THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

Faculty of Engineering & Technology

DEPARTMENT OF CIVIL AND BUILDING ENGINEERING

DC 10, DB 10, DBC 10, CA 10

SEMESTER EXAMINATIONS

APRIL/MAY 2010 SERIES

CHEMISTRY 2

TIME: 2 HOURS

Instructions to Candidates

This paper consists of **FIVE** Questions.
Answer Q1 and any other **TWO** Questions.

Question ONE

(a). The following table gives first, second, third and fourth ionization energies in Ks/mole IE_1, IE_2, IE_3 and IE_4 respectively of elements P, Q, R and S on the periodic table. Symbols P, Q, R and S are not actual elements symbol.

Element	IE_1	IE_2	IE_3	IE_4
P	497	4582	6938	9576
Q	504	984	5732	6939
R	421	3081	4620	5940
S	580	1823	2758	11846

(i). Write chemical equations for formation of the most stable ions of P, Q, R and S.

(ii). Which of the above elements have same chemical properties. Give reasons for your answer.

(iii). Classify elements P, Q, R and S as S-block, P-block, d-block and f-block on the p.d. Table. Use knowledge of electronic configuration to justify your answer.

(iv). Write chemical equations for reaction of elements P, Q, R and S with oxygen gas.

(14 Marks)

(b). Justify for the following observations:

(i). Fe^{+2} is readily oxidized to Fe^{+3} but Zn^{+2} is not oxidized to Zn^{+3}.

(ii). $_{11}Na$ has a larger atomic size than $_{13}Al$.

(iii). $^{35}_{17}Cl$ and $^{37}_{17}Cl$ have same Chemical properties but different physical properties.

(12 Marks)

(c). From the following Redox equation:

$$Mg + H_2So_4 \rightleftharpoons MgsSo_4 + H_2$$

Identify:

(i) Reduction process
(ii) Oxidation process
(iii) Oxidant
(iv) Reluctant

(4 Marks)

Question TWO

(a). State:

(i). **THREE** difference between ionic compounds covalent compounds.
(ii). **TWO** requirements for hydrogen bond formation.
(iii). **THREE** factor that influence formation of ions.

(8 Marks)

(b). (i). Write chemical equations to show self ionization of water.

(ii). Use the above equation in b(i) to define an acid and a base.

(iii). Define - PH
- Buffer Solution

(iv). Give **TWO** types of buffer Solution and one example in each case.

(8 Marks)

Question THREE

(a). Outline the following modes of formulation process for a growing PVC polymer.

(i). Mutual combination
(ii). Dispropotionation

(6 Marks)

(b). With help of balanced chemical equation describe the rusting process of iron.

(10 Marks)

(c). State:

(i). **TWO** uses of polymer in building construction.
(ii). **TWO** methods of preventing iron from Rusting.

(4 Marks)

Question FOUR

(a). With help of equations describe:

(i). **THREE** methods of removing Temporary water hardness.
(ii). **TWO** methods of removing permanent water hardness.

(12 Marks)

(b). List **FIVE** main ingredients of paint and state **ONE** function of each.

(8 Marks)

Question FIVE

(a). State and differentiate between **THREE** types of chemical formulaes.
(6 Marks)

(b). Define the following terms:

(i). Isotope
(ii). Atomic number
(iii). Mass number

(3 Marks)

(c). State (i). Hunds rule
(ii). Aufbaus principle

(2 Marks)

(d). List **FIVE** important characteristics of a good polymer. **(5 Marks)**

(e). (i). Write full name of EDTA.
(ii). Draw structural formula of EDTA.
(iii). Draw structural formulae of the most stable ion of EDTA.
(5 Marks)