**SUKELLEMO**

**CHEMISTRY PAPER 1 233/1**

**MARKING SCHEME**

**1.** Allotropes; 1mk

**2.** (a) 69-31= 38 1mk

(b) 60.4 x 69 + 39.6 x 71 1mk

 100 100

 41.676 + 28.116 1/2mk

 = 69.792 1/2mk

**3**. (a) 2NaOH(aq) + C12(g) NaC1(aq) + NaOCI(aq) +H2O (l) 1mk

Penalize ½ mk for missing /wrong state symbols

(b) The mixture contains NaOCI 1/2 ; which decomposes to give [O] which bleaches 1/2mk

 Acc. NaOCI(aq) NaCI(aq) + [dye + O] 1mk

c) Manufacture HCI

 Manufacture plastics // PVC any one 1mk

 Purification // treatment of water

**4.** (i) Yellow precipitate // substance 1mk

(ii) X is Nearer to lead(II) nitrate crystal (on the diagram)1mk

(iii)Pb2+ are denser// heavier ; diffuse slowly ½

 I- ions are less dense // lighter diffuse faster ½

**5.** i) Group ½ ; Atomic radius increase down the group ½ due to increase in number of energy levels

ii) As the size of atom increase down the group; ½ strength of metallic bonds decrease // forces of attraction between atoms decrease. ½

**6.** (i) Sodium sulphite // Na2SO3 ½

 Sodium carbonate // Na2CO3 ½

(ii) Oxidation // reduction // redox 1mk

(iii) It is hygroscopic // absorbs water vapour from gases ; 1mk

 **7.** Na2CO3 (aq) +2HCl(aq) NaCI(aq) + H2O(aq) +CO2(g)

Moles HCl

100cm3 1 Mole

20cm3 20x1 = 0.02 moles½

 1000

Moles Na2CO3

0.02 x 1 = 0.01moles ½

 2

25cm3 0.01 moles

100cm3 100 x 0.01

 25

 = 0.04 moles½

Mass Na2CO3

1 mole Na2CO3 106

0.04 moles 0.04x106

 = 4.24g ½

Mass NaCl

10.6g-4.24g = 6.36g½

%Nacl = 6.36 x100

 10.6

= 60% ½

**8.** Electrolysis of molten ore ; ½ Potassium is very reactive ; ½

**9**.(i) HCI gas is acidic react with CaO 1mk

OR

HCI is denser than air ; should be collected by downward delivery 1mk

OR

Wrong method of gas collection ½

Wrong drying agent ½

(ii) Ammonia // NH3

(iii) NaCl(s) + H2SO4(l) NaHSO4(aq) + HCI(g)

Penalize ½ mk for missing /wrong state symbols

**10.**Giant atomic // covalent; 1mk has high boiling point implying giant structure //, strong covalent bonds ½ burns to form an acidic oxide; Non -metal ½

**11. (**a) (i) Q=I x t

= 0.6 x90=3240 1mk

(ii) 3.79g 3240C

 226g 226x 3240 = 193203.166 C 1mk

 3.70

b) 96500C 1F

193203.166 193203.166 x 1 ½ mk = 2.00 Charge is 2+ ½mk

 96500

**12. (**a) PbS 1mk

 (b) (i) To reduce the remaining PbS to Pb 1mk

 (ii) To remove impurities 1mk

13.(i) Heat absorbed is used to weaken the forces of attraction between the particles 1mk

(ii) Process II (1mk) ; This is because Cd CI2 is an ionic compound with strong ionic bonds (1mk); more energy is needed.; H2O has hydrogen bonds and van der waals forces between molecules which are weaker ; (1mk); less energy is needed

