MINISTRY OF EDUCATION AND HIGHER EDUCATION

FORM FOUR EXAMS, 2012

CHEMISTRY

20
12

P/LAND NATIONAL EXAMINATION BOARD

PUNTLAND STATE OF SOMALIA

MINISTRY OF EDUCATION

NATIONAL EXAMINATIONS BOARD

NAME OF THE STUDENT	
NAME OF THE SCHOOL	
ROLL NUMBER	

FORM FOUR CHEMISTRY EXAMINATION

MAY 2012

TIME 2:10 HOURS

INSTRUCTIONS TO CANDIDATES

Instructions to the candidate (please read carefully)

This paper consist of 20 pages, count now, if there is missing please inform to the invigilator

- Answer ALL question
- Write your working on the space provided below the question, no extra paper allowed
- If you write wrong answer please delete and write the right answer clearly
- This paper consist of two parts
- **PART A: (10 multiple choices)   =   10 marks**
- **PART B: (9 structured questions)   =   90 marks**
        Total   =   100 marks

Use this page for rough work, it will not be marked

Section A: Multiple choice questions   (10 marks)

For each question in this section, Circle the correct answer.

1. Which of the following reactions is a chemical change

   a) Ice melting

   b) Burning paper

   c) Heating iodine

   d) Heating wax

2. Which of the following PH numbers contain more hydrogen ion

   a) PH_3

   b) PH_5

   c) PH_2

   d) PH_4

3. Which of the following formulae below is the general formula

   for alkene family

   a) $C_n H2n_{+2}$

   b) C_nH_{2n+1OH}

   c) C_nH_{2n}

   d) C_nH_{2n-1}

4. The process by which colored substances are separated is

called

   a) Fractional distillation

   b) Evaporation

   c) Separating funnel

   d) Chromatography

5. Which of the following solutions is non-electrolyte

   a) Sugar solution

   b) Lithium Bromide

   c) Aluminium chloride

   d) Sodium nitrate

6. Which of the following electronic configuration would you

expect to be a calcium atom

   a) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6$

   b) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^5$

   c) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^1$

   d) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^2$

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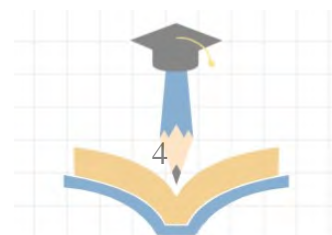
7. Which is the special name of group 7 elements?

   a) Alkali metals

   b) Halogens

   c) Noble gas

   d) Alkaline earth metals

8. When lone-pair of electron is shared by atoms is known as:

   a) Ionic bond

   b) Metallic bond

   c) Dative bond

   d) Covalent bond

9. Joining together many small molecules to form one large

   molecules is known as:

   a) Polymer

   b) Elimination

   c) Neutralization

   d) Substitution

10.   The positive sign that is written after an enthalpy

change symbol (ΔH) tells about

      a) Heat gain or loss between a reacting system and its

         surrounding

      b) Heat gain by the surrounding

      c) Heat gain by the reacting system

      d) Heat loss by the reacting system

PART TWO

STRUCTURAL QUESTIONS   (90 marks)

QUESTION ONE   (10 marks)

The table bellow shows the structures of several particles.

Particle	Electron	Proton	Neutron
A	12	12	12
B	12	12	14
C	10	12	12
D	10	8	8
E	9	9	10

    a) Which three particles are neutral atoms?

    ....
    ....
    ....(3marks)

b) i) which particle is a negative ion?
....(1mark)

ii) what is the change on this ion?
....(1mark)

c) i) Which particle is a positive ion?
....

ii) What is the change on this ion?
....(1mark)

d) i) which two particles are isotops?
....
....(2marks)

ii) Define the term isotopes?
....
....
....(1 mark)

QUESTION TWO   (10marks)

    a) using dot and cross diagram draw the structures of the following compounds:

i.   carbon dioxide(CO_2)
....
....
....
....
....
....(1mark)

ii. Water molecules (H_2O)

....
....
....
....
....
.... (1mark)

iii. Ammonia (NH_3)

....
....
....
....(1mark)

b) Write the electron configuration of the following atoms in term of (s,p,d,f)

  i. Argon Ar=18 electrons

....

....(1mark)

  ii. Chlorine   CL=17 electrons

....

....(1mark)

  iii. Nitrogen   N = 7 electrons

....

....(1mark)

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c) Magnesium oxide is a compound made up of magnesium ions and oxygen ions.

    i.   Write a word equation of the reaction when magnesium reacts with oxygen?

....

