DEPARTMENT OF EDUCATION
REPUBLIC OF SOUTH AFRICA

SENIOR CERTIFICATE EXAMINATION - 2005

PHYSICAL SCIENCE P2
CHEMISTRY

STANDARD GRADE

FEBRUARY/MARCH 2005

Marks: 150

2 Hours

**This question paper consists of 13 pages,
a data sheet of 4 pages and 1 multiple-choice answer sheet.**

GENERAL INSTRUCTIONS

1. Write your **examination number** (and **centre number** if applicable) in the appropriate spaces on the answer book.
2. Answer **ALL** the questions.
3. Non-programmable calculators may be used.
4. Appropriate mathematical instruments may be used.
5. A data sheet is attached for your use.
6. Marks may be forfeited if instructions are not followed.

QUESTION 1

INSTRUCTIONS

1. Answer this question on the specially printed **ANSWER SHEET.** *[NOTE: The answer sheet may be either a separate sheet provided as part of your question paper, or printed as part of the answer book.]*
   Write your **EXAMINATION NUMBER** (and **centre number** if applicable) in the appropriate spaces if a separate answer sheet is used**.**

2. Four possible answers, indicated by A, B, C and D, are supplied with each question. Each question has only ONE correct answer. Choose only that answer which, in your opinion, is the correct or best one and mark the appropriate block on the answer sheet with a cross.

3. Do not make any other marks on the answer sheet. Any calculations or writing that may be necessary when answering this question should be done in the answer book and must be deleted clearly by means of a diagonal line drawn across the page.

4. If more than one block is marked, no marks will be awarded for that answer.

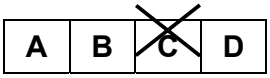
PLACE THE COMPLETED ANSWER SHEET INSIDE THE FRONT COVER OF YOUR ANSWER BOOK, IF A SEPARATE ANSWER SHEET HAS BEEN USED.

EXAMPLE:

QUESTION: The symbol for the SI unit of time is ...

A t.
B h.
C s.
D m.

ANSWER:



1.1 Which ONE of the following substances has the strongest intermolecular forces in the solid phase?

A CO_2

B H_2O

C O_2

D CH_4 (3)

1.2 Which ONE of the following is a property of an ideal gas?

A At high pressure the gas turns into a liquid.

B The collisions between the molecules are inelastic.

C There are strong forces of attraction between molecules.

D Molecules only exert forces of repulsion on each other during collisions. (3)

1.3 The Contact process is the name of the process that involves the catalytic oxidation of …

A ammonia.

B sulphur dioxide.

C nitrogen dioxide.

D hydrogen sulphide. (3)

1.4 The gas liberated (given off) when sodium nitrate is strongly heated, is ...

A oxygen.

B nitrogen.

C ammonia.

D carbon dioxide. (3)

1.5 An unknown salt solution is added to a solution of silver nitrate and to a solution of sulphuric acid. A white precipitate forms in each case. The unknown salt solution is probably …

A barium chloride.

B lead nitrate.

C copper(II)chloride.

D barium nitrate. (3)

1.6 Hydrogen gas is prepared by reacting zinc granules with an excess of a 1 mol.dm^{-3} hydrochloric acid (HCℓ) solution.
Which ONE of the following will **NOT** increase the rate of the reaction?

A Heating the acid

B Using zinc powder

C Using 1,5 mol.dm^{-3} HCℓ solution

D Doubling the volume of the HCℓ solution (3)

1.7 Ammonium chloride dissolves in water and the temperature of the solution drops sharply. From this information you can conclude that this is a(n) …

A reduction reaction.

B oxidation reaction.

C endothermic reaction.

D exothermic reaction. (3)

1.8 The following reaction is in equilibrium in a closed container:

$$X_2(g) + Y_2(g) \equiv 2XY(g) \qquad \Delta H < 0$$

The amount of XY can be increased by …

A decreasing the temperature.

B increasing the temperature.

C decreasing the pressure by increasing the volume.

D increasing the pressure by decreasing the volume. (3)

1.9 Which ONE of the following can act either as an acid or a base?

A H_3O^+

B CO_3^{2-}

C $C\ell^-$

D HSO_4^- (3)

1.10 Which ONE of the following dilute solutions has a pH less than 7?

A Sugar
B Vinegar
C Ammonia
D Table salt (3)

1.11 In a zinc-copper electrochemical cell, the concentration(s) of which ion(s) will increase when the cell is in operation?

