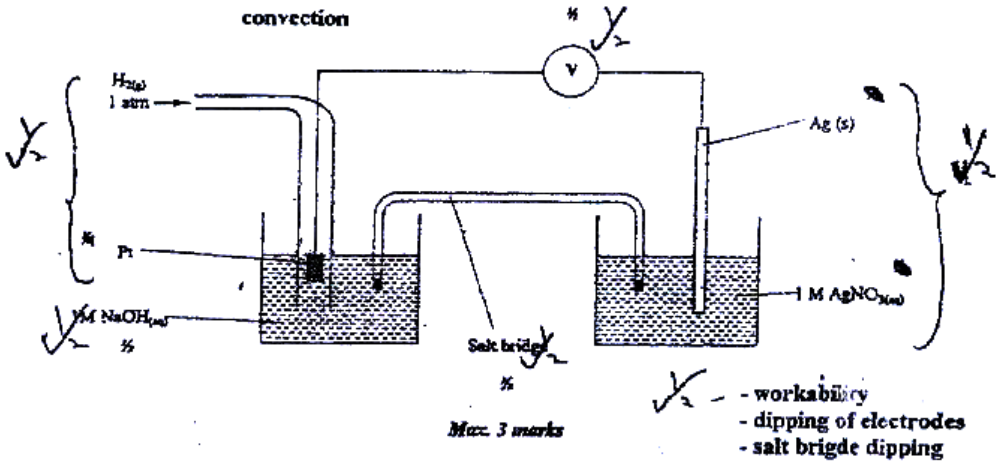
At cathode $2H^{+}$ (aq) + 2e→ H_2 (g) / $4N^{+}$ (aq) + $4e^{+}$ → 2 Hg

Or $4OH^-(aq) + 4 H(aq) \rightarrow 2 H_2O(l) + O_2 + (g) + 2 H_2 (g) (l)$

11. To 50 cm^3 of 2.8 M NaOH, add 25 cm^3 of 2.8 M $H_2 SO_4$ or 50 cm^3 of 1.4 M/ 100m^3 of 0.7 m

- Heat mixture to concentrate (½)
- Cool it for crystals to form (½)
- Filter and dry the residue (3 mks)

12.



13. Moles of oxygen = 0.83 = 0.026 (½) / 0.0259375

Moles of $NaNO_3$ = 2 x 0.026 / 0.051875

0.05 (½) / 0.051875

R. M .M $NaCO_3$ = 85 (½)

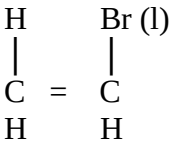
Mass of $NaNO_3$ = converted $\frac{0.052 \times 85}{4.41}$ / 4.4094 (½)

4.41
8.53
51. 693%5

Or 183

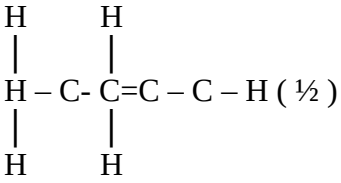
51.7% (3 mks)

14. (a)



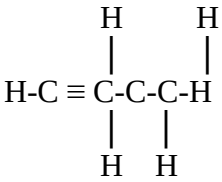
Bromoethane (l) / 1 bromoethane (2 mks)

(b)



(½) (1 mk)

(c)



(½) (1 mk)

15. (a) The gas burns with a blue flame (1)

(b) (i) The iron isles reactive than magnesium (1)

(ii) Heat the iron powder (1) (3 mks)

16. (a) To be read from graph (x) = 79g/ 100g water 78 + 1 g / 100g H_2O

(77, 78, 79)

(b) R.F.M of KNO_3 = 101

Molar concentration = $\frac{79\ ½}{101} \times \frac{1000/}{100}$

= 7.82 m

17. 10 electrons (l)

3 single bonds constitutes 6 electrons – There are 5 covalent bonds

Double bond – 4 electrons (l) – 3 single bonds 1 double bond

18.

Bottle	Correct label
1	Sodium chloride

2 Sugar

3 Sodium carbonate (3 mks)

19. (a) Catalyst (l) or words to that effect

(b) Add bromine water or acidified potassium magnate (VII) (1) if they decolorize (½) then gas is either an alkene or an alkynes (½) (3 mks)

20. (a) Chemical change

(b) Physical change

(c) Chemical change

21. Magnesium phosphate (reject formula)

22. Tests 2 (½) and 3 (½) for test 2 iron is above hydrogen in the reactivity series hence it displaces hydrogen (i) for test 3. Dilute sulphuric acid is not an oxidizing agent (1).

23. (a) Pale green solution turns yellow (i)

(b) Sodium hydroxide (l) Potassium hydroxide

(c) Water (l)

24. (a) S_1H_4 it has a higher boiling point (l)

(b) No hydrogen bonding in CH_4 and S_1H_4 (l) while the hydrogen bond in H_2O is stronger than that in H_2S_1 (l)

25. (a) Colourless solution becomes brown/ black

L_2 (aq)/S

(b) Blue PPt dissolving to form a deep blue solution (l) $Cu(NH_3)_4^{2+}$ (3 mks)

26. (a) Temperature and pressure are directly proportional (l) IR words towards that ofeal

(b) With increase in temperature, the gas particles gain more Kinetic energy (l)

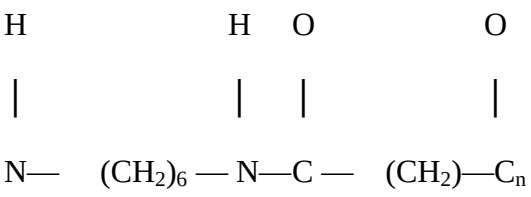
They move faster and collide with the walls of the container more frequently hence increasing pressure.

27. The amount of hydrogen would reduce (l) increase in pressure shifts the reaction to the side with fewer molecules or Equation shifts to the left.

Less Volume

28. (a) Energy of the activated energy (1) Therefore more molecules will take part in effective collision. (3 mks)

29. (a)



(b) Making synthetic fibres such as for

- Ropes
- Blouses
- Stockings
- Undergarments
- Trousers

30. (a) Crush the roses with a suitable solvent (½) Filter/ decant/ Scape wilt, droper to obtain pigment/ e.g. ethanol – Methanol – Propanus - Aocome

(b) Add pigment to an acid or base

It shows different colours in each