....

....**.(1mark)**

    ii.   What type of chemical bond is present in magnesium oxide?

....

....**..**...(1mark)

    iii.   Write the ions present in magnesium oxide?

....

....

....**....................(2marks)**

QUESTION THREE   (10marks)

a) most metals react with acids to form salt and hydrogen gas

    i.   complete the following equation

Magnesium + hydrochloric acid $\longrightarrow$ ....+ hydrogen gas

                                             (1mark)

    ii.   Write a chemical equation for the reaction above?

....

....**......**2marks)

iii.   What this type of reaction is called?

....

....(1mark)

b) Hydrochloric acid is a strong acid and ethanoic acid is a

weak acid

i.   Define the term strong acid with equation?

....

....

....(2marks)

ii.   Write the chemical symbol of nitric acid?

....

....(1mark)

c) Look at these different types of solutions

$H_2SO_{4(aq)}$ $NH_{3(aq)}$ $KNO_{3(aq)}$ $NaOH_{(aq)}$ $CH_3COOH_{(aq)}$

i.   Identify the weak alkali?

....

....(1mark)

ii.   Identify the strong acid?

....

....(1mark)

iii.   Identify the strongest alkali?

....

....(1mark)

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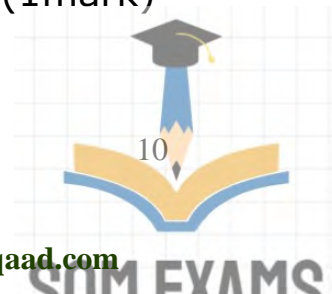
QUESTION FOUR   (10MARKS)

Study the periodic table below; letters do not represent the actual symbols of elements. Use the letters once, twice or more.

I	II						III	IV	V	VI	VII	III
											R	
	L						P					
												K
H												
					W							

Which element(s): -

a) Is transition metal?...(1mark)

b) Is a most electronegative element?
....(1mark)

c) Is a noble gas?
....(1mark)

d) Forms an ion with a charge of +3?
....(1mark)

e) Forms an alkaline solution?
.... (1mark)

f) Is an element which is a gas containing single atoms?
....(1mark)

g) Has two electrons in its outer shell?
....(1marks)

h) Which two elements are gases at room temperature?
....(2marks)

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i) Can form two different valencies?

....(1mark)

QUESTION FIVE   (10marks)

a) Name the following organic compounds:

i.

```
        H     H      H
        |     |      |
   H-C — C —  C — H
        |     |      |
        H     H      H
```

...........................(1mark)

ii.

```
      H     H                H
      |     |                |
 H — C — C ═══ C  —  C — H
      |          |      |
      H          H      H
```

..........................(1mark)

iii.

...........................(1mark)

iv.

```
        H       O
        |      //
   H — C __ C
        |       \
        H       OH
```

...........................(1mark)

v.

```
        H    H      H
        |    |      |
   H —— C —— C ———— C —— OH
        |    |      |
        H    H      H
```
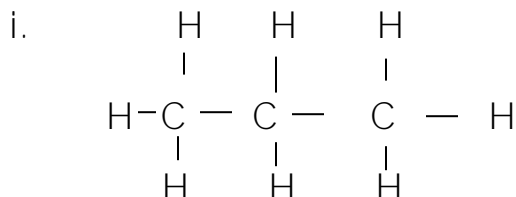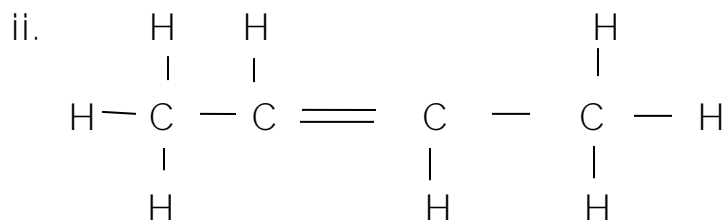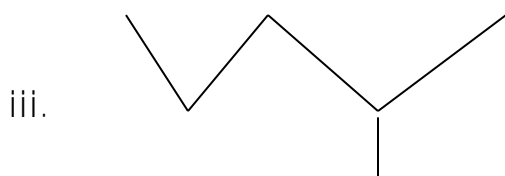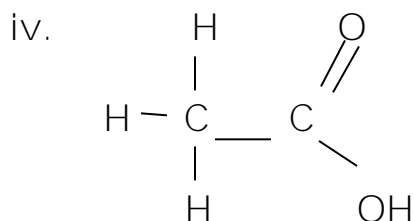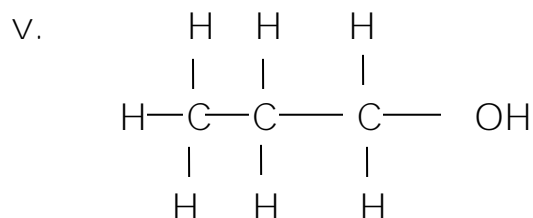
………………………(1mark)

