FORM FOUR TERM ONE EXAM 2017

CHEMISTRY PAPER 2
MARKING SCHEME

SCHOOLS NET KENYA
Osiligi House, Opposite KCB, Ground Floor
Off Magadi Road, Ongata Rongai | Tel: 0711 88 22 27
E-mail:infosnkenya@gmail.com | Website: www.schoolsnetkenya.com

CHEMISTRY PAPER 233/2

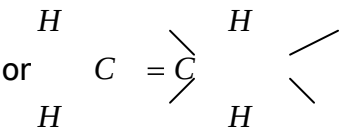
MARKING SCHEME -

1. (a) (i) Fractional distillation *(1mk)*

(ii) Miscibility of the components (fractions) *Any x 1 (1mk)*

- Close range of boiling points

(b) (i) $CH_2 = CH_2$

or  *(1mk)*

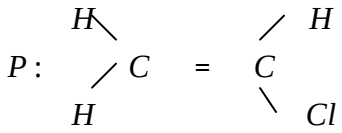
(ii) Pass the two gases separately through acidified potassium manganate (VII) *(1mk)*

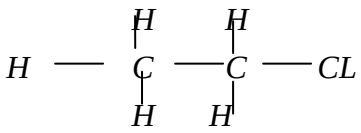
ethene decolourises the purple solution but butane does not

(1mk)

or

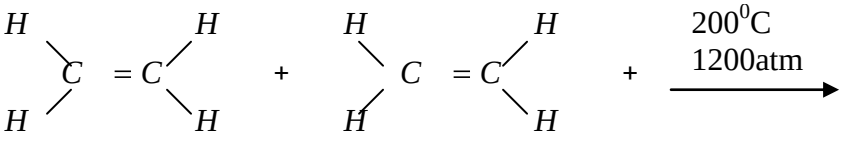
Pass the two gases separately through bromine water <u>in the dark</u> (1mk) Ethene decolourises the water but butane does not (1mk)

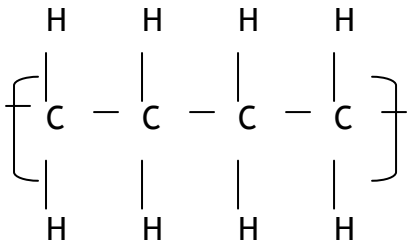
(c) 

Q:  *(1mk)*

(d) It is insoluble in water *(1mk)*

e)

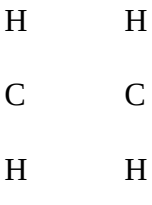


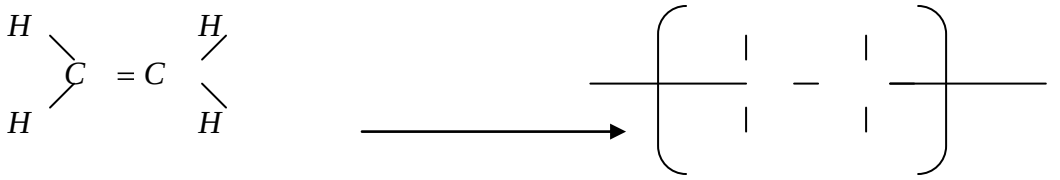


(1mk)

200^0C
1200 atm

.



n  n

(1mk)

(ii) It poses a disposal problem because it is non-biodegradable

(1mk)

(f) Oxy-acetylene flame for welding

(1mk)

2. a) E = 2:6 ✓ 1

b) (i) E^{2-} or F^{-} *any one 1 mark*

(ii) H^{+} or I^{2+}*any one 1 mark*

c) Amphoteric oxide✓1

d) F✓ ½ because it has the smallest atomic radius/reactivity of non- metals decreases down the

group✓ ½

e) (i) K has a giant atomic✓½ structure in which there are very strong covalent bonds which ✓ ½ require a

lot of energy to break than in N which has a simple✓ ½ molecular structure with weak van der waal's force that require less energy to break

