Province of the
EASTERN CAPE
EDUCATION

[redacted]

GRADE 11

NOVEMBER 2010

PHYSICAL SCIENCES P2

MARKS: 150

TIME: 3 hours

This question paper consists of 17 pages including an answer sheet.

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. Write your name and/or examination number (and centre number if applicable) in the appropriate spaces on the ANSWER BOOK.

2. Answer ALL the questions.

3. Answer SECTION A on the attached ANSWER SHEET and place the completed answer sheet inside your answer book.

   The question paper consists of TWO sections.
   SECTION A: [25 MARKS]
   SECTION B: [125 MARKS]

4. Answer SECTION B in the ANSWER BOOK.

5. Non-programmable calculators may be used.

6. Appropriate mathematical instruments may be used.

7. Number the questions correctly according to the numbering system used in this question paper.

8. Start each question in SECTION B on a new page.

9. Data sheets are attached for your use.

10 Give brief motivations, discussions, etcetera where required.
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SECTION A

Answer this section on the attached ANSWER SHEET.

QUESTION 1 ONE-WORD ITEMS

Give ONE word/term for EACH of the following descriptions. Write only the word/term next to the question number (1.1 – 1.5) in the ANSWER BOOK.

1.1 The chemical bond that forms when one molecule or ion donates a pair of electron to another molecule or ion or ion which has a vacant orbital in the valence shell. (1)

1.2 The law which states the relationship between pressure and volume of an enclosed mass of gas at constant temperature. (1)

1.3 The simplest mole ratio in which the elements of a compound have bonded. (1)

1.4 A solution whose concentration is exactly known. (1)

1.5 The substance that is reduced and gains electron during a redox-reaction. (1)
[5]

QUESTION 2 MULTIPLE-CHOICE QUESTIONS

Four possible options are provided as answers to the following questions. Each question has only ONE correct answer. Choose the best answer and write only the letter (A – D) next to the question number (2.1 – 2.10) in the ANSWER BOOK.

2.1 The ability of an atom in a molecule to attract the bonding electron pair to form a polar covalent bond:

A. Ionisation energy
B. Electronegativity
C. Enthalpy
D. Heat of reaction (2)

2.2 The minimum energy the colliding molecules must have for a reaction to start:

A. Activation energy
B. Ionisation energy
C. Bond energy
D. Lattice energy (2)

2.3 Iron metal reacts with chlorine gas to form reddish brown vapours of iron(III) chloride. The balanced chemical equation is as follows:

$$2\ Fe_{(s)} + 3\ C\ell_{2(g)} \rightarrow 2\ FeC\ell_{3(g)}$$

In this reaction the oxidation number of …

A. iron increases and iron is reduced.
B. $C\ell_{2(g)}$ increases and $C\ell_{2(g)}$is oxidised.
C. iron increases and Fe is oxidised.
D. $C\ell_{2(g)}$ increases and $C\ell_{2(g)}$ is the oxidizing agent. (2)

2.4 0,1 mol of Na_2CO_3 is dissolved in water and the volume is made up to 1 dm^3. What is the concentration of sodium carbonate solution, sodium ions and carbonate ions?

	Na_2CO_3 ($mol.dm^{-3}$)	Na^+ ($mol.dm^{-3}$)	CO_3^{2-} ($mol.dm^{-3}$)
A.	0,2	0,1	0,1
B.	0,1	0,1	0,2
C.	0,2	0,2	0,1
D.	0,1	0,2	0,1

(2)

2.5 Consider the following acid-base reaction

$$NH_4^+{}_{(aq)} + CO_3^{2-}{}_{(aq)} \rightleftharpoons NH_{3(aq)} + HCO_3^-{}_{(aq)}$$

According to the Bronsted-Lowery concept of acids and bases, in this reaction $NH_4^+{}_{(aq)}$ …

A. accepts a proton and acts as a base.
B. donates a proton and acts as a base.
C. accepts a proton and acts as an acid.
D. donates a proton and acts as an acid. (2)

