

# KANDARA SUB-COUNTY SECONDARY SCHOOLS FORM 2 2015 JOINT EXAMINATION

KENYA CERTIFICATE OF SECONDARY EDUCATION (K.C.S.E)

Chemistry (233)

October/November 2015

## MARKING SCHEME

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| <p>1. a) D ✓ 1<br/>b) C ✓ ½<br/>Explanation - IT is a strong ✓ ½ acid with pH value 2 hence reacts vigorously with the metal.<br/>c) B ✓ 1</p> <p>2. a) A - chimney ✓ ½<br/>C - Base ✓ ½<br/>b) Allows air to enter the chimney ✓ 1</p> <p>3. a) An electrolyte is a compound which either in molten state or in aqueous state/solution allows electricity to pass through it ✓ 1<br/>b) i) Through the use of delocalised electrons ✓ 1mk<br/>ii) Use of mobile ions ✓ 1mk<br/>c) Mercury is a conductor ✓ 1mk<br/>Explanation - Does not decompose during conductivity ✓ 1mk</p> <p>4. a) Sunlight/UV light ✓ 1mk<br/>b) Oxygen gas ✓ 1mk<br/>c) <math>2\text{HOCl}_{(aq)} \rightarrow \text{O}_{2(g)} + 2\text{HCl}_{(aq)}</math> ✓ 1mk<br/>d) Turns red ✓ 1mk</p> <p>5. a) Heat the mixture gently ✓ ½mk in a beaker covered with a watchglass with cold water. Iodine sublimes ✓ ½mk<br/>Add cold water to the remaining mixture after cooling ✓ ½, stir and filter to get sodium chloride filtrate and lead (II) chloride as residue ✓ ½mk<br/>Run distilled water through the residue to remove any sodium chloride ✓ ½ remaining. Dry the residue between 2 filter papers. ✓ ½</p> <p>6. a) Atoms of the same element with different atomic masses ✓ 1mk<br/>b) P + N = Mass No<br/>18 - 8 = 10 Neutrons ✓ 1mk</p> <p>7. SO<sub>2</sub> has covalent bonds and weak van der Waals forces which generally are not strong. ✓ 1</p> | <p>SiO<sub>2</sub> has strong covalent bonds in the giant atomic structure which are very strong to break ✓ 1mk</p> <p>8. a) On the grid ✓ 1mk<br/>b) i) F ✓ 1mk<br/>ii) A/B ✓ 1mk<br/>c) C - alkaline earth metals ✓ 1mk<br/>I - Halogens ✓ 1mk<br/>d) B is more reactive than A or A is less reactive than B ✓ 1mk<br/>e) H ✓ ½<br/>Does not easily lose or gain electrons ✓ ½<br/>f) i) CO ✓ 1mk Rej OC<br/>B<sub>2</sub>G Rej GB<sub>2</sub></p> <p>9. <math>\frac{82.8 \times 24}{100} + \frac{8.1 \times 25}{100} + \frac{9.1}{100} \times 26</math> ✓ 1<br/>= 19.872 + 2.025 + 2.366 ✓ 1<br/>= 24.263 ✓ 1</p> <p>10. a) <math>2\text{KNO}_{3(s)} \xrightarrow{\text{heat}} 2\text{KNO}_{2(s)} + \text{O}_{2(g)}</math> ✓ 1mk<br/>b) -Is odourless - colourless ✓ ½<br/>- Slightly soluble in water ✓ ½<br/>any 2 = 1mk<br/>c) i) Mixed with acetylene/ to give oxyacetylene flame for welding. ✓ 1mk<br/>ii) Used to burn rocket fuels ✓ 1mk<br/>Used in steel making /respiratory aid in hospitals<br/>Used in mountain climbing /deep sea diving any 2</p> <p>11. a) <math>\text{Ca}(\text{OH})_{2(g)} + 2\text{HCl}_{(aq)} \rightarrow \text{CaCl}_{2(aq)} + \text{H}_2\text{O}_{(l)}</math> ✓ 1mk<br/>b) <math>\text{Na}_2\text{CO}_{3(s)} + \text{H}_2\text{SO}_{4(aq)} \rightarrow \text{Na}_2\text{SO}_{4(aq)} + \text{CO}_{2(g)} + \text{H}_2\text{O}_{(l)}</math> ✓ 1mk<br/>c) <math>\text{Mg}_{(s)} + 2\text{HNO}_{3(aq)} \rightarrow \text{Mg}(\text{NO}_3)_{2(aq)} + \text{H}_2\text{O}_{(l)}</math> ✓ 1mk</p> <p>(II) a) <math>2\text{C}_2\text{H}_6(g) + 7\text{O}_2(g) \rightarrow 4\text{CO}_2(g) + 6\text{H}_2\text{O}(g)</math> ✓ 1mk<br/>b) <math>2\text{NH}_3(g) + \text{H}_2\text{SO}_4(aq) \rightarrow (\text{NH}_4)_2\text{SO}_4(aq)</math> ✓ 1mk<br/>c) <math>\text{PbO}_{(s)} + 2\text{HNO}_3(aq) \rightarrow \text{Pb}(\text{NO}_3)_{2(aq)} + \text{H}_2\text{O}_{(l)}</math> ✓ 1mk</p> |
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12. a) Gas L - Hydrogen gas ✓ 1mk  
 b) Calcium hydroxide was formed which is a weak base. ✓ 1mk  
 c) There would be no bubbles observed. ✓ 1mk  
 Reason - Copper does not react with solid water ✓ 1mk

