**WEITHAGA ZONE JOINT EXAM 2019**

**CHEM PP2 MARKING SCHEME**

1**. (a) X - *Sodium ethonoate🗸 1***

 **Q - *Sodium ethoxide 🗸 1***

 **R - *Iodoethane 🗸 1***

 **b)** $CH\_{3}COONa\_{\left(s\right)}+ NaOH\_{(aq)} CH\_{4(g)} + Na\_{2}CO\_{3(s)}$

 **(c)**

1. **I (2 marks)**

**Reagent - *Propan-l-ol 🗸 1***

**Condition - *Conc. H2SO4 🗸 1***

1. **IV (2 marks)**

**Reagent - *Conc. H2SO4 🗸 1***

**Condition - Temp 160 – 1800C *🗸 1***

 **(d)**

 **I - *Esterification***

 **II - *Substitution***

 **IV - *Oxidation***

 **V - *Dehydration***

 **2.(i) Noble gases √1**

 **(ii) D2SO4 √1**

 **(iii) (a) Y √1**

 **(b) E √1**

 **(iv) Ionic bond √1 – Because B reacts by losing an electron (s) which are gained by H. √1**

 **(v) D//M √1 Any one, one mark**

 **(vi) Because E reacts by gaining an extra electron which reduces √1 the electrostatic**

 **pull by the positive nucleus making the ionic radius increase. wtte**

 **(vii) At Period III Group IV**

 **(viii) Because of the increase in the strength of the molecular bonds in the oxide of L as**

**compared to that of G. √1 w.t.t.e**

 **(ix) C has a smaller atomic √1 radius than I because of the increase in the strength of the**

**nucleus on the valency electrons in C as the number of protons increase √1 w.t.t.e**

 **(x) 1st ionization energies increases from J – L across the period due to addition of an**

**extra proton in the nucleus increasing the attraction of the valency electrons √**

**3.a)i**



 **(ii) What was the solubility of each salt at 650C? (1 mark)**

$KNO\_{3}- 120g/100g $ **of water** $\pm 1$ **🗸 ½**

 ***KBr*** $-$ ***87g/100g of water*** $\pm $ ***1 🗸 ½***

 **(iii) 100g of a saturated solution of potassium nitrate at 700C was cooled to 200C. What mass of the crystals will be crystallized? (2 marks)**

 ***At 700C solubility = 135g/100g of water***

 ***If 235g contain 135g of salt***

 ***100g contain 135g***

$\frac{100 ×135}{235}=57.4468g $***🗸 ½***

 ***At 200C solubility = 26g/100g of water***

 ***If 126g contain 26g of salt***

 ***100g contain ?***

$\frac{100 ×26}{126}=20.6349g $***🗸 ½***

 ***Mass which will crystallized***

 ***57.4468 – 20.6349***

 ***= 36.8119g***

 **b i)**$CuCO\_{3(s)} heat CuO\_{(s)} + CO\_{2(g)}$

 **ii)Solution C - *Copper (II) chloride*  (1 mark)**

 **Solid D - *Copper (II) hydroxide* (1 mark)**

 **(c)**

2+

$Cu (NH\_{3})\_{4}$

**4**

 **i)*To displace air in flask H over the hot copper turnings.***

 **(1 mark)**

 **ii) *The brown solid changes to black***

 **(1 mark)**

 **Iii )*Nitrogen, carbon (IV) oxide, argon, (Xeron, neon) (Any one)***

 **(1 mark)**

 **Iv )*410cm3***

**🗸1**

 **v)** $\frac{\left(500 ×410\right)}{500}×100= \frac{90 ×100}{500}=18\%$**🗸1**

**B.**

***a) Black CuO turns to red-brown Cu.***

 **(b)** $2H\_{2(g)} + O\_{2(g )}2H\_{2}O\_{(l)}$

 **(c) *To determine the reducing property of hydrogen.* 🗸1*Hydrogen is above Cu* 🗸1 *in the reactivityseries, thus it reduces the oxygen from CuO.***

 ***5A. a) A , The energy of the product is less than the energy of the reactant.***

 ***b) B, The enrgy of the product is greater than the energy of the reactant.***

 **5B(a) The blue colour of solution fades /changes from blue to colourless Brown solid deposited√ ½**

**(b) i) No. of moles that reacted Zn = 65**

 **0.65 √ ½ = 0.01moles √ ½**

 **65**

**(ii) The no. of moles that was displaced from the solution (Cu =64)**

 **0.64 √ ½ = 0.01moles√ ½**

 **64**

**(iii) The mole ratio of Zn: Cu**

 **0.01: 0.01**

 **1:1**

**(c) Cu2+(aq) + Zn(s)  Cu(s) + Zn2+(aq) or CuSO4(aq) + Zn(s) Cu(s) + ZnSO4(aq)**

**(d) (i) Enthalpy change that occurs when one mole of a substance is displaced from a solution of its ions √ 1**

 **(ii) 1mole = 205.8Kj**

**0.01 moles = 205.8 x 0.01√ ½**

 **= 2.059kJ √ ½**

**Mass of solution = 20cm3 x 1g/cm3**

 **= 20g √ ½**

 **H = mcΔθ**

 **Δθ = mcΔθ**

 **Δθ = H = 2.05kJ √ 1**

 **20g x 4.2Jg-1k-1**

 **Δθ = 24.5k √ ½**

***6.a) Reaction in which the electrons are lost and gained***

***b)i) Zinc /Zn***

***ii), Zn2+ + 2e Zn and Pb2+2e Pb***

***iii),Zn/Zn2+ //Pb2+ /Pb.***

**7. (a) Identify substances. (3 marks)**

 **A - *Hydrogen***

 **B - *Nitrogen***

 **D - *NO***

**(b) Step I - *Iron finely divided / iron***

 **Step II - *Platinum – rhodium catalyst***

 **(c) *4NH(3) + SO2 2NO(g) + 6H2O***

 **(d)(i) Hot and concentrated sodium hydroxide. (1 mark)**

 ***6NaOH(aq) + 3Cl2(g)NaClO3(aq) + 5NaCl(aq) + H2O(l)***

 **(ii) Dilute and cold sodium hydroxide. (1 mark)**

 ***2NaOH(aq) + Cl2 NaOCl + NaCl + H2O***

**II.**

1. **Liquid P - *dinitrogen tetra oxide***
2. **Gas Y - *oxygen***

$2Pb\left(NO\_{3}\right)\_{2} 2PbO\_{(s)} + 4NO\_{2(s)} + O\_{2(g)}$

1.
* ***Nitrogen (V) oxide relights a glowing splint while nitrogen (II) oxide does not.***
* ***N2O has xtic sweet smell, while. NO2 is odourless.***

**8. . (a) (i)CuFeS2;**

 **(ii) Copper (I) Sulphide;**

 **(iii) 3Cu2S + 4O2 2Cu(s) + 2Cu2O + 3SO2(g)**

 **(iv) SiO2; FeO(l) + SiO2(s) FeSiO3**

 **(v) To reduce Copper (I) Oxide**

**b)**

**Pure copper**

**Bristen copper**

**Copper (II) sulphate solution**

**+**

**-**