2.6 The number of molecules in 3 mol of CO_2 gas:

A. $4,98 \times 10^{-24}$
B. $2,00 \times 10^{23}$
C. $1,806 \times 10^{24}$
D. $6,02 \times 10^{23}$ (2)

2.7 The iron ore that is most abundant which is used in the blast furnace for the extraction of iron metal is …

A. haematite.
B. dolomite.
C. calcite.
D. malachite. (2)

2.8 Two different gases are kept under standard conditions of temperature and pressure. If the two gases occupy the same volume, then they will have the same …

A. mass.
B. number of molecules.
C. density.
D. atomic mass. (2)

2.9 The chemical reaction in which an unsaturated hydrocarbon is converted to a saturated hydrocarbon using hydrogen gas and nickel as a catalyst:

A. Halogenation
B. Hydrogenation
C. Hydration
D. Hydrohalogenation (2)

2.10 The atmospheric layer in which the ozone layer is found:

A. Troposphere
B. Thermosphere
C. Stratosphere
D. Ionosphere (2)

[20]

TOTAL SECTION A: 25

SECTION B Answer this section in the ANSWER BOOK

INSTRUCTIONS AND INFORMATION

1. Start each QUESTION on a NEW page.
2. Leave one line between two subquestions, for example between QUESTIONS 3.1 and 3.2.
3. The formulae and substitutions must be shown in ALL calculations.
4. Round off your answers to TWO decimal places.

QUESTION 3 (Start on a new page)

3.1 The covalent bonds in the formation of the following compounds are drawn **INCORRECTLY** Write down their correct Lewis structure to show the correct way in which covalent bonding takes place in these molecules.

3.1.1 H – H – O (2)

3.1.2 O = C – O (2)

3.1.3 N = N (2)

3.2 Classify the following diatomic molecules as polar or non-polar:

3.2.1 CH_4 (2)

3.2.2 H_2O (2)

3.2.3 HCℓ (2)

3.3 Ammonia is manufactured by the Haber process according to the equation

$$N_{2(g)} + 3\ H_{2(g)} \rightleftharpoons 2\ NH_{3(g)}$$

During a chemical reaction when chemical bonds are broken energy is absorbed and when chemical bonds are formed energy is released.

3.3.1 What is the energy absorbed or released when chemical bonds are broken or formed are called? (1)

3.3.2 Using the following information in the table given below, calculate the heat of reaction (ΔH) for the above reaction.

N = N	H – H	N – H
941 kJ.mol^{-1}	436 kJ.mol^{-1}	389 kJ.mol^{-1}

(7)

3.4 Hot and cold packs are in common use today for the treatment of injuries and reduction of swelling. Cold packs absorbed heat from the surroundings to produce cooling effect. Hot packs produce instant relief for hikers and skiers especially for the treatment of pulled muscles.

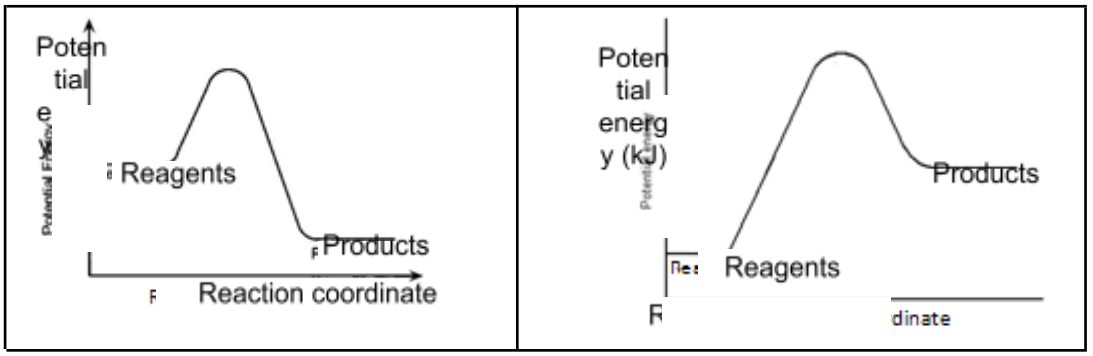
The two reactions that are taking place in the cold pack and hot pack are given below labelled as **A** and **B**.