b) 2-**chloro propane is an organic compound, write it's**

  i.   Molecular formula
       …………………………………………………………………(1mark)

 ii.   Structural formula
       …………………………………………………………………..(1mark)

iii.   Displayed formula
       ………………………………………………………………………………
       ………………………………………………………………………………
       ……………………………………………………………………..(1mark)

iv.   Skeletal formula
       ………………………………………………………………………………
       ……………………………………………………………. (1mark)

  v.   How many carbon atoms are there in 2-chloro propane?
       ………………………………………………………………………………
       ………………………………………………………………………………
       ……………………………………………………………..(1mark)

QUESTION SIX   (10marks)

a) The reaction between magnesium atom and sulphur dioxide
   is like this:
   $Mg_{(s)}$ + $SO_{2(g)}$ $\longrightarrow$ $MgO_{(s)}$ + $S_{(s)}$

  i.   Which substance is oxidized?
       ……………………………………………………………………………(1mark)

ii.   Which substance is reduced?
....(1mark)

iii. Which substance is oxidizing agent?
....(1mark)

iv.   Which substance is reducing agent?
....(1mark)

b) $Zn_{(s)}$ $+ HCl_{(aq)}$ $\longrightarrow$ $ZnCl_{2(aq)}$ $+$ $H_{2(g)}$
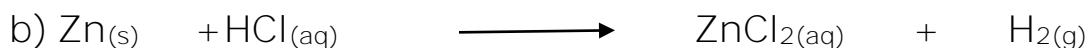
i.   Write the ionic equation for this reaction?
....
....(2marks)

ii. This ionic equation is represented by two half equations. Write these two ionic equations?
....
....
....
....(2marks)

iii. Explain why this is a redox reaction?
....

....

....

....

....(2marks)

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QUESTION SEVEN   (10marks)

This diagram shows the apparatus used to find out the effect of an electric current on a concentrated aqueos solution of sodium chloride.
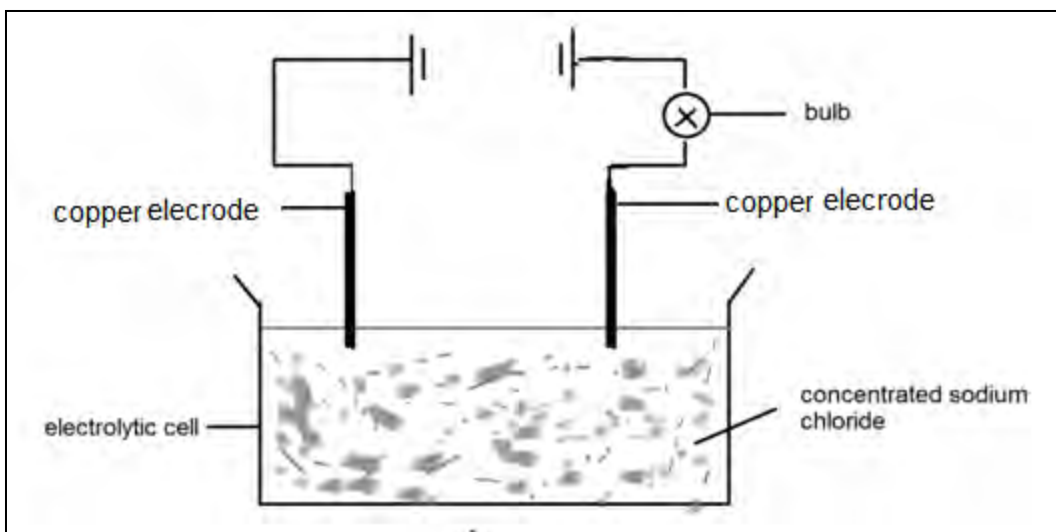
a) What does electrolysis mean?

....
....(1mark)

b) Why the solutions conduct electricity?

....
....
....(1mark)

c) List all the ions present in sodium chloride solution?

....
....
....
....
....
....(4marks)

d) Name the product formed at the anode?

....

....

....(1mark)

e) Name the product formed at the cathode?

....(1mark)

f) The remaining solution after the electrolysis of sodium chloride will turn litmus paper blue.

    i.   What is the name of this solution?