(ii) increasing number of protons leads to increase in nuclear force of attraction being exerted on electrons

from H to J hence ionic radius decreases from H to J

f) (i) H floats on water since it✓1 is less dense than water. Hydrogen✓ ½ gas is produced and heat✓ ½ which melts H

(ii) $2\ H_{(s)} + 2H_2O_{(l)} \longrightarrow 2HOH_{(aq)} + H_{2(g)}$✓1 or

$2Na_{(s)} + 2H_2O_{(l)} \longrightarrow 2NaOH_{(aq)} + H_{2(g)}$

3. a)

Experiment	1/T
1	0.0185
2	0.01587
3	0.012195
4	0.00971
5	0.00609

b) (i) scale – 1 mark

Plotting – 1mk

Line best fit – 1mk

(ii) Shown on the graph✓ ½ 1/t currently read from graph✓ ½

t = correct found from 1/t ✓ 1 mk

(iii) The rate of the reaction is directly✓1propotional to the concentration of H_2O_2

(iv) -temperature

- catalyst
- pressure
- size of particles used (any *two X 1 mark)*

c) The equilibrium shifts from right to left or backward reaction✓ 1 is favoured. The color changes from colourless to yellow - orange✓ 1

4. (a). It is the enthalpy change when 1 mole of a substance. Completely burns in oxygen under standard conditions of temperature and pressure

(b)

$\Delta H = MC\Delta T$

$\frac{500}{1000} \times 4.2 \times 19.5 = -40.95$ kJ

(c)

R.F.M. = 46 $\qquad \frac{46 \times 40.9}{1.5}$

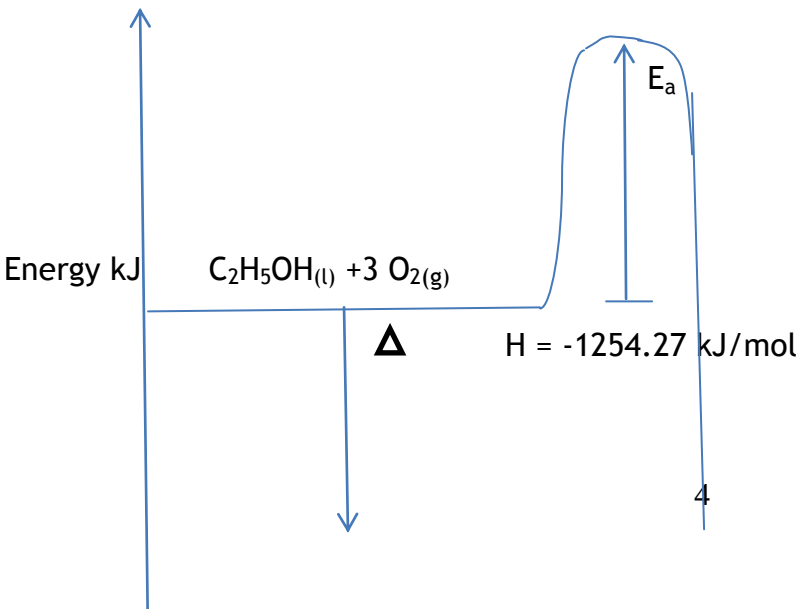
1.5G → 40.9 KJ

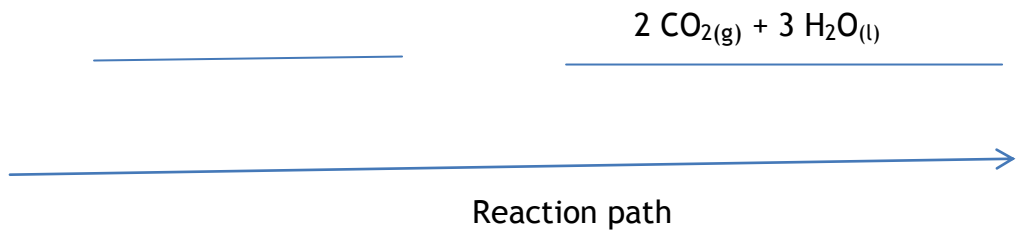
466G -1254.27 kJ/mol

(d)