A Only Cu^{2+}
B Only Zn^{2+}
C SO_4^{2-}
D Both Zn^{2+} and Cu^{2+} (3)

1.12 In the reaction:

$$Mg + Fe^{2+} \rightarrow Mg^{2+} + Fe$$

A protons are transferred to Fe^{2+}
B protons are transferred to Mg
C electrons are transferred to Fe^{2+}
D electrons are transferred to Mg (3)

1.13 Consider the following redox reaction:

$$H_2S(g) + 2FeC\ell_3(aq) \rightarrow 2FeC\ell_2(aq) + S(s) + 2HC\ell(aq)$$

The oxidation half-reaction for the above reaction is:

A $H_2S \rightarrow S + 2H^+ + 2e^-$
B $2Fe^{3+} + 2e^- \rightarrow 2Fe^{2+}$
C $S + 2H^+ + 2e^- \rightarrow H_2S$
D $C\ell_2 + 2e^- \rightarrow 2C\ell^-$ (3)

1.14 Which ONE of the following compounds is an example of a **saturated** hydrocarbon?

A C_2H_4

B C_3H_8

C $C_2H_2Br_2$

D $C_2C\ell_4$ (3)

1.15 Which ONE of the following statements concerning the alkanes is **NOT CORRECT**? The alkanes …

A are all hydrocarbons.

B are a homologous series.

C are all gases at room temperature.

D can be represented by the formula C_nH_{2n+2}. (3)

[45]

ANSWER QUESTIONS 2 – 7 IN YOUR ANSWER BOOK.

INSTRUCTIONS

1. Start each question on a new page in your answer book.
2. Leave one line between subsections, for example between QUESTIONS 2.1. and 2.2.
3. Give ALL formulae used and show your workings (this includes substitutions).
4. Number your answers in the same way that the questions are numbered.

QUESTION 2

2.1 Consider the following list of chemical substances represented by the letters A to E:

A. $NaC\ell(s)$ B. $S(s)$ C. $H_2O(\ell)$

D. $SO_2(g)$ E. $C_6H_{14}(g)$

Select from the above list, a substance which:

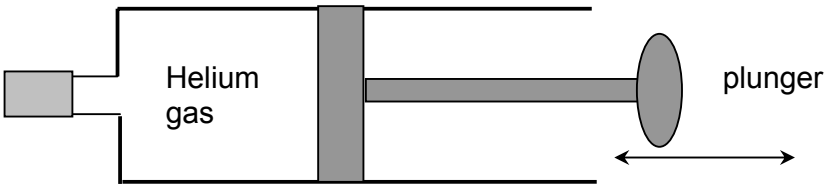
2.1.1 Has allotropes (2)

2.1.2 Forms an acid when dissolved in water (2)

2.1.3 Is used as a fuel (2)

2.1.4 Conducts electricity in the molten state (2)

2.2 The diagram below shows a gas syringe containing helium gas. The plunger of the syringe **can move freely**.



The helium gas is at **STP**, and it occupies a volume of 40,0 cm^3.

2.2.1 Write the pressure of the helium gas in the syringe. (2)

The temperature of the system is now increased to 80^oC.

2.2.2 State what you would observe happening to the plunger as the temperature of the system increases to 80^oC. (2)

2.2.3 Explain your observation in QUESTION 2.2.2 in terms of the kinetic molecular theory. (3)

2.2.4 Calculate the volume of the helium gas at 80^oC and standard pressure. (4)
[19]

QUESTION 3 (START ON A NEW PAGE)

3.1 A piece of magnesium ribbon is set alight and placed in a gas cylinder that is filled with sulphur dioxide gas.

3.1.1 Write the balanced equation for the reaction that takes place. (3)

3.1.2 State what type of reaction this is.
(Choose from ACID-BASE, REDOX or PRECIPITATION REACTION.) (2)

3.1.3 Which property of sulphur dioxide is demonstrated in this reaction? (2)

3.2 Nitric acid is thermally unstable and decomposes when heated.

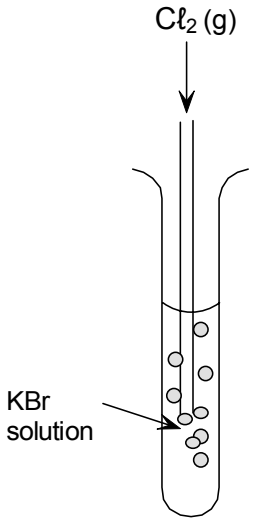
3.2.1 Write the balanced equation for this reaction. (3)

Nitric acid also discolours (turns yellow) when left in sunlight.

