

KITUI COUNTY MOCK

233/1

CHEMISTRY

PAPER 1

(THEORY)

JULY, 2017

TIME: 2 HOURS

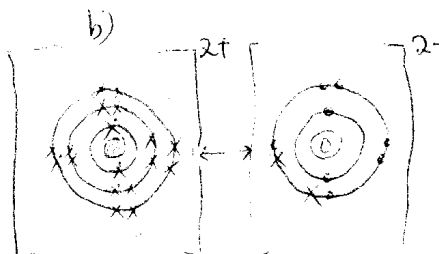
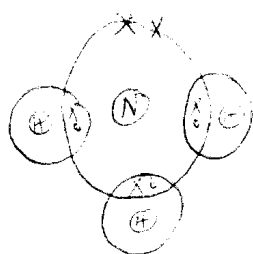
END OF TERM II FORM FOUR EXAMINATION, 2017
Kenya Certificate of Secondary Education (K.C.S.E)

MARKING SCHEME

1. a) i) K ✓1mk
ii) J ✓1mk
b) In methylbenzene HCl remains as a molecule / does not ionize hence is neutral ✓1mk
c) L is a better conductor than J ✓½ mk because L is a strong acid which ionizes fully to give more hydrogen ions ✓1 mk
2. i) Vulcanization ✓1 mk
ii) Saponification ✓1 mk
3. a) Nitrogen ✓½ mk
Argon ✓½ mk
b) - Used in hospitals by patients with breathing difficulties
- Used by mountain climbers and deep sea divers
- Mixed with hydrogen to provide fuel for space rockets
- Oxyacetylene flame is used in welding and cutting metals (any 2 mks)
4. a) Magnesium burns with a bright light ✓½ mk
A white powder is formed ✓½ mk
b) $\text{Mg}_{(s)} + \text{H}_2\text{O}_{(g)} \rightarrow \text{MgO}_{(s)} + \text{H}_{2(g)}$ ✓1mk
c) Remove the delivery tube from the water trough before heating is stopped ✓1mk to prevent sucking back ✓1mk
5. a) Equilibrium shifts to the right ✓½ mk where there are few molecules ✓½ mk
b) It will have no effect ✓½ mk because the number of molecules are equal on both sides ✓½ mk
6. Heat the mixture, ammonium chloride sublimes ✓½ mk
Add water to the remaining mixture, NaCl dissolves leaving silver chloride ✓½ mk
Filter to obtain silver chloride as the residual and NaCl as the filtrate ✓½ mk
Heat the filtrate to dryness to obtain solid NaCl ✓½ mk
7. i) $\text{Ag}^+_{(aq)} + e^- \longrightarrow \text{Ag}_{(s)}$
ii) $Q = It$
 $= 0.03 \times 2 \times 60 \times 60$
 $= 216\text{C}$ ✓1mk
 $96500\text{C} \rightarrow 108\text{g}$
 $216\text{C} \rightarrow ?$
 $\frac{216 \times 108}{96500}$ ✓1 mk
 $= 0.242\text{g}$ ✓½ mk

8.

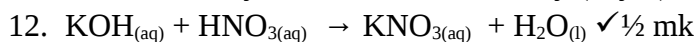
a)



9. a) Curve I ✓1 mk the concentration of F increases with time since F is the product ✓1 mk
b) After time (t) the concentration of E and F remains constant because equilibrium has been established ✓1 mk
10. a) The chloric (I) acid decomposes to form atomic oxygen ✓1 mk the atomic oxygen attacks and bleaches the blue flower ✓1 mk
b) $2\text{HOCl}_{(aq)} \rightarrow \text{O}_{2(g)} + 2\text{HCl}_{(aq)}$ ✓1mk

11. **Luminous** **non-luminous**

- | | |
|----------------|------------------|
| - Sooty | - non-sooty |
| - Not very hot | - very hot |
| - Not steady | - steady (any 2) |



$$\text{moles of HNO}_3 = \frac{2 \times 100}{1000} \text{ ✓½ mk}$$

$$= 0.2 \text{ moles } \text{ ✓½ mk}$$

Mole ratio $1\text{HNO}_3 : 1\text{KOH}$

$$\therefore \text{Mole of KOH} = 0.02 \text{ moles } \text{ ✓½ mk}$$

Moles of KOH in 200cm^3

$$\frac{0.2 \times 200}{100} \text{ ✓½ mk}$$

$$= 0.4 \text{ moles } \text{ ✓½ mk}$$

$$\text{Mass } y = 0.4 \times 56 \text{ ✓½ mk}$$

$$= 22.4\text{g } \text{ ✓½ mk}$$

13. MgO has a giant ionic structure while SiO_4 has a giant covalent structure hence in molten state MgO conducts since it has mobile ions while SiO_4 does not