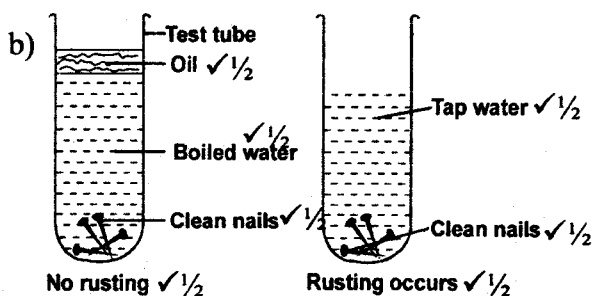
13. a) Ammonia gas ✓ 1mk  
 b) i) Step II - Filtration ✓ 1mk  
 ii) Step III - Roasting /heating/thermal decomposition ✓ 1mk  
 c) -Carbon (IV) oxide has ✓ ½mk  
 - ammonia gas ✓ ½mk  
 d) -Uses of sodium carbonate  
 i) Glass manufacture ✓ ½  
 ii) Softening hardwater ✓ ½

14. - Is a good conductor of heat ✓ 1mk  
 - Does not easily corrode all to the stable insoluble aluminium oxide coating formed on its surface ✓ 1mk

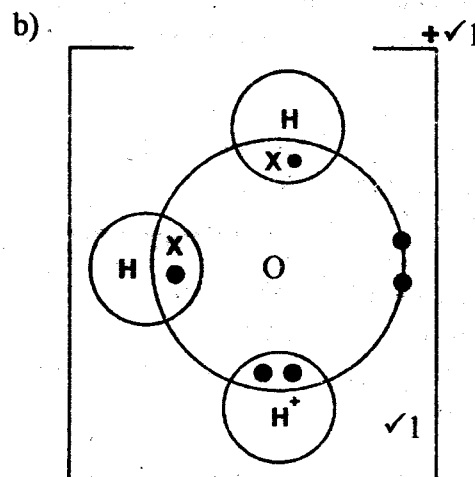
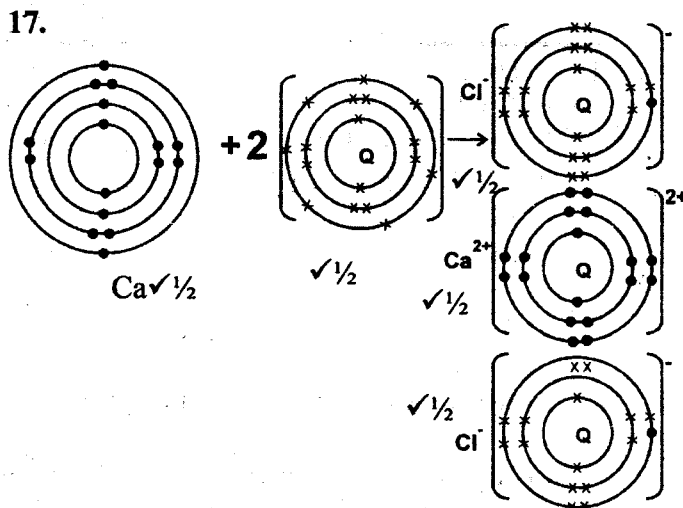
b) Aluminium oxide coating, on the surface is amphoteric ✓ ½ hence react with the basic wood ash solution therefore wearing out the ✓ ½ container 1mk