3.2.2 Write the **NAME** of the substance responsible for the yellow colour. (2)

3.3 Chlorine gas ($C\ell_2$) is bubbled through an aqueous solution of potassium bromide (KBr) in a test tube.

The solution changes colour.



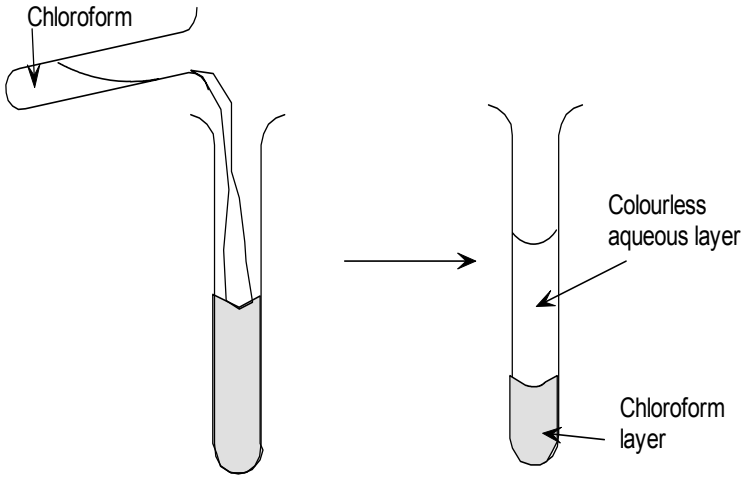
3.3.1 Write the balanced equation for the reaction that will explain this colour change. (3)

Some chloroform is then added to this test tube.

The test tube is carefully shaken.

The solution separates into two layers.

The aqueous layer becomes colourless, while the chloroform layer takes on a colour.



3.3.2 Give the **NAME** of the solute (dissolved substance) in the aqueous layer (top layer). (2)

3.3.3 Give the **NAME** of the solute (dissolved substance) in the chloroform layer (bottom layer). (2)
[19]

QUESTION 4 (START ON A NEW PAGE)

4.1 Two test tubes, X and Y, contain different solutions of sodium thiosulphate as shown in the table below.

	Test tube X	Test tube Y
Concentration of sodium thiosulphate	1,0 mol.dm^{-3}	1,5 mol.dm^{-3}
Temperature of solution	10°C	20°C

Equal volumes of a 2,0 mol.dm^{-3} solution of hydrochloric acid is then added to each test tube and a reaction takes place.

4.1.1 In which test tube (X or Y) will the reaction occur at the fastest rate? (1)

4.1.2 Give TWO reasons for the answer to QUESTION 4.1.1 above. (4)

4.2 The following reaction is in equilibrium in a closed container:

$$4X(g) + Y_2(g) \equiv 2X_2Y(g) + 1\ 300\ kJ$$

4.2.1 What does the double arrow (≡) indicate? (2)

4.2.2 Write the value of the heat of reaction (ΔH) for the forward reaction. (2)

4.2.3 Is the forward reaction exothermic or endothermic? Give a reason for your answer. (3)

*How will the **amount** of Y_2 in the container be influenced if:*
(Write only INCREASES, DECREASES or STAYS THE SAME.)

4.2.4 The temperature is increased (2)

4.2.5 X_2Y is continuously removed from the system (2)

4.2.6 The pressure of the system is decreased (by increasing the volume) (2)

4.2.7 A suitable catalyst is added (2)

[20]

QUESTION 5 (START ON A NEW PAGE)

5.1 Sulphuric acid is dissolved in water.

5.1.1 Write the balanced equation for the reaction of sulphuric acid with water. (3)

5.1.2 Write ONE conjugate acid-base pair in the reaction in QUESTION 5.1.1. (2)

5.2 In a titration, 20 cm^3 of a 0,1 $mol.dm^{-3}$ sodium hydroxide (NaOH) solution neutralises 25 cm^3 of an ethanoic acid (CH_3COOH) solution.

