# KCSE CLUSTER TESTS 11

## *Chemistry Paper 1*

1.
A-Chimney.(1mark)

B-Air hole. (1mark)

 2 marks

2.

a) Q- period two because it has two energy levels.(1mark)

b) Q has 5 protons while P has 3 protons. These protons in each are pulling the same number of energy level S.

Therefore the pull in Q is more than in P making Q have a small radius

 3 marks

3.

a) It is lighter than air. (½mark)

b) Dipping a burning splint that produces a pop sound. (½mark)

c) Copper is less reactive and therefore does not react with steam
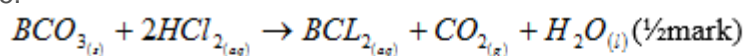
 15 marks

4.

(i) K and M. (1mark)

(ii) k and M. K is an acid while M is a strong alkali that react with aluminium hydroxide which is amphoteric. (2marks)

 2 marks

5.

$$BCO_{3(s)} + 2HCl_{2(aq)} \rightarrow BCL_{2(aq)} + CO_{2(g)} + H_2O_{(l)} \text{ (½mark)}$$

$$\text{Moles of } HCL = \frac{20}{100} \times 1 = 0.02 moles.$$

$$\text{Moles ratio } BCO_3 : HCL = 1:2 \text{ (½mark)}$$

$$\text{MOLES OF } BCO_3 = \frac{1}{2} \times 0.0 = 0.01 moles \text{ (½mark)}$$

$$\text{No of moles of } BCO_3 = \frac{1}{R.F.M} = 0.01 = R.F.MofBCO_3 = \frac{1}{0.01} = 100 \text{ (2marks)}$$

$$R.AMofB = 100 - (12 + 48) = 40$$

 3 marks

6.
a) Sublimation.

b) Bleaching.

c) Polymerization
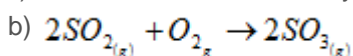
 3 marks

7.

a) Vanadium (V) oxide/$V_2O_5$/Platinum Rhodium/Pt/Rh

i) any one.

ii) Penalize ½ mark if state symbols missing or wrong.

b) $2SO_{2(g)} + O_{2g} \rightarrow 2SO_{3(g)}$

c) Manufacture of paint chemicals/dyes/plastics/fertilizer/lead acid accumulators/explosives.(3marks)
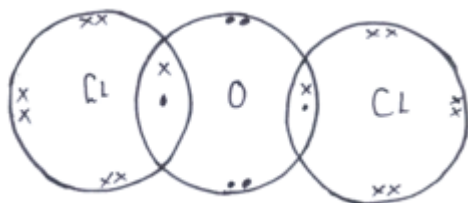
 3 marks

8.
a) Source of heat (½ mark)

b)
$$Anode \, 2Cl_i^- \rightarrow Cl_{2_g} + 2e \, (1mark)$$

$$cathode \, _____ \, Zn_{(s)} \rightarrow Zn_{(l)}^{2+} 2e^- \, (1mark)$$

3 marks

9.



3 marks

10.
a) $N_2H_{4(s)} + O_{2(g)} \rightarrow N_{2(s)} + 2H_2O_{(l)}$

b) b) Bond breaking .Bond forming

2 marks

11.
. a) –Hydrogen chloride.(1mark)

b) Iron (II) chloride.

$$Fe_{(s)} + 2HCl_{(g)} \rightarrow FeCl_{2_{(s)}} + H_{2(g)} \, (1mark)$$

3 marks

12.
i) Under the same conditions the rate of diffusion is inversely proportional to the square root of its density.

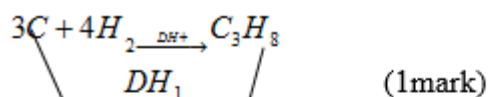ii) $V = \dfrac{12 \times 12 \times 44}{16} = 19.8999$

3 marks

13.
a) $\dfrac{Rkr}{RBr_2} = \dfrac{158.8}{83.3} = 1.38 \, (1mark)$

b) Kr is lighter than Br2 by 1.38.