15. i) Range (between) 100°C - 105°C ✓ 1mk  
 ii) impure ✓ ½mk  
 Reason - Mpt and bpt is not constant but a range. ✓ ½mk  
 iii) Lowers the melting point of a substance. ✓ 1mk  
 iv) Heating curve ✓ 1mk  
 v) Solid (ice) particles absorb heat energy, temperature rises ✓ ½ and molecules (particles)vibrate at fixed positions. ✓ ½

16. a) i) Step I - Dust particles ✓ 1mk  
 Step II - Carbon (IV) oxide ✓ 1mk  
 Step III - Water vapour ✓ 1mk  
 ii) -196°C - Nitrogen ✓ 1mk  
 -186°C - Argon ✓ 1mk  
 -183° - Oxygen ✓ 1mk

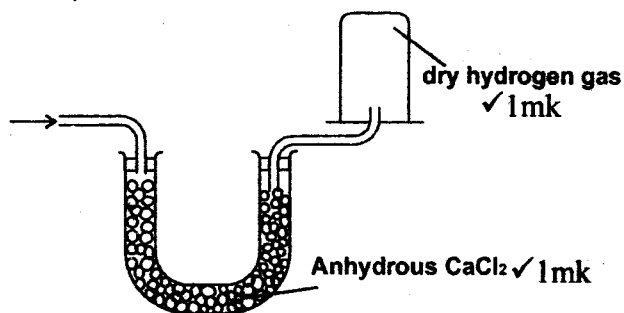


- c) a) Storage for semen for artificial insemination ✓ 1mk  
 b) In manufacture of ammonia in the Haber Process ✓ 1mk  
 c) In light bulbs to provide inert atmosphere to prevent oxidation of filament.  
 any 2



18. i) Glass beads increases the surface area for the condensation process. ✓ 1mk  
 ii) Fractionating column - allows water vapour to condense into liquid and flowback into the flask before reaching boiling point. ✓ 1mk  
 iii) Oil refinery/extraction of nitrogen and oxygen from air, wine industries etc. ✓ 1mk

19. a)



Or use concentrated sulphuric acid in a reagent bottle.

- b) Dilute hydrochloric acid ✓ 1mk
- c) Nitric acid is a strong oxidising agent hence oxidises hydrogen produced to water ✓ 1mk

II a) i) Colourless droplets of a liquid formed on the cooler parts of the tube S.

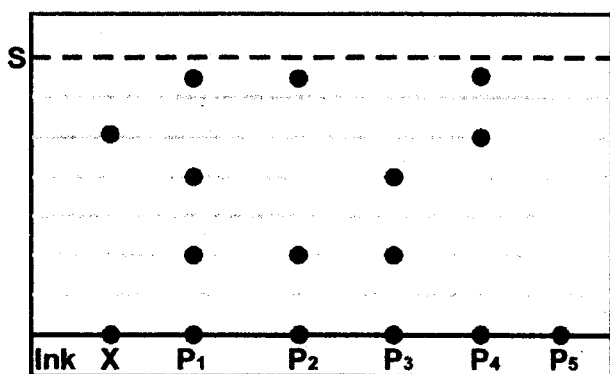
- ii) Hot black copper (II) oxide ✓ ½ turns to red-brown solid ✓ ½

b) To prevent an explosion since hydrogen explodes in air when ignited ✓ 1mk

c) It is less dense than air ✓ 1mk

- d) - In oxyhydrogen flame used in welding.
- In hydrogenation/Hardening of oils to fats
- In manufacture of ammonia gas in Haber process
- In manufacture of hydrochloric acid
- any 2 each* ✓ 1mk

20.



- a) S - on the diagram ✓ 1mk
- b) P4 ✓ ½ - Has a dot corresponding to that of the ink X. ✓ ½
- c) 3 ✓ ½ Has made 3 dots ✓ ½
- d) P2 ✓ ½ - Has one mark only ✓ ½
- e) P5 is insoluble in the solvent used. ✓ ½mk

- 21. i) Increases in number of energy levels ✓ 1mk
- ii) Increased number of electrons strains the nucleus hence electrons not effectively pulled
- Added electrons during ion formation leads to repulsion ✓ 1mk

- 22. i) Efflorescence ✓ 1mk
- ii) Deliquescency ✓ 1mk
- iii) Hygroscopy ✓ 1mk

23. a) A drug is a substance when taken alters the normal functioning of the body. ✓ 1mk

- b) Alcohol, cigarettes, tobacco, miraa, etc.
- Any (legal drug)* ✓ 1mk