A $NH_4NO_{3(s)} \rightarrow NH_4^+{}_{(aq)} + NO_3^-{}_{(aq)}$ (cold pack)

B $4\ Fe_{(s)} + 3\ O_{2(g)} \rightarrow Fe_2O_{3(s)}$ (hot pack)

3.4.1 Write down the heat of the reaction (ΔH) for the above two reactions **A** and **B** indicating the correct signs. (+ve or -ve signs.) (2)

3.4.2 The potential energy versus reaction coordinate graph for the above reactions **A** and **B** is given below:



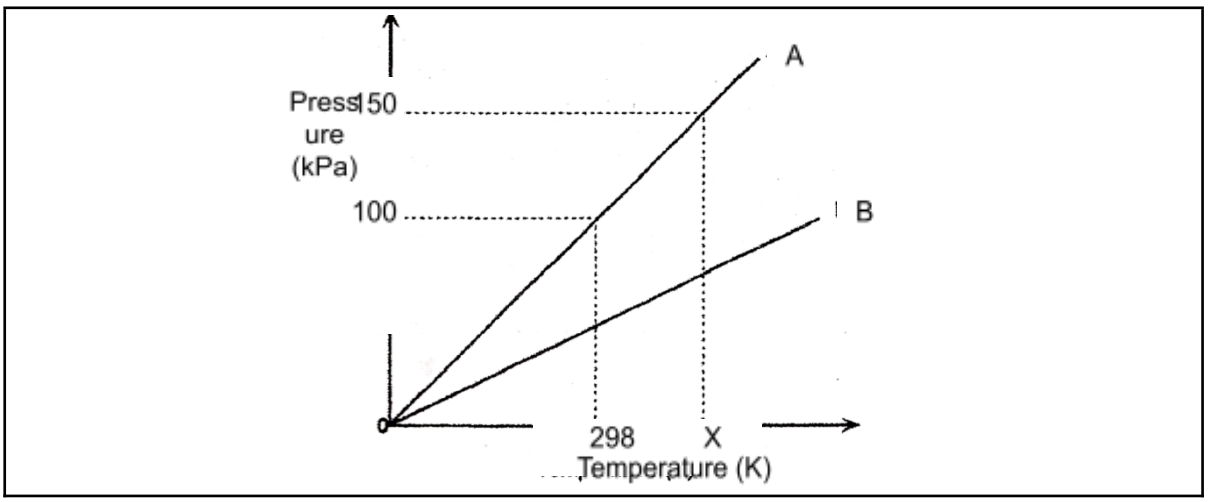
Graph 1 Graph 2

Which graph represents reaction **A** (Graph-1 or Graph-2)? Give a reason for your answer. (3)

[25]

QUESTION 4 (Start on a new page)

Two learners A and B, investigate the relationship between the temperature and pressure of an enclosed mass of gas. The learners used different samples of $SO_{2(g)}$ in two identical containers with a fixed volume of 1 dm^3. The results obtained by the learners A and B were plotted on the same set of axes as shown below:



4.1 Formulate an investigative question for this investigation. (2)

4.2 Write down the mathematical relationship between pressure and kelvin temperature from the learners conclusion based on the graph they obtained. (2)

4.3 Which variable is kept constant during this investigation? (1)

4.4 Give an explanation for the relationship that you have written in QUESTION 4.2 using the Kinetic Theory of gases. (3)

4.5 Calculate the value of temperature indicated by X (in °C) using the information given on the graph. (6)

4.6 Calculate the mass of $SO_{2(g)}$ used by learner A. (7)

4.7 Write down the temperature which in degree celsius is equal to zero kelvin. What is this temperature called? (2)

[23]

QUESTION 5 (Start on a new page)

A dilute solution of ethanoic acid called vinegar is used daily in food industry and households. The relative molecular mass of ethanoic acid is 60 $g.mol^{-1}$. Ethanoic acid consists of 39,9% carbon, 6,7% hydrogen and 53,4% oxygen.

