**GATITU MIXED SECONDARY SCHOOL**

**END OF TERM ONE EXAM CAT 1**

**CHEMISTRY**

**FORM IV 2015**

INSTRUCTIONS:

*Answer all questions in the space provided.*

*Remember to write your* ***registration*** *number.*

1. (a) Differentiate between lattice and hydration energy. (2 marks)

………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

 (b) Use the information below to answer the questions that follow:- (3 marks)

Ca(s) + ½ O2(g) CaO(s) ΔH =-635KJ/mol

C(s) + O2(g) CO2(g) ΔH= -394KJ/mol

Ca(s) + C(s) + 3/2O2(g) CaCO3 ΔH = -1207KJ/mol

 Calculate the enthalpy change for the reaction:

Ca(s) + CO2(g) CaCO3(s)

………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

1. 0.92g of ethanol was found to burn in excess air producing a temperature rise of 32.50C in 200cm3 of water. (C=12.0 H=1.0 O=16.0) (Density of water 1g/cm3, Specific heat capacity of water 4.2kj kg-1k-1)

 a) Write the equation for combustion of ethanol. (1 mark)

………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

 b) Determine the molar heat of combustion of ethanol. (3 marks)

………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

1. The diagram below shows energy levels for the reaction

 ½ H2(g) + ½ F2(g) HF(g)



 (a) Work out the activation energy for the reaction (2 marks)

……………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

 (b) Calculate the heat of formation of HF (2 marks)

………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

 (c) Is the reaction endothermic or exothermic? (1 mark)

……………………………………………………………………………………………………………..

1. Study the standard electrode potentials for the elements given below and answer the questions that follow. The letters do not represent the actual symbols of the elements

 Eθ

 Q + 2e- 2Q- (aq) +2.87

2(g)

 R2(g) + 2e- 2R-(aq) +1.36

 S2+ (aq) + 2e- S (s) + 1.23

 2T+(aq) + 2e- T2(g) 0.00

 U2+(aq) + 2e- U(s) -0.13

 V2+(aq) + 2e-  V(s) -0.76

1. Define the following; (2 marks)
2. Reduction

............................................................................................................................................................................................................................................................................................................

1. Oxidation

...........................................................................................................................................................................................................................................................................................................

1. What is the Eθ value of the weakest reducing agent? (1 mark)

……………………………………………………………………………………………………………………………………………………………………………………………………………

1. Which element is likely to be hydrogen? Give a reason for your answer (2 marks)

……………………………………………………………………………………………………………………………………………………………………………………………………………...

1. Draw a labeled diagram for the cell that would be obtained when the half cell of elements S and V are combined. (2 marks)

………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

1. Calculate the e.m.f of the electrochemical cell in a (iii) above (2 marks)

……………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………..

1. When magnesium reacts with hydrochloric acid, a salt is formed and hydrogen gas.
2. Define an acid. (2 marks)

………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

1. Write the chemical formulae of the salt formed. (1/2 mark)

………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

1. The compound was dissolved in water to form an aqueous solution. The solution was then electrolyzed using graphite electrodes containing planitised platinum. Write the half equation that occurred at the;
2. Anode (2 marks)

……………………………………………………………………………………………………………………………………………………………………………………………………

1. Cathode

……………………………………………………………………………………………………………………………………………………………………………………

1. State one observation made at the cathode. (1/2 mark)

……………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………….

1. Name three amphoteric oxides (1⅟2 marks)

………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

1. What is a strong acid? (1/2 mark)

……………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………