Form 4 Mock 233/2 CHEMISTRY Past Paper

NAME……………………………………………………INDEX NO:…………………
CANDIDATE'S SIGNATURE…………………………………DATE……………………….

233/2
CHEMISTRY
THEORY
Paper 2
JULY/AUG. 2010
Time: 2 HRS

BUTERE DISTRICT JOINT EVALUATION TEST – 2010
Kenya Certificate of Secondary Education (K.C.S.E)

233/2
CHEMISTRY
THEORY
Paper 2
JULY/AUG. 2010
Time: 2 HRS

INSTRUCTIONS TO CANDIDATES

?Write your Name and Index No. in the spaces provided.
?Sign and write the date of examination in the spaces provided.
?Answer ALL the questions in the spaces provided.
?Mathematical tables and electronic calculators may be used.
?All working must be clearly shown where necessary.
?Mathematical tables and silent electronic calculators may be used.

QUESTION	MAXIMUM SCORE	CANDIDATES SCORE
1	10	
2	11	
3	12	
4	12	
5	13	
6	10	
7	12	
Total	80	

This paper consists of 12 printed pages. Candidates should check the question paper to ensure that all pages are printed as indicated and no questions are missing

1.a)Study the flow chart below and answer the questions that follow.

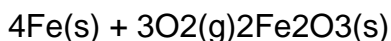i)Name the substances removed in steps I, II and III(3mks)

I.………………………………………………………………………………..

II.………………………………………………………………………………..

III.………………………………………………………………………………..

ii)Name the gases obtained with respect to their boiling points

- 1960C…………………………………………………………………..

- 1860C ……………………………………………………………….

- 1830C…………………………………………………………..(3mks)

b)With the aid of labeled diagrams explain how you would show that for rusting to occur, oxygen is necessary.(2mks)

c)Iron reacts with oxygen according to the equation below

4Fe(s) + 3O2(g)2Fe2O3(s)

How many moles of Fe2O3 would be formed if 1kg of iron reacts with excess oxygen?

(Fe = 56)(2mks)

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2.a)The table below shows the ions of elements W, X, Y, Z and their electronic configuration

IonElectronic configuration
W-2.8.8
X2+2.8.8
Y3+2.8
Z2-2.8

i)Which two elements belong to the same period?(1mk)

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

ii)In which group does Y3+ belong?(1mk)

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iii)Draw the atomic structure of element Z(1mk)

iv)What is the formula of the compound formed between W and X?(1mk)

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

b)The flow chart below shows the preparation of carbon (II) oxide and its reactions.

i)Name the type of reaction taking place between H2C2O4 and Conc. H2SO4(1mk)

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ii)Why is gaseous mixture passed through conc. KOH?(1mk)

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

iii)Write an equation for the production of B and C(1mk)

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iv)State one use of carbon (II) oxide.(1mk)

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c)4.6g of a compound made up of carbon, hydrogen and oxygen was completely burnt

in excess oxygen. 8.8g of carbon (iv) oxide and 5.4g of water were formed at the end of the experiment. Determine the simplest formula of the compound.
(C = 12, H = 1, O = 16)

3.a)The scheme below represents the manufacture of a cleansing agent.

i)Draw the structure of B and state the type of cleansing agent for which it belongs.
Structure …………………………………………………………….(1mk0
Type …………………………………………………………….(1mk)
ii)State one disadvantage of using B as a cleansing agent.(1mk)
……………………………………………………………………………………………..
b)Describe how a cleansing agent removes dirt from linen(3mks)
……………………………………………………………………………………………..
……………………………………………………………………………………………..
……………………………………………………………………………………………..
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c)Perspex is a polymer containing big molecules of the type.

i)Give the structure of its monomers(1mk)
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……………………………………………………………………………………………..
ii)What type of polymer is Perspex?(1mk)
……………………………………………………………………………………………..
iii)Given that the relative molecular mass of Perspex is 6708, calculate the number of monomers in Perspex. (O = 16, C = 14, H = 1)(2mks)

d)Some bond energies are given below;

C = C = 598KJMol-1, C – C = 346KJMol-1, C – H = 413Jmol-1

H – H = 436KJMol-1

Calculate the energy change for the reaction of a mole of ethane with a mole of hydrogen.(2mks)

4.a)i)In the space provided sketch a labeled diagram to show how hydrogen chloride gas can be prepared and collected in the laboratory using sodium chloride and conc. Sulphuric acid. (the gas need not be dry).(2mks)

ii)Write an equation for the reaction that take place in (i) above(1mk)

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iii)Name one drying agent for hydrogen chloride(1mk)

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iv)State and explain the observation that would be made when hydrogen chloride gas is bubbled through a solution of lead (II) nitrate.(2mks)

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v)Concentrated hydrochloric acid is used for removing oxides from metal surfaces (pickling). Explain why concentrated nitric acid cannot be used for the same Purpose(1mk)