5.1 Determine the molecular formula of ethanoic acid. (8)

5.2 A particular recipe for the baking of malva pudding requires 75 cm^3 of vinegar and 2,2g of baking soda ($NaHCO_3$).

5.2.1 Calculate the number of moles of $NaHCO_3$ in 2,2 g of baking soda. (3)

5.2.2 Is ethanoic acid a strong acid or a weak acid? Give a reason for your answer. (3)

5.2.3 Calculate the concentration of the vinegar used if the 75 cm^3 vinegar reacts completely with 60 cm^3 of $NaHCO_3$ solution of concentration 0,1 $mol.dm^{-3}$. The equation for the reaction that takes place is given below:

$$CH_3COOH + NaHCO_3 \rightarrow CH_3COONa + H_2O + CO_2$$ (5)

[19]

QUESTION 6 (Start on a new page)

A group of learners in a school performed the following experiments to investigate about the various type of chemical reactions. The experiment they performed, the observations made and the type of reaction based on their conclusion are entered in a tabular column as shown below

	Experiment	Observations	Type of reaction
1.	A clean dry strip of Zinc metal is placed in Copper sulphate solution ($CuSO_4$) in a small beaker.	A black substance is deposited on the surface of the zinc metal and the blue colour solution slowly fades	Addition reaction
2.	$H_2S_{(g)}$ passed through a solution of $FeC\ell_3$ taken in a test tube.	Yellow particles of sulphur formed.	Redox reaction
3.	A piece of magnesium ribbon is placed in a test tube containing hydrochloric acid.	Bubbles of hydrogen gas formed.	Redox reaction

Answer the following questions using the above table drawn up by the learners:

6.1 Define a *reducing agent*. (2)

6.2 Write down the balanced oxidation half reaction taking place in Experiment 1. (2)

6.3 In Experiment 1 the oxidation number of Cu decreases from +2 to zero. Is this half reaction an oxidation or reduction reaction? (1)

6.4 The learners entered the type of reaction for Experiment 1 **INCORRECTLY**. Write the correct type of reaction. Write the balanced ionic equation to show how you arrived at the conclusion. (5)

6.5 Write down the balanced nett ionic equation for the reaction taking place in Experiment 3. (3)

6.6 From the balanced equation in QUESTION 6.5 write down the FORMULA of the oxidizing agent. (1)

6.7 What is the oxidation number of Fe in $FeC\ell_3$? (1)

[15]

QUESTION 7 (Start on a new page)

Cigarette lighters are filled with butane gas under pressure. Butane gas is an alkane which burns in oxygen to form heat and light energy.

7.1 Is the alkane butane a saturated hydrocarbon or unsaturated hydrocarbon? Give a reason for your answer. (2)

7.2 Write down the balanced equation for the complete combustion of butane gas in oxygen. (3)

7.3 What are isomers? (2)

7.4 Write down the structural formula of two possible isomers of butene (C_4H_8) and mention the IUPAC name of each of them. (6)

7.5 Prop-2-ene reacts with bromine water. The bromine water is decolourised by this unsaturated hydrocarbon.

7.5.1 Write down the balanced equation for this reaction using structural formula. (3)

7.5.2 Write down the IUPAC name of the saturated hydrocarbon formed. (2)

7.5.3 Is the reaction in QUESTION 7.5.1 an example of substitution, addition or elimination reaction? (2)

[20]

QUESTION 8 (Start on a new page)

The discovery of iron 3 000 years ago made a huge difference to the lives of people. Construction of buildings, manufacturing of modern weapons and utensils and the population increase put more demand for iron. Iron ore is mixed with limestone and coke in the blast furnace to produce the metal.

8.1 What is an ore? (2)

8.2 Name the gas formed when the blast of air reacts with coke and carbon dioxide at high temperature. (1)

8.3 Write down the balanced equation for the reaction of haematite with the gas formed in QUESTION 8.2. (3)

8.4 What is the role of limestone in a blast furnace? (2)

8.5 Write the chemical formula of the slag formed when limestone reacts with sand. (2)

8.6 Name TWO commercial uses of the slag formed in the blast furnace. (4)

[14]

QUESTION 9 (Start on a new page)

A science learner is presenting a report about the green house effect and global warming which leads to climate change to a gathering of learners at his school. He was explaining to learners how each family is contributing to global warming through the activities that they do.