**14.** NaHCO3//Na2CO3 to each 1mk

More effervescence // bubbles with H2SO4 ½

Fewer effervescence with CH3COOH ½

 OR

Add universal indicator to each 1mk

Use pH chart to determine pH ½

H2SO4-1,2,3 ½

CH3COOH-4,5,6

Acc; use of electrical conductivity

**15**.(i) No of half lives = 10 = 4 1mk

 2.5

Original amount is 100%

R.A = 100x  1/2  4  ½

= 100 x 1/ 16 = 6.25% ½

(ii) 216 Po 208Pb +242He + 2-1 0e

 84 82

m = 208+8+0=216 m=2 1mk

n=82+4-2=84 n=2 1mk

 **16.** a) (i) Butan-1-0l // Butanol 1mk

 H H H H

 | | | |

ii) H - C- C- C- C - OH 1mk

 | | | | rej condensed formula

 H H H H

C4H9 OH +6O2(g) 4CO2(g) +5H2O(l) ignore states symbols

**17.** a) Hardening of rubber // making rubber stronger// tougher 1mk by heating with rubber.

b) (i)Reduces yield of SO3 ½ ; Reverse reaction which is endothermic is favoured. ½

(ii)Increases yield of SO3; ½ forward reaction which is accompanied by decrease in volume is favoured ½

 **H H H H H**

 **| | | | |**

**18.** (i) CH3CH2CHCHCH3  or H – C -C - C= C- C- H1mkPent-2-ene 1mk

 | | |

 H H H

(ii) Ethylpropaneate 1mk

**19.**(i) 2C17H35COONa(aq)+ Ca2+(aq) (C17H35COO)2Ca + 2Na+ (aa) 1mk

(ii) Addition of sodium carbonate ½

 Ion exchange . ½

**20.** (i) CH4(g) +H2O(g) CO(g) +3H2(g) - ½ missing or wrong states

 H

 |

(ii) H-C-H + H-O-H C= O +3H- H

 |

 H

Heat absorbed Heat released

4x412=1648 1x995=995

2x463=926 3x436=1308

Total= + 2574 ½ Total = -2303 ½

ΔH= +2574-2303½

= +271kJ ½

**21.**

* Add 50cm3,1M or 25cm32M H2SO4 to NaOH solution ;1mk
* Transfer mixture to an evaporating dish
* Evaporate to saturate the solution ½
* Allow saturated solution to cool ½
* Filter // decant to obtain crystals ½
* Rinse crystals with distilled water and dry between filler papers ½

Accept use of any other correct volume and molarity of H2SO4 provided there is complete neutralisation

**22.** (i) Calcium carbonate 1mk rej CaCO3

ii) CaCO3(s) + H2O(l) + CO2(g) Ca(HCO3)2(aq) 1mk

 Penalize ½ mk for missing /wrong state symbols

 iii) Fire extinguishers: ½ denser than air ½Does not burn/support combustion

or

Refrigerating agent; ½ solid CO2 sublimes ½

**23.** (i)

½

Acc . over water method; gas collected using a measuring cylinder or a graduated gas jar

 ½

**(ii)** An increase in temperature increases the kinetic energy of particles ;1mk : This leads to more frequent collision ½ which increases the rate of a chemical reaction½

**24.**a) Propanone 1mk

b)Fractional distillation: 1mk : Have different but close boiling points: 1mk

**25.**(a)Water // H2O 1mk

(b) No white ppt// No ppt ½ NaOH absorbs // react with CO2 ½

**26.** i) P4(s) +5O2(g) 2P2O5 (s) 1mk

ii) Blue litmus turns red ½

Red remains red ½

**27**.(i) Platinum // nichrome wire 1mk

ii) Platinum wire glows ½

brown fumes ½

iii) 4NH3(g)+ 5O2(g) 4NO(g) + 6H2O(g) -½ for missing

 or wrong states symbols

**28.** (a) An acid- base indicator is a substance that gives a definite colour in acid and another definite colour in a basic solution 1mk

(b) Phenolpthalein - red ½

Methylorange - yellow ½

**29**.(a) Base Line 1mk  **30.** E.m.f = Ered – Eox

 +0.34 + 0.54 ½

(b) A,C,D All 3- 1mk = +0.88V½

 2- ½mk

 1- 0mk

**31.**( i) X-Zinc sulphate // Zn2+ ½ Acc. Any other soluble salt of zinc and copper

Y -Copper (II) Chloride //Cu2+ ½

ii) From zinc to copper 1mk

iii) Zn(aq) Zn2+(aq) +2e 1mk

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