      ....(1mark)

    ii.   Give one chemical property for it?

      ....(1mark)

QUESTION EIGHT   (10marks)

The first six successive **ionization energies of an element ''D''** are shown in the table below.

Ionization energy						
Element electrons	1st	2nd	3rd	4th	5th	6th
D	1086	2353	4621	6223	37832	47278

a) Define the term ionization energy?

....

....

....

....(2marks)

b) Why there is a large increase in ionization energies from the 2nd and the 3rd ionization energies?

....

....

....

....(2marks)

c) Suggest the group in the periodic table to which ''D'' element belongs?

....

....

....(1mark)

d) The first ionization energy of Lithium is $520 kjmol^{-1}$

i. Write an equation with state symbols to represent the first ionization energy of Lithium?

....

....

....

....(2marks)

ii. Write three factors that affect the ionization energy?

....

....

....

....

....(3marks)
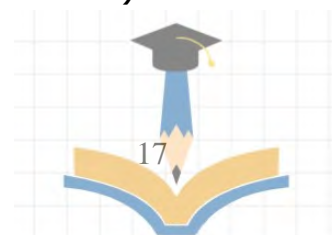
QUESTION NINE   (10marks)

The apparatus below was used for approximate measurements of enthalpy change by burning known mass of ethanol(C_2H_5OH). Study it and answer questions that follow.
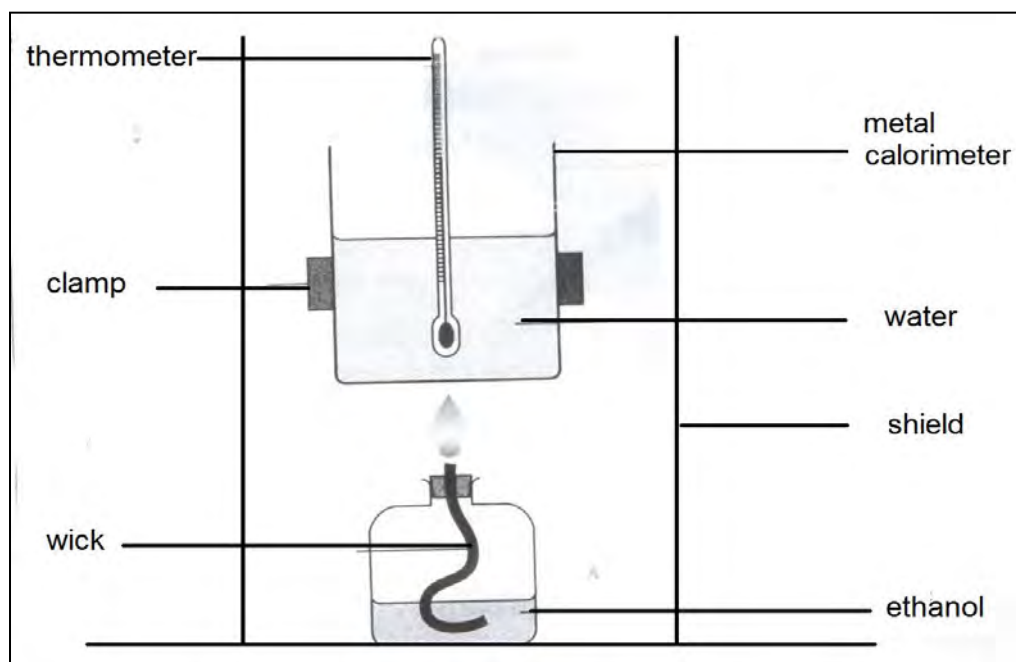
Sample result:

- Mass of water in the Calorimeter   = 100gr

- Mass of flask + Ethanol before heating the reaction   =35.5gr

- Mass of flask + Ethanol after heating the reaction   =12.5gr

- Mass of Ethanol burnt in the reaction   =_____

- Initial temperature of the water   =31°

- Final temperature of the water   =56°

- Temperature rise of the water   =_____

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a) What mass of ethanol is burnt?

....
....
....…......(1mark)

b) Calculate the temperature rise of the water?

....
....
....(1mark)

c) Calculate the moles of ethanol burnt? (C=12, H=1, O=16)

....
....
....
....
....
....
....(2marks)

d) Determine the enthalpy change of the reaction? (heat capacity of water = 4.2kj)

....
....
....
....
....
....
....
....(2marks)

e) Calculate the molar enthalpy change of the reaction?

....
....
....
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....
....
....(2marks)

f) Write a balanced chemical equation for the combustion of ethanol?

....
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....
....
....
....(2marks)

.... THE END

SOM EXAMS