9.1 Briefly explain what is meant by green house effect and how it leads to global warming. (4)

9.2 Name THREE gases that are responsible for global warming. (3)

9.3 Mention TWO actions of human beings that contribute to global warming. (2)

[9]

TOTAL SECTION B: 125

GRAND TOTAL: 150

NATIONAL SENIOR CERTIFICATE
NASIONALE SENIOR SERTIFIKAAT

DATA FOR PHYSICAL SCIENCES GRADE 11
PAPER 2 (CHEMISTRY)

GEGEWENS VIR FISIESE WETENSKAPPE GRAAD 11
VRAESTEL 2 (CHEMIE)

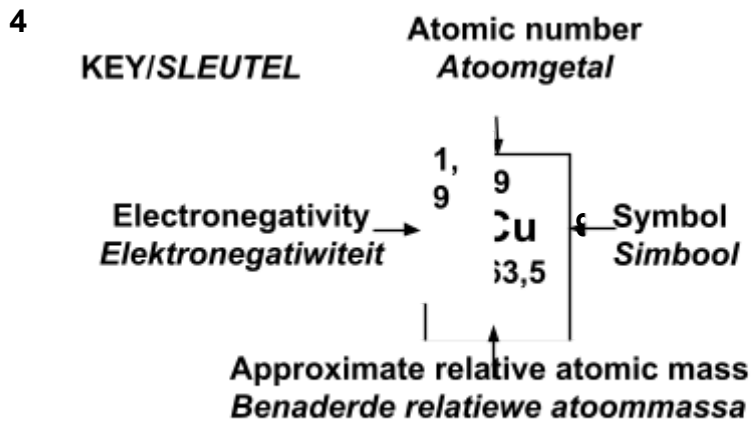
TABLE 1: PHYSICAL CONSTANTS/*TABEL 1: FISIESE KONSTANTES*

NAME/*NAAM*	SYMBOL/*SIMBOOL*	VALUE/*WAARDE*
Standard pressure *Standaarddruk*	p^{θ}	$1{,}013 \times 10^5$ Pa
Molar gas volume at STP *Molêre gasvolume by STD*	V_m	$22{,}4\ dm^3 \cdot mol^{-1}$
Standard temperature *Standaardtemperatuur*	T^{θ}	273 K

TABLE 2: FORMULAE/*TABEL 2: FORMULES*

$n = \frac{m}{M}$	$c = \frac{n}{V}$
$c = \frac{m}{MV}$	$E_{cell}^{\theta} = E_{cathode}^{\theta} - E_{anode}^{\theta}$ / $E_{sel}^{\theta} = E_{katode}^{\theta} - E_{anode}^{\theta}$ $E_{cell}^{\theta} = E_{reduction}^{\theta} - E_{oxidation}^{\theta}$ / $E_{sel}^{\theta} = E_{reduksie}^{\theta} - E_{oksidasie}^{\theta}$ $E_{cell}^{\theta} = E_{oxidising\ agent}^{\theta} - E_{reducing\ agent}^{\theta}$ / $E_{sel}^{\theta} = E_{oksideermiddel}^{\theta} - E_{reduseermiddel}^{\theta}$