1. Some heat is lost to the surrounding
2. Some heat is absorbed by the apparatus
3. Inaccurate readings

e)





(f)

$$\frac{1254.27}{46} = 27.27\ kJ/g$$

5. **I** a) For compression of the gases ✓1

b) To pump back the recycled material /Unreacted gases/N_2,H_2✓1

c) Nitrogen - Air✓1

Hydrogen – Natural gas or cracking✓ 1 of Alkane

d) Dust particles , carbon (IV) oxide, water vapour (any two) ½ each✓

e) Liquid ✓1 Since it has a high✓½ boiling point ✓½

II a) Green solid is deposited .✓1 This is due to the formation of Iron (II) chloride✓1

b) Iron (III) Chloride // $FeCl_3$✓1

c) It sublimes . $FeCl_3$. vapour turns into solid at the cooler part of the round bottom flask.

d) To prevents moisture from entering the flask since $FeCl_3$ is deliquescent✓1.

6 a) L- Ammonium chloride ✓1mk
M- Zinc (ii) carbonate ✓ 1mk

b) Heat /heating (1mrk)

c) Hot –yellow ✓ 1mk
Cold –white ✓ 1mk

d) Name : tetrahydroxo zinc (ii) ion /zincate ion
Formula – $\left[Zn(OH)_4\right]^{2-}_{(aq)}$ ✓ ½mk

e) To separate insoluble Zinc (ii) carbonate from soluble ammonium chloride ✓1mrk

f) i) Molarity of HNO_3 – 63/63 ✓ ½ = 1M✓ ½

(ii) $Na_2CO_{3(aq)} + 2HNO_{3aq} \longrightarrow 2NaNO_{3aq} + H_2O_{(l)} + CO_{2(g)}$

No. of moles of $HNO_3 = \frac{25 \times 1}{1000} = 0.025$moles

Mole ratio of $Na_2CO_3 : HNO_3 = 1:2$ ✓ ½

No. of $NaCO_3 = \frac{0.025}{2}$ ✓ ½ = 0.0125moles

iii) Molar mass of $Na_2CO_3 = 23 \times 2 + 12 + 16 \times 3 = 106$

Mass of $Na_2CO_3 = 106 \times 0.0125 = 1.325$g ✓02

% of Na_2CO_3 c $\frac{1.325 \times 100}{7}$ ✓ ½mk = 18.9286% ✓ ½mk

7. (a) (i) - 2.90 volts✓ ½

+ 2.87 volts✓ ½

(ii) E^{θ}_{cell} = Ered u - E oridation

=E.RHS –E.L.H.S

=2.87 - -2.90✓ / 1

= 2.87 + 2.90✓ ½

= 5.77volts.✓ ½

(b) (i) Is an electrolyte which contains only one type of cation and one type of anion.✓ 1

(ii) (I) ✓ ½ Mark correct points of the anode and the cathode on the diagram.

(II) Anodic Reaction

$40H^-_{(aq)} \longrightarrow 2H_2O_{(l)} + O_{2(g)} + 4e^-$ ✓ 1

Cathodic Reaction.

$Cu^{2+}_{(aq)} + 2e \longrightarrow Cu_{(s)}$ ✓1

(iii) A brown solid is deposited at the cathode. ✓1

(c) 3.57g of Q was depositedly 11500 c

:. 119g of a would be deposited by $\frac{119 \times 11500}{3.57}$ ✓1

= 383,33.33C✓ ½

If 1mole of Q atoms (119g) repair = 383,333.33C

No. of faradays required to deposit Q= ?

$$\left[\frac{383,333.33}{96,500}\right] \surd 1$$

$$= 3.97 = 4\ F \surd \frac{1}{2}$$