14. a) X – 143 ✓½ mk

Y – 50 ✓½ mk

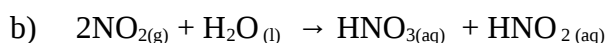
- b) - Energy generations
- Food preparation
- Pest control
- Carbon dating

(Any 2 each ½ mk)

15. a) - Brown fumes are observed ✓½ mk

- Black solid is deposited ✓½ mk

- Blue colour fades ✓½ mk



c) It relights a glowing splint

16. a) Soapless detergent

b) i) Does not form scum

ii) Causes pollution since it is non-biodegradable

17. a) The volume of a fixed mass of a gas is inversely proportional to its pressure at constant temperature ✓1mk. This is because particles of a gas are widely apart hence can be compressed ✓1mk

b) i) Low pressure ½ mk

ii) High temperature ½ mk

Specify

18. In diamond each carbon atom is covalently bonded to four other carbon atoms in a rigid giant atomic structure ✓1mk. In graphite each carbon atom is covalently bonded to their other carbon atoms in layers ½mk. The layers are held together by weak Vander walls forces which are easily broken ✓½mk

19. a) i) An element is a substance which cannot be split into any simpler substance by any chemical process

ii) Atomic number is the number of protons in an atom

b) $\text{T}_2(\text{SO}_4)_3$

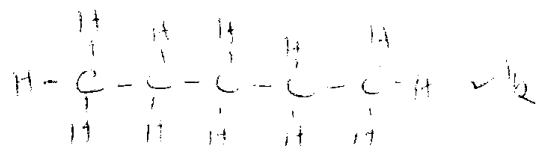
20. a) Experiment 1 ✓½ mk

Experiment 3 ✓½ mk

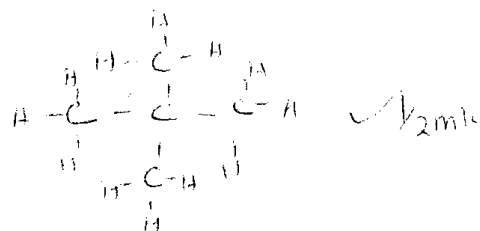
b) In experiment 1, solid potassium carbonate has no free ions to conduct electricity ✓1mk

In experiment 3, sugar consists of molecules which do not conduct electricity ✓1mk

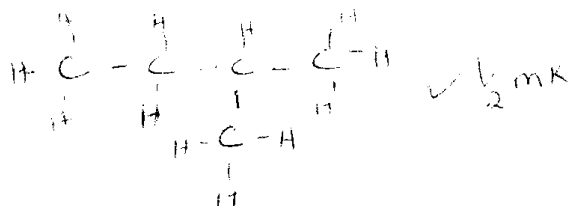
21. a) Cotton / wool / silk ✓1mk
b) - Are strong than natural fibres
- Not easily affected by chemicals
- Last longer / are durable
- Are cheaper
(Any 1)
22. a) X ✓½ mk it has a completely filled outermost energy level ✓½ mk
b) i) W and Y ✓1mk
ii) YW ✓1mk
23. a) Copper pyrites ✓½ mk
Malachite ✓½ mk
b) In order to concentrate the ore
c) Brass ✓1mk used in soldering wires and ornaments ✓1mk
24. a) G
b) The ionic radius of I is bigger than of E ✓1mk since I has more energy level than E ✓1mk
25. a) This is the energy change that takes place when one mole of a compound is formed from its constituent elements in their standard state
b) $\Delta H_4 = \Delta H_1 + \Delta H_2 + \Delta H_3$
 $= (-286 \times 3) + (-394 \times 2) - (-277)$
 $= -1369 \text{ KJ/mol}$
26. a) Oxidation state is the apparent charge that atoms have in molecules / ions
b) $(2 \times 3) + 2N = 0$
 $2N = -6$
 $N = -3$
c) The heat is required to break the strong triple covalent bonds between nitrogen atoms
- 27.



Pentane ✓ 1/2 mk



2, 2-dimethyl propane ✓^{1/2} mk



2 – methyl butane ✓ ½ mk

28. The product from the nettle plant is acidic ✓1mk hence aqueous ammonia solution being basic neutralizes the acidic product. ✓1mk
29. Ionization energy is the energy required to remove an electron from an atom in gaseous state ✓1mk while electron affinity is the energy released when an atom in gaseous state gains an electron.
30. Burning Magnesium produces heat energy enough to break the sulphur / oxygen bond setting oxygen free. Magnesium uses the free oxygen to continue burning.