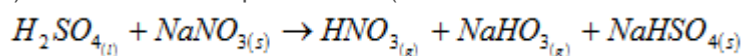Kr gas moves through 1.38x10=13.8 cm. (1mark)

3 marks

14.

$$3C + 4H_{2 \xrightarrow{\quad DH+ \quad}} C_3H_8$$
$$DH_1 \qquad \qquad \text{(1mark)}$$

$$3CO_2 + 2H_2O$$

$$DH+ = DH_1 - DH_2 \qquad \qquad (\text{½mark})$$
$$= 3(-393.5) + 4(-285.9) - (-2220.6)$$
$$= (1180.5 + -1143.6) - -222.6 \qquad (\text{½mark}) (\text{½mark})$$
$$= -2324.1 + 222.6.6 = -103.5$$

3 marks

15.

a) Concentration Sulphuric Acid. (1mark

$$H_2SO_{4(l)} + NaNO_{3(s)} \rightarrow HNO_{3(g)} + NaHO_{3(g)} + NaHSO_{4(s)}$$

c) It easily decomposes when exposed to light/heat.

$$4HNO_{3(l)} \rightarrow 2H_2O_{(l)} + 4NO_{2(g)} + O_{2(g)} \text{ (1mark)}$$
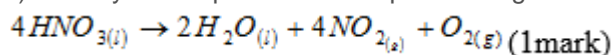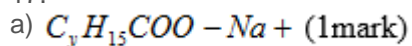
3 marks

16.

a) During a busy day the vehicles move at slow speed causing incomplete combustion of carbon in thus increase in concentration Carbon (II) oxide.

b) It combines with haemoglobin to form carboxyhaeglobin which does not dissociate thus causing suffocation and it is colour less and ordourless.

3 marks

17.

a) $C_yH_{15}COO - Na +$ (1mark)

b) Soapy detergent. (1mark)

c) Forms scum with hard water

3 marks

18.

React aluminium sulphite with excess ammonia hydroxide to form ammonium hydroxide filter to obtain residue as Aluminum hydroxide then dry between the filter paper.

3 marks

19.

. In C the excess CO2 reacts with Calcium hydroxide to form soluble Calcium Hydrogen Carbonate. In D insoluble Calcium Carbonate is formed

3 marks

20.

a) A-2.8.1

B-2.1 b)

B because it is smaller in size therefore outermost electron is strongly attracted.

2 marks

21.

Region B because it has the lowest boiling point. (2marks

3 marks

22.

i) No effect on the position of equilibrium because the number of mobs of gaseous on both sides of equilibrium are equal.

ii) Equilibrium position will shift from right to left backwards/more and steam are formed.(3marks

3 marks

23.

a) Is a solution/liquid/molten containing mobile ions that decomposes when electric current passes through it.

b) Because it is a metal containing delocalized electrons therefore not decomposed by the current.

3 marks

24.

a) i) R,is a weak acid and /dissociates.

(ii) Ionizes partly/sparingly.(½marks)

Q – is a strong acid and ionizes

b) End point all Mg is used up

3 marks

25.

Ratio 2:1 moles of $NaOH \, 0.2 \times \dfrac{40}{1000} = 0.008 moles \rightarrow$ moles of acid 0.004moles

$2 \times \dfrac{1}{0.004} = 50$

3 marks

26.

. a) When a system is in equilibrium and subjected to stress the equilibrium shifts to accommodate the stress.

b) Temperature of $450^0$-$500^0$ C, pressure of 200atm

3 marks

27.

a) B because the quantity of solid B that dissolves is higher than B below 900c/solubility of A is lower than of B from the graph below 900c.
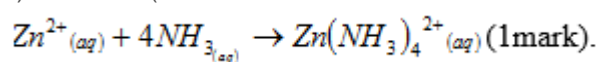
b) A crystals out since the solubility decreases with 30-10=20g of A. No crystals of B are formed

3 marks

28.

a) Lead Ions.(1mark)

b) Zinc Ions.(1mark

$Zn^{2+}_{(aq)} + 4NH_{3(aq)} \rightarrow Zn(NH_3)_4^{2+}_{(aq)}$ (1mark).

3 marks