5.2.1 Give ONE reason why CH_3COOH is regarded as a weak acid. (2)

5.2.2 Write the balanced equation for the neutralisation reaction that takes place. (3)

5.2.3 Calculate the number of moles of sodium hydroxide used in this reaction. (2)

5.2.4 Using the answer to QUESTION 5.2.3, calculate the concentration of the ethanoic acid. (4)

5.2.5 From the table below, name a suitable indicator for use in this titration.

NAME OF INDICATOR	pH RANGE OF INDICATOR
methyl orange	3,1 – 4,4
methyl red	4,4 – 6,2
phenolphthalein	8,3 – 10,0

(2)
[18]

QUESTION 6 (START ON A NEW PAGE)

6.1 Lindile sets up an electrochemical cell using the following reaction:

$$Zn + Cu^{2+} \rightarrow Zn^{2+} + Cu$$

6.1.1 Write the balanced equation for the half-reaction taking place at the cathode. (2)

6.1.2 Name the type of reaction that takes place at the anode. (2)

6.1.3 Write the **FORMULA** of a suitable salt that can be used in the zinc half-cell. (2)

6.1.4 Write the cell notation for this cell. (3)

6.1.5 Which electrode undergoes a decrease in mass? Write the equation of a half-reaction to justify your answer. (3)

6.1.6 State the energy conversion that takes place in the cell when it is in operation. (2)

6.2 Concentrated hydrochloric acid reacts with manganese(IV)oxide (MnO_2) to produce chlorine gas.

Use the Table of Standard Reduction Potentials (Table 4) to write the following:

6.2.1 The oxidation half-reaction (2)

6.2.2 The reduction half-reaction (2)
[18]

QUESTION 7 (START ON A NEW PAGE)

7.1 Consider the following list of organic compounds, represented by the letters A to D:

A: $CH_3 - CH_2 - CH_2 - CH_3$

B: $CH_3 - CH = CH - CH_3$

C:
$$CH_3 - \underset{\displaystyle CH_3}{\underset{|}{CH}} - CH_3$$

D: $CH \equiv C - CH_2 - CH_3$

From the list above, write **only the letter(s)** representing:

7.1.1 TWO compounds that are isomers of each other (2)

7.1.2 TWO compounds that are unsaturated hydrocarbons (2)

7.1.3 The compound that belongs to the homologous series with the general formula C_nH_{2n-2} (2)

7.2 Write the IUPAC name of compound B in QUESTION 7.1 above. (2)

7.3 Write the structural formula for tetrachloroethene. (3)
[11]

TOTAL: 150

DEPARTMENT OF EDUCATION
DEPARTEMENT VAN ONDERWYS

SENIOR CERTIFICATE EXAMINATION
SENIORSERTIFIKAAT-EKSAMEN

DATA FOR PHYSICAL SCIENCE
PAPER 2 (CHEMISTRY)

GEGEWENS VIR NATUUR- EN SKEIKUNDE
VRAESTEL 2 (CHEMIE)

TABEL 1: FISIESE KONSTANTES

TABLE 1: PHYSICAL CONSTANTS

Avogadro-konstante Avogadro's constant	N_A of/or L	6,02 x 10^{23} mol^{-1}
Molêre gaskonstante Molar gas constant	R	8,31 $J.K^{-1}.mol^{-1}$
Standaarddruk Standard pressure	p^θ	1,013 x 10^5 Pa
Molêre gasvolume by STD Molar gas volume at STP	V_m	22,4 $dm^3.mol^{-1}$
Standaardtemperatuur Standard temperature	T^θ	273 K

TABEL 2: FORMULES

TABLE 2: FORMULAE

$\frac{p_1V_1}{T_1} = \frac{p_2V_2}{T_2}$	$\frac{c_aV_a}{c_bV_b} = \frac{n_a}{n_b}$
$pV = nRT$	$K_w = [H^+][OH^-] = 10^{-14}$ by/at 298 K
$n = \frac{m}{M}$	$pH = -\log[H^+]$
$c = \frac{n}{V}$	$E^\theta_{sel} = E^\theta_{oksideermiddel} - E^\theta_{reduseermiddel}$ $E^\theta_{cell} = E^\theta_{oxidising\ agent} - E^\theta_{reducing\ agent}$
$c = \frac{m}{MV}$	$E^\theta_{sel} = E^\theta_{katode} - E^\theta_{anode}$ $E^\theta_{cell} = E^\theta_{cathode} - E^\theta_{anode}$

