**MALIET 2019 P1**

***Kenya Certificate of Secondary Education (K.C.S.E)***

233/1

CHEMISTRY

PAPER 1

MARCH 2019

**Marking scheme:**

1 Add tetrachloromethane to the mixture

filter to remove ammonium chloride

allow filtrate to evaporate tetrachloromethane to form crystals of iodine(1 ½ marks)

2 x-papers partly burnt in region in contact with pale blue region

or un burnt part placed in the inner region of the flame

Y-burns uniformly or placed in the outermost region of flame (2 marks)

3 (i)formation of a brown substance on iron when exposed to air and moisture

(ii)zinc is more active than iron

galvanising (zinc) continues to protect iron even when the iron layer is exposed (2 marks)

or

zinc is oxidised in preference to iron

tin is less reactive than iron

rusting continues to occur when the tin layer is scratched(2 marks)

4 Magnesium combines with oxygen and nitrogen from air

increase in mass due to the oxygen and nitrogen combining with magnesium (1 mark)

5 a)(i) ion M-2.8.8

(ii) ion N-no electrons

(2 marks)

(b) indicate a diagram (1 mark)

6 (a) Heat change when 1 mole of substance is formed from its elements in their standard rates

Conditions of pressure and temperature (1 mark)

(b) H4=( H1+ H2)- H3

=(-286+-394)-277

=-680+277

= -453 kj mol-

(3 marks)

7 B is more reactive than C

less energy is required to ionise B than C (2 marks)

8. a) Fractionating column

b) liebig’s condenser

c) Condensing the vapour before its boiling point is reached.

d) Fractionating column

9. a) Q- oxygen

P- concentrated sulphuric (vi) acid

R- concentrated sulphuric (vi) acid

N- Sulphur (iv) oxide

b) Copper (ii) sulphate, blue in colour

10 (a) i)Efflorescence

loss of water of crystallization when hydrated

substance is exposed to atmosphere (2marks)

(ii)Deliquescence

Absorbing water from the atmosphere till it forms a solution

(iii)hygroscopy

Absorbing water from the atmosphere but not enough to form a solution

11. a) Gas Y – nitrogen (i) oxide OR N2O

b) Heating ammonium nitrate directly could result in an explosion

c) -Formerly used as anaesthetic during dental surgery

- used as an oxidiser in racing car engines & rockets or any other correct answer

12 3Mg(s)+N2(g)\_\_\_\_\_\_\_\_Mg3N2(s)

Ratio: 3:1

Moles of N2=1/3 moles of Mg=(1/3 x 8/24)

Volume=moles x molar gas volume(22.4)

(1/3 x 8/24) x 22.4

=2.48 dm3

13 add excess concentrated sulphuric acid to copper turnings in a fume chamber

filter to remove un reacted copper

Heat to saturate

Cool for crystals to form (3 marks)

14 (a)syringe

(b)indicate on the graph

15 in diamond the structure is tetrahedral with strong covalent bonds throughout the structure

in graphite the hexagonal rings have strong covalent bonds between the layers of hexagonal rings are Vander waals forces which are weak

16

5.7 = 32

20 X

X=(20/15.7)x32

= 51.93

C N

46.1 : 53.9

12 14

3.8 3.85

(CN)n=51.93

(12 +14)n=51.93

n=2

formula =C2N2

(2 marks)

17. a) i. K

ii. J

b) Hydrogen chloride does not dissociate in methylbenzene hence no hydrogen ions (H+) present

18 The triple bond in nitrogen molecule requires more energy to atomise (1 mark)

19 a) 4(C-H) + (Cl-Cl) 3(C-H) + C-Cl + H-Cl

4x414 + 244 + 3(-414) + -326 + -431 ✓1

414 + 244 – 326 – 431

= - 99KJ✓

Or:

Bonds broken = C-H + Cl – Cl

+414 + 244 = +658 ✓1

Bonds formed C-Cl + H – Cl

-326 – 431 = -757

ΔH = - 99KJ✓1

b) Presence of sunlight (UV) ✓

20 mass of crystal in solution = 70-10

= 60g

60 g are contained in 80 cm3

100cm3 contains 100/80 x60

=75g/100cm3

=75g/10g of water (2 marks)

21 (a)Nitrogen(iv) oxide

(b) H+(aq)+OH-(aq)\_\_\_\_\_\_\_\_\_\_\_\_\_H2O(l)

22 a) Sodium chloride saturated with Ammonia✓ ½

b) Heating limestone/calcium carbonate ✓ ½

c) I. NH3(aq) + CO3(aq) + H2O(l) NH4HCO3(aq) ✓1

d) II. NH4HCO3(aq) + NaCl(aq) NH4Cl(aq) + NaHCO3(s) ✓1

23 SO2 dissolves in water to form SO32-

SO32- is oxidised to SO42- by chlorine

SO42- reacts with barium chloride to form white insoluble barium sulphate (2 marks)

24 (a)hydrogen chrolide

(b)iron (II)chloride

Fe(s)+2HCl(g)\_\_\_\_\_\_\_\_\_FeCl2(s)+H2(g)

25 36/100 x1.18=0.4248

Grams of acid in 10cm3

0.4248x10=4.248

moles=4.248/36.5 in 250cm3 of water

therefore 1000cm3 contains 1000/250x4.248/36.5

=0.4655M.HCl(aq) (2marks)

26 a) i. Gas D Carbon (iv) oxide

ii. sodium carbonate

b) Ba2+(aq)+ CO32-(aq) BaCO3 (S)

c) Colourless liquid forms in the cooler parts of the test tube.

27 Bubbles are observed

H2 diffuses in faster rate than oxygen leaves

High pressure causes the gas to move out down the tube

28 R.A.M

= (9x16)+(1x18)

10

=144+18 = 162

10 10

=16.2 (2marks)

29 sodium forms ions by loss of electrons the remaining electrons are attracted more by the nucleus. Chlorine forms ions by gain of electrons. Radius increases due to repulsion between electrons and screening effects

(2marks)