TABLE 3: THE PERIODIC TABLE OF ELEMENTS



1 (I)	2 (II)	3								11	12	13 (III)	14 (IV)	15 (V)	16 (VI)	17 (VII)	18 (VIII)
2,1 H 1																	2 He 4
1,0 3 Li 7	1,5 4 Be 9											2,0 5 B 11	2,5 6 C 12	3,0 7 N 14	3,5 8 O 16	4,0 9 F 19	10 Ne 20
0,9 11 Na 23	1,2 12 Mg 24											1,5 13 Aℓ 27	1,8 14 Si 28	2,1 15 P 31	2,5 16 S 32	3,0 17 Cℓ 35,5	18 Ar 40
0,8 19 K 39	1,0 20 Ca 40	1,3 21 Sc 45	1,5 22 Ti 48	1,6 23 V 51	1,6 24 Cr 52	1,5 25 Mn 55	1,8 26 Fe 56	1,8 27 Co 59	1,8 28 Ni 59	1,9 29 Cu 63,5	1,6 30 Zn 65	1,6 31 Ga 70	1,8 32 Ge 73	2,0 33 As 75	2,4 34 Se 79	2,8 35 Br 80	36 Kr 84
0,8 37 Rb 86	1,0 38 Sr 88	1,2 39 Y 89	1,4 40 Zr 91	41 Nb 92	1,8 42 Mo 96	1,9 43 Tc	2,2 44 Ru 101	2,2 45 Rh 103	2,2 46 Pd 106	1,9 47 Ag 108	1,7 48 Cd 112	1,7 49 In 115	1,8 50 Sn 119	1,9 51 Sb 122	2,1 52 Te 128	2,5 53 I 127	54 Xe 131
0,7 55 Cs 133	0,9 56 Ba 137	57 La 139	1,6 72 Hf 179	73 Ta 181	74 W 184	75 Re 186	76 Os 190	77 Ir 192	78 Pt 195	79 Au 197	80 Hg 201	1,8 81 Tℓ 204	1,8 82 Pb 207	1,9 83 Bi 209	2,0 84 Po	2,5 85 At	86 Rn

0 87 , Fr 7	0 88 , Ra 9 226	89 Ac

58 Ce 140	59 Pr 141	60 Nd 144	61 Pm	62 Sm 150	63 Eu 152	64 Gd 157	65 Tb 159	66 Dy 163	67 Ho 165	68 Er 167	69 Tm 169	70 Yb 173	71 Lu 175
90 Th 232	91 Pa	92 U 238	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr

TABLE 4A: STANDARD REDUCTION POTENTIALS
TABEL 4A: STANDAARD REDUKSIEPOTENSIALE

Half-reactions/*Halfreaksies*			E^{θ} (V)
$F_2(g) + 2e^-$	$\rightleftharpoons$	$2F^-$	+ 2,87
$Co^{3+} + e^-$	$\rightleftharpoons$	Co^{2+}	+ 1,81
$H_2O_2 + 2H^+ + 2e^-$	$\rightleftharpoons$	$2H_2O$	+1,77
$MnO_4^- + 8H^+ + 5e^-$	$\rightleftharpoons$	$Mn^{2+} + 4H_2O$	+ 1,51
$C\ell_2(g) + 2e^-$	$\rightleftharpoons$	$2C\ell^-$	+ 1,36
$Cr_2O_7^{2-} + 14H^+ + 6e^-$	$\rightleftharpoons$	$2Cr^{3+} + 7H_2O$	+ 1,33
$O_2(g) + 4H^+ + 4e^-$	$\rightleftharpoons$	$2H_2O$	+ 1,23
$MnO_2 + 4H^+ + 2e^-$	$\rightleftharpoons$	$Mn^{2+} + 2H_2O$	+ 1,23
$Pt^{2+} + 2e^-$	$\rightleftharpoons$	Pt	+ 1,20
$Br_2(\ell) + 2e^-$	$\rightleftharpoons$	$2Br^-$	+ 1,07
$NO_3^- + 4H^+ + 3e^-$	$\rightleftharpoons$	$NO(g) + 2H_2O$	+ 0,96
$Hg^{2+} + 2e^-$	$\rightleftharpoons$	$Hg(\ell)$	+ 0,85
$Ag^+ + e^-$	$\rightleftharpoons$	Ag	+ 0,80
$NO_3^- + 2H^+ + e^-$	$\rightleftharpoons$	$NO_2(g) + H_2O$	+ 0,80
$Fe^{3+} + e^-$	$\rightleftharpoons$	Fe^{2+}	+ 0,77
$O_2(g) + 2H^+ + 2e^-$	$\rightleftharpoons$	H_2O_2	+ 0,68
$I_2 + 2e^-$	$\rightleftharpoons$	$2I^-$	+ 0,54
$Cu^+ + e^-$	$\rightleftharpoons$	Cu	+ 0,52