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vi)Hydrogen Chloride gas bubbled through water conducts electricity where as, that bubbled through methyl/benzene does not. Explain(2mks)
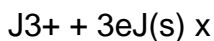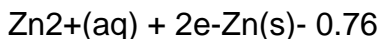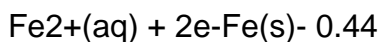
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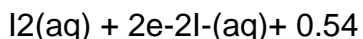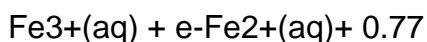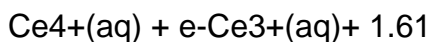
b)A sample of hydrogen chloride was dissolved in water to make 250cm3 of solution. 25cm3 of the solution required 46cm3 of 11.0M sodium hydroxide for complete neutralization. Determine the mass of hydrogen chloride gas that was dissolved to make 250cm3 of solution. (H = 1, Cl= 35.5)(3mks)

5.The following table shows standard electrode potentials for some half reactions

E /Volts

Ce4+(aq) + e-Ce3+(aq)+ 1.61

Fe3+(aq) + e-Fe2+(aq)+ 0.77

I2(aq) + 2e-2I-(aq)+ 0.54

Fe2+(aq) + 2e-Fe(s)- 0.44

Zn2+(aq) + 2e-Zn(s)- 0.76

J3+ + 3eJ(s) x

Reference to the above table answer the following questions (Base on the values given)

a)Which is the strongest reducing agent?(1mk)

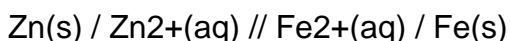……………………………………………………………………………………..

b)Which substance in the table would be used to oxidize iodide ions to iodine?(1mk)

……………………………………………………………………………………..

c)Study the cell representation below and answer the questions that follow.

KNO3

Zn(s) / Zn2+(aq) // Fe2+(aq) / Fe(s)

i)Identify the anode and the cathode

Anode…………………………………………………………………….(1mk)

Cathode …………………………………………………………………..(1mk)

ii)If the two electrodes in (i) above are connected externally, what reactions will take place in each half cell?(1mk)

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……………………………………………………………………………………..

iii)What is the emf of the cell?(1mk)

……………………………………………………………………………………..

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

iv)What is the role of KNO3?(1mk)

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

v)Write an electrochemical equation to show what happens when a Zinc rod
is dipped in a solution of iron (II) ions.(1mk)

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

vi)Explain what happens when KCl is used instead of KNO3 in a case where
Pb(s) / Pb2+(aq) is one of the half cells.(2mks)

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

KNO3

d)If the emf of the cell J(s) / J3+(aq) // I2(aq) / 2I-(aq) is 1.32V, calculate the value for
J3+(aq)/ J(s) (The value of x)(2mks)

6.The reaction between bromine and methanoic acid at 300C. proceeds according to the
information given below.
Br2(aq) + HCOOH(aq) H+(aq)2Br-(aq) + 2H+(aq) + CO2(g)
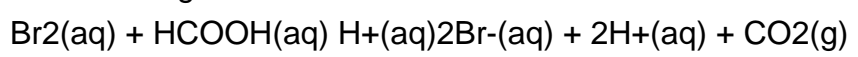
Concentration of
Br2(aq) (Mol dm-3) x 10 -310.08.16.64.43.02.01.3
Time (minutes)01246810

a)Plot a graph of concentration of bromine (vertical axis) against time(3mks)

b)From the graph determine;

i)The concentration of bromine at the end of 3 minutes.(1mk)

…………………………………………………………………………………………..

ii)The rate of reaction at time t where t = 1 ½ minutes(2mks)

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c)Explain how the concentration of bromine affects the rate of the reaction(2mks)

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d)On the same axis, sketch the curve that would be obtained if the reaction was carried out at 200C and label the curve as curve II. Give a reason for your answer.(2mks)

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7.a)i)What is hard water?(1mk)

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ii)In a certain Institution, water is pumped from the nearby river through a column filled with complex sodium compounds. The water is then tapped for domestic use as shown in the diagram below.

Explain how the hard water was softened as it is passed through the column.(2mks)

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iii)Write an ionic equation to show how sodium carbonate is used to soften hard water(1mk)

…………………………………………………………………………………………..

b)A student wanted to determine the solubility of Potassium nitrate at a certain temperature. He obtained the following results.

Mass of evaporating dish = 12.72g

Mass of evaporating dish + Saturated solution = 34.10g

Mass of evaporating dish + salt = 17.00g

Calculate the solubility of potassium nitrate from the results above.(2mks)

c)Study the flow chart below and answer the questions that follow.

i)Name;

Compound T……………………………………………………………(1mk)

Gas U …………………………………………………………………..(1mk)

ii)Give a chemical test that could be used to identify gas U.(1mk)

…………………………………………………………………………………..

…………………………………………………………………………………..

d)A student was given aqueous solutions of six salts A up to F, and was told to carry out certain tests on each solution. The students results are given in the table below.

SolutionResults of adding NaOH dropwise until in excessResults of adding acidified AgNO3Results of adding acidified BaCl2

ABlue pptWhite pptNo ppt

BWhite ppt soluble in excessNo pptWhite ppt

CRed-Brown pptWhite pptNo ppt

DNo ppt but alkali gas set free on warmingWhite pptNo ppt

EGreen pptNo pptWhite ppt

FWhite ppt Insoluble in excessNo pptNo ppt

Identify the salts which could be present in the solutions.(3mks)

A…………………………………………………………………………

B…………………………………………………………………………

C…………………………………………………………………………

D…………………………………………………………………………

E..

F..