

FORM FOUR CLUSTER KCSE MODEL 4

CHEMISTRY PAPER 2 ANSWERS

- a) i) P : Protons $13\sqrt{1/2}$, mass number = $27\sqrt{1/2}$
Q: Neutrons $18\sqrt{1/2}$ E.C = $2.8.6\sqrt{1/2}$
- ii) Period $3\sqrt{1}$. Has three occupied energy levels. $\sqrt{1}$
- b) i) X $\sqrt{1}$ Readily accepts electrons because of its smaller atomic size. $\sqrt{1}$
- ii) Y, Z, and Q $\sqrt{1}$. Ionic radii are smaller than atomic radii. $\sqrt{1}$
- iii) $4Na_{(s)} + Q_{(s)} \rightarrow Na_4Q_{(s)} \sqrt{1}$
- iv) Ionic bond $\sqrt{1}$
- v) Acidic $\sqrt{1}$

2.

- a) i) A readily loses electrons hence it is more reactive than B. Therefore cannot be displaced from its salt solution.

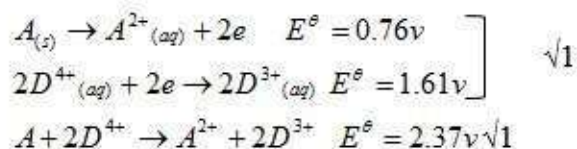
OR

Overall $E^\ominus$ value is negative $\sqrt{1}$ hence reaction cannot take place $\sqrt{1}$

- ii) (I) Element A. $\sqrt{1}$

(II) D $\sqrt{1}$

- b) A combined with D.



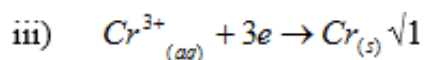
- c) $Fe^{3+}_{(aq)} + 3e \rightarrow Fe_{(s)} \sqrt{1/2}$

1 mole of Fe require $3F\sqrt{1/2}$

$$\therefore 0.1 \text{ mole of Fe} \rightarrow \frac{3}{1} \times 0.1 \sqrt{1/2}$$

$$= 0.3 F \sqrt{1/2}$$

- d) i) To give steel a nice appearance $\sqrt{1}$
- ii) To make the surface rough so that chromium can stick to the steel. $\sqrt{1}$



$$Q = 4.5 \times 20 \times 60$$

$$= 5400 \text{ C} \checkmark 1$$

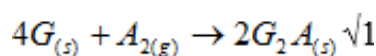
$$96500 \times 3 \rightarrow 52$$

$$\therefore 5400 \rightarrow \left(\frac{52 \times 5400}{96500 \times 3} \right)^{\sqrt{1/2}}$$

$$= 0.9699481$$

$$= 0.97 \text{ g}^{\sqrt{1/2}}$$

3.



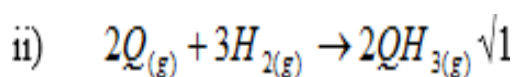
ii) C has a larger atomic radius than E ✓1. Across the period, atomic radius decrease. ✓1

iii) Produce white fumes. ✓1

iv) Element X becomes an ion by gaining an electron. ✓1/2. Electron affinity produce heat. ✓1/2

b) Z should be placed immediately after E horizontally. ✓1

c) i) It can either gain or lose an electron to become stable. ✓1



iii) Alkali metals ✓1

iv) It has more delocalized electrons than G in its valence energy level. ✓1

4.

- a)i) Ethane/ CH_3CH_3 / C_2H_6 ✓
 ii) High pressure and ion temperature. ✓1
 b)i) Hydrogenation. ✓1
 ii) Ethylethanoate: $CH_3\overset{\overset{O}{\parallel}}{C}-O-CH_2CH_3$ ✓1
 c) $CH_3CH_2OH_{(l)} + 3O_{2(g)} \rightarrow 2CO_{2(g)} + 3H_2O_{(l)}$ ✓1
 d) Causes environmental pollution ✓1 since it is non-biodegradable. ✓1
 e)
$$\begin{array}{ccc} H & & Cl \\ | & & | \\ H-C & - & C-H \\ | & & | \\ H & & H \end{array}$$
 ✓1 -Chloro-ethane ✓1
 F)i) Sodium metal ✓1

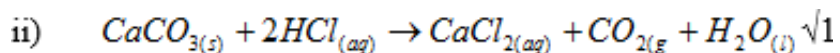
5.

- a) i) ΔH_1 and ΔH_2 ✓1
 ii) Atomisation of oxygen gas ✓1
 iii) Condensation ✓1
 iv) $\Delta H_f = \Delta H_1 + \Delta H_2 + \Delta H_3 + \Delta H_4$ ✓2
 v) Exothermic. ✓1 Overall energy change is below reactants energy level. ✓2
 b)i) -Blue colour of solution fades. ✓1
 -Brown solid deposited at the bottom of the container. ✓1
 ii) $-Cu_{(aq)}^{2+} + Zn_{(s)} \rightarrow Cu_{(s)} + Zn_{(aq)}^{2+}$ ✓1
 iii) $\frac{0.2 \times 50}{1000} = 1.0 \times 10^{-2}$ moles ✓1
 iv) $1 \times 10^{-2} \text{ mole} \rightarrow 4.2 \times \frac{50}{1000} \times 7^\circ C$ ✓1

$$1 \text{ mole} \rightarrow \left(\frac{4.2 \times 5 \times 10^{-2} \times 7}{10^{-2}} \right) \text{ ✓1}$$

$$= -147 \text{ kJ/mole} \text{ ✓1}$$

6. a)i) Complete and well labelled diagram including either water or sodium hydrogen carbonate and drying agent.√3

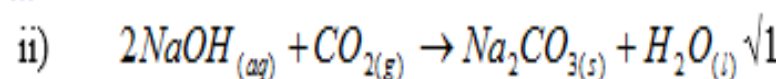


b) -White powder and black specks√1

-White powder is due to the formation of Magnesium Oxide.√1 Black specks due to the formation of carbon.√1

c) Litmus changed to blue√1 because the resultant solution is a base.√1

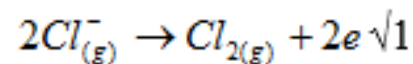
di) Sodium carbonate.√1 Do not accept formula.



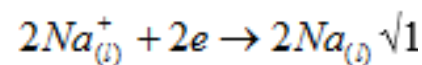
7. a)i) To lower the melting point of sodium chloride.√1

ii) Carbon.√1 It does not react with chlorine.√1

Anode



Cathode



b) It requires a lot of electricity.√1

c) -In street lights.