Increasing oxidising ability/*Toenemendeoksidereneverm oë* ↑

Increasing reducing ability/*Toenemendereduserendeverm oë* ↓

$SO_2 + 4H^+ + 4e^-$	$\rightleftharpoons$	$S + 2H_2O$	+ 0,45
$2H_2O + O_2 + 4e^-$	$\rightleftharpoons$	$4OH^-$	+ 0,40
$Cu^{2+} + 2e^-$	$\rightleftharpoons$	Cu	+ 0,34
$SO_4^{2-} + 4H^+ + 2e^-$	$\rightleftharpoons$	$SO_2(g) + 2H_2O$	+ 0,17
$Cu^{2+} + e^-$	$\rightleftharpoons$	Cu^+	+ 0,16
$Sn^{4+} + 2e^-$	$\rightleftharpoons$	Sn^{2+}	+ 0,15
$S + 2H^+ + 2e^-$	$\rightleftharpoons$	$H_2S(g)$	+ 0,14
$2H^+ + 2e^-$	$\rightleftharpoons$	**$H_2(g)$**	**0,00**
$Fe^{3+} + 3e^-$	$\rightleftharpoons$	Fe	− 0,06
$Pb^{2+} + 2e^-$	$\rightleftharpoons$	Pb	− 0,13
$Sn^{2+} + 2e^-$	$\rightleftharpoons$	Sn	− 0,14
$Ni^{2+} + 2e^-$	$\rightleftharpoons$	Ni	− 0,27
$Co^{2+} + 2e^-$	$\rightleftharpoons$	Co	− 0,28
$Cd^{2+} + 2e^-$	$\rightleftharpoons$	Cd	− 0,40
$Cr^{3+} + e^-$	$\rightleftharpoons$	Cr^{2+}	− 0,41
$Fe^{2+} + 2e^-$	$\rightleftharpoons$	Fe	− 0,44
$Cr^{3+} + 3e^-$	$\rightleftharpoons$	Cr	− 0,74
$Zn^{2+} + 2e^-$	$\rightleftharpoons$	Zn	− 0,76
$2H_2O + 2e^-$	$\rightleftharpoons$	$H_2(g) + 2OH^-$	− 0,83
$Cr^{2+} + 2e^-$	$\rightleftharpoons$	Cr	− 0,91
$Mn^{2+} + 2e^-$	$\rightleftharpoons$	Mn	− 1,18
$A\ell^{3+} + 3e^-$	$\rightleftharpoons$	$A\ell$	− 1,66
$Mg^{2+} + 2e^-$	$\rightleftharpoons$	Mg	− 2,36
$Na^+ + e^-$	$\rightleftharpoons$	Na	− 2,71
$Ca^{2+} + 2e^-$	$\rightleftharpoons$	Ca	− 2,87
$Sr^{2+} + 2e^-$	$\rightleftharpoons$	Sr	− 2,89
$Ba^{2+} + 2e^-$	$\rightleftharpoons$	Ba	− 2,90
$Cs^+ + e^-$	$\rightleftharpoons$	Cs	- 2,92
$K^+ + e^-$	$\rightleftharpoons$	K	− 2,93
$Li^+ + e^-$	$\rightleftharpoons$	Li	− 3,05

