**MARKING SCHEME**

**CHEMISTRY PAPER 2**

**ARISE AND SHINE TRIAL 1 EXAM**

**AUGUST - 2022**

1. (a). Q 1- has highest number of occupied energy levels

(b). U- most electro negative/highest to attract tendency the highest elector affinity

(c.(i). S – 2.8 1/2

(ii). Q – 2,8,8,1 1/2

(d). P is larger than R 1 nuclear charge increase across the period //R has more protons than P. 1

e). Atomic mass = P + n

18 + n = 40

N = 40 – 18

N = 22

Composition P = 181/2 , n = 221/2

f). i) P2S1/2 //Na2O

ii) RT/MgS1

g.i) U- or S2- // F- or O2-

ii). P+ or R2+1 // Na+ or Mg 2+

2.a i) W – propanoic acid /CH3CH2COOH1

ii). Gas V – carbon (iv). Oxide 1 / CO2

b.i). Hydrogenation 1

ii). Polymerisation 12

c.i). Oxidation 1

ii). H H H 1,2 dibromopropane1

Q H C C C H

H Br Br

CH3 H

P C C polypropene

H H n

d). CH3CHCH2(g) + Br2(g) CH3CHBrCH2Br(g)

Q3.

1.a) EItt has the more positive standardelectrode potential

b.i) A and E half cells1

ii). A(s)/A+(aq) // ½ E2(s)/E-(aq) Pt EƟ=+4.28V1/2

c). emf = Ered – Eoxid

=2.92 - -(-0.44)1

= -2.48V

Overall emf is negative, the reaction1 does not take place Orz

2A+ + 2e- A(s) EƟ – 2.92

D(s) D2+ + 2e- EƟ + 0.44\_\_\_\_\_\_\_\_\_\_

2A+(aq) + D(s) A(s) + D2+(aq) E – 2.48

11. a) H -Anode 1/2

J – Cathode 1/2

b) a burning splint is introduced at the mouth a test tube containing gas F1

A dep sound is produced 1

Accept: It goes off/extinguishes with a loop ‘sound

Reject – It burn with a ‘pop’ sound

c) Q = it Q = 5x [(3x60) + 21]

= 5 x 201

= 1005c1

4OH(aq) 2H2O(l) + O2(g) + 4e- 1

If = 96500c

4 x 96500c 24000cm3

1005 c ?

1005c x 24000 1/2

4 x 96500c = 62.4870466

= 62.48cm31/2

4(i) Mass of magnesium oxide = 20.92 – 19.52

=1.40g

(a)(i). Mass of magnesium = 20.36 = 19.52

= 0.84g1/2

Mass of oxygen = 20.92 – 20.36

= 0.56g1/2

Percentage mass of oxygen in magnesium oxide = x 100%

= 40%1/2

(II)

|  |  |  |
| --- | --- | --- |
| Element | Mg | O |
| % composition by mass  R.A.M  No. of moles  Mole ration | 60  24  = = 2.52  =  11/2 | 40  16  = 2.51/2  =  1 1/2 |

The empirical formula is MgO1

(b). (i). 2HaOH(aq) + H2SO4(aq) Na2SO4(aq) + 2H2O(l)1/2

I. Moles of sulphuric acid that reacted with the solution = 1/2

= 0.005 moles 1/2

NaOH : H2SO4

2:1 1/2

Moles of sodium hydroxide 0.005 x2

0.01 moles 1/2

II. If 50cm3 contains 0.01 moles

1000cm3 contains = 1/2

0.2 moles1

III. RMM of NaOH = 23 + 16 + 1

= 40

Mass of NaOH in 1 litre 0.2 x 40

= 8g1/2

Mass of sodium chloride in the mixture = (8.8 – 8)g

= 0.8g1/2

Percentage mass of sodium chloride = x 100%1/2

= 9.09%1/2

5.(a)(i). Change in temperature T = 46.5 – 25

= 21.5k1/2

Heat evolved H =MCT

= 0.45 x 4.2 x 21.51/2

= 40.635KJ1

(ii). Mass of ethanol burned = 125.5 – 124.0

= 1.5g

Molar mass of C2H5OH = (2 x 12) + (6 x 1) + 16

= 461/2

No.of moles = 1/2

= 0.032608695652173 moles

Molar heart of combustion of ethanol =1/2

= -1,246.14Kjmol-1

(b). CH3H2OH(l)+ 3O2(g) 2CO2(g)+ 3H2O(l)1

c). Heat last to the surrounding 1 and that absorbed by apparatus1 is not accounted for.

d)(i). H2 (g) + ½O2(g) H2O(g) = -286kJmol-11/2

Enegy (kJ)

H2(g) + ½ O2(g) 1/2

== -286kJmol-1

H2O(g)1/2

Reaction path 1/2

e). (i). A fuel is a substance that produces useful energy when it undergoes a chemical or nuclear reaction 1

(ii). Cost

Heating value

Availability

Environmental effects

Ease of storage

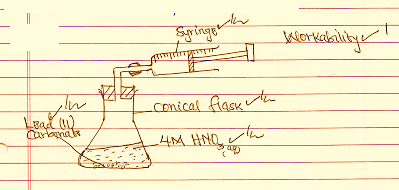
Ease of transportation

Ease and rate of combustion

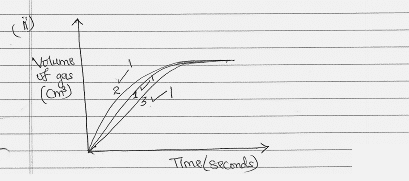
(Any two for mk)

6. (a) surface area 1 / size of particles

(b) (i).



(ii).



(iii). PbCO3(s) + 2HNO3(aq) Pb(NO3)2(aq) + CO2(g) + H2O(l)

(Penalize ½ mk for missing/wrong state symbols)

c). Insoluble lead (II) chloride formed coat the surface of lead (II) carbonate.1 This prevents further reaction 1

(d). Colourless solution changes to yellow/orange1. Addition of hydrochloric acidincreases the concentration of H+ ions and the equilibrium shifts from right to left 1

(7)(a)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Solubility of potassium chlorate  (g/100gH2O | 50.01 | 25.01 | 16.71 | 12.51 | 10.01 |

NB1mk  for expressing solubility values to the same number of decimal places.

(b). S-1/2

L- ½

P – 1

C – 1

3

(c) (i). 11g/100gH2O1

(ii). 72oc (0.5)1

(d). solubility of potassium, chlorate increases with increase in temperature 1/more potassium chlorates dissolves as temperature rises1

e). Extraction of sodium carbonate from Trona

Extraction of sodium chloride

(Any one)