TABLE 4B: STANDARD REDUCTION POTENTIALS
TABEL 4B: STANDAARD REDUKSIEPOTENSIALE

Half-reactions/*Halfreaksies*			E^{θ} (V)
$Li^+ + e^-$	⇌	Li	− 3,05
$K^+ + e^-$	⇌	K	− 2,93
$Cs^+ + e^-$	⇌	Cs	− 2,92
$Ba^{2+} + 2e^-$	⇌	Ba	− 2,90
$Sr^{2+} + 2e^-$	⇌	Sr	− 2,89
$Ca^{2+} + 2e^-$	⇌	Ca	− 2,87
$Na^+ + e^-$	⇌	Na	− 2,71
$Mg^{2+} + 2e^-$	⇌	Mg	− 2,36
$A\ell^{3+} + 3e^-$	⇌	$A\ell$	− 1,66
$Mn^{2+} + 2e^-$	⇌	Mn	− 1,18
$Cr^{2+} + 2e^-$	⇌	Cr	− 0,91
$2H_2O + 2e^-$	⇌	$H_2(g) + 2OH^-$	− 0,83
$Zn^{2+} + 2e^-$	⇌	Zn	− 0,76
$Cr^{3+} + 3e^-$	⇌	Cr	− 0,74
$Fe^{2+} + 2e^-$	⇌	Fe	− 0,44
$Cr^{3+} + e^-$	⇌	Cr^{2+}	− 0,41
$Cd^{2+} + 2e^-$	⇌	Cd	− 0,40
$Co^{2+} + 2e^-$	⇌	Co	− 0,28
$Ni^{2+} + 2e^-$	⇌	Ni	− 0,27
$Sn^{2+} + 2e^-$	⇌	Sn	− 0,14
$Pb^{2+} + 2e^-$	⇌	Pb	− 0,13
$Fe^{3+} + 3e^-$	⇌	Fe	− 0,06
$2H^+ + 2e^-$	⇌	**$H_2(g)$**	**0,00**
$S + 2H^+ + 2e^-$	⇌	$H_2S(g)$	+ 0,14
$Sn^{4+} + 2e^-$	⇌	Sn^{2+}	+ 0,15
$Cu^{2+} + e^-$	⇌	Cu^+	+ 0,16
$SO_4^{2-} + 4H^+ + 2e^-$	⇌	$SO_2(g) + 2H_2O$	+ 0,17
$Cu^{2+} + 2e^-$	⇌	Cu	+ 0,34
$2H_2O + O_2 + 4e^-$	⇌	$4OH^-$	+ 0,40
$SO_2 + 4H^+ + 4e^-$	⇌	$S + 2H_2O$	+ 0,45
$Cu^+ + e^-$	⇌	Cu	+ 0,52
$I_2 + 2e^-$	⇌	$2I^-$	+ 0,54
$O_2(g) + 2H^+ + 2e^-$	⇌	H_2O_2	+ 0,68
$Fe^{3+} + e^-$	⇌	Fe^{2+}	+ 0,77
$NO_3^- + 2H^+ + e^-$	⇌	$NO_2(g) + H_2O$	+ 0,80
$Ag^+ + e^-$	⇌	Ag	+ 0,80
$Hg^{2+} + 2e^-$	⇌	$Hg(\ell)$	+ 0,85
$NO_3^- + 4H^+ + 3e^-$	⇌	$NO(g) + 2H_2O$	+ 0,96
$Br_2(\ell) + 2e^-$	⇌	$2Br^-$	+ 1,07
$Pt^{2+} + 2e^-$	⇌	Pt	+ 1,20
$MnO_2 + 4H^+ + 2e^-$	⇌	$Mn^{2+} + 2H_2O$	+ 1,23
$O_2(g) + 4H^+ + 4e^-$	⇌	$2H_2O$	+ 1,23
$Cr_2O_7^{2-} + 14H^+ + 6e^-$	⇌	$2Cr^{3+} + 7H_2O$	+ 1,33
$C\ell_2(g) + 2e^-$	⇌	$2C\ell^-$	+ 1,36
$MnO_4^- + 8H^+ + 5e^-$	⇌	$Mn^{2+} + 4H_2O$	+ 1,51
$H_2O_2 + 2H^+ + 2e^-$	⇌	$2H_2O$	+1,77
$Co^{3+} + e^-$	⇌	Co^{2+}	+ 1,81
$F_2(g) + 2e^-$	⇌	$2F^-$	+ 2,87

NAME:…….

SECTION A

QUESTION 1

1.1 _____ (1)

1.2 _____ (1)

1.3 _____ (1)

1.4 _____ (1)

1.5 _____ (1)

[5]

QUESTION 2

2.1	**A**	**B**	**C**	**D**
2.2	**A**	**B**	**C**	**D**
2.3	**A**	**B**	**C**	**D**
2.4	**A**	**B**	**C**	**D**
2.5	**A**	**B**	**C**	**D**
2.6	**A**	**B**	**C**	**D**
2.7	**A**	**B**	**C**	**D**
2.8	**A**	**B**	**C**	**D**
2.9	**A**	**B**	**C**	**D**
2.10	**A**	**B**	**C**	**D**

(10 x 2) **[20]**

TOTAL SECTION A: 25