TABEL 3: DIE PERIODIEKE TABEL VAN ELEMENTE

TABLE 3: THE PERIODIC TABLE OF ELEMENTS

SLEUTEL / KEY

Atoomgetal / Atomic number

Elektronegatiwiteit / Electronegativity

Simbool / Symbol

Relatiewe atoommassa (benaderd) / Relative atomic mass (approximately)

I	II											III	IV	V	VI	VII	0
2,1 H 1																	2 He 4
1,0 Li 7	1,5 Be 9											2,0 B 11	2,5 C 12	3,0 N 14	3,5 O 16	4,0 F 19	10 Ne 20
0,9 Na 23	1,2 Mg 24											1,5 Aℓ 27	1,8 Si 28	2,1 P 31	2,5 S 32	3,0 Cℓ 35,5	18 Ar 40
0,8 K 39	1,0 Ca 40	1,3 Sc 45	1,5 Ti 48	1,6 V 51	1,6 Cr 52	1,5 Mn 55	1,8 Fe 56	1,8 Co 59	1,8 Ni 59	1,9 Cu 63,5	1,6 Zn 65	1,6 Ga 70	1,8 Ge 73	2,0 As 75	2,4 Se 79	2,8 Br 80	36 Kr 84
0,8 Rb 86	1,0 Sr 88	1,2 Y 89	1,4 Zr 91	Nb 92	1,8 Mo 96	1,9 Tc	2,2 Ru 101	2,2 Rh 103	2,2 Pd 106	1,9 Ag 108	1,7 Cd 112	1,7 In 115	1,8 Sn 119	1,9 Sb 122	2,1 Te 128	2,5 I 127	54 Xe 131
0,7 Cs 133	0,9 Ba 137	La 139	1,6 Hf 179	Ta 181	W 184	Re 186	Os 190	Ir 192	Pt 195	Au 197	Hg 201	1,8 Tℓ 204	1,8 Pb 207	1,9 Bi 209	2,0 Po	2,5 At	Rn
0,7 Fr	0,9 Ra 226	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

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

Increasing oxidising ability / Toenemende oksideervermoë ↑

↓ Increasing reducing ability / Toenemende reduseervermoë

Halfreaksie / Half-reaction	E° /volt
$F_2 + 2e^- \rightleftharpoons 2F^-$	+2,87
$H_2O_2 + 2H^+ + 2e^- \rightleftharpoons 2H_2O$	+1,77
$MnO_4^- + 8H^+ + 5e^- \rightleftharpoons Mn^{2+} + 4H_2O$	+1,51
$Au^{3+} + 3e^- \rightleftharpoons Au$	+1,42
$C\ell_2 + 2e^- \rightleftharpoons 2C\ell^-$	+1,36
$Cr_2O_7^{2-} + 14H^+ + 6e^- \rightleftharpoons 2Cr^{3+} + 7H_2O$	+1,33
$O_2 + 4H^+ + 4e^- \rightleftharpoons 2H_2O$	+1,23
$MnO_2 + 4H^+ + 2e^- \rightleftharpoons Mn^{2+} + 2H_2O$	+1,21
$Pt^{2+} + 2e^- \rightleftharpoons Pt$	+1,20
$Br_2 + 2e^- \rightleftharpoons 2Br^-$	+1,09
$NO_3^- + 4H^+ + 3e^- \rightleftharpoons NO + 2H_2O$	+0,96
$Ag^+ + e^- \rightleftharpoons Ag$	+0,80
$NO_3^- + 2H^+ + e^- \rightleftharpoons NO_2 + H_2O$	+0,80
$Hg^{2+} + 2e^- \rightleftharpoons Hg$	+0,79
$Fe^{3+} + e^- \rightleftharpoons Fe^{2+}$	+0,77
$O_2 + 2H^+ + 2e^- \rightleftharpoons H_2O_2$	+0,68
$I_2 + 2e^- \rightleftharpoons 2I^-$	+0,54
$SO_2 + 4H^+ + 4e^- \rightleftharpoons S + 2H_2O$	+0,45
$2H_2O + O_2 + 4e^- \rightleftharpoons 4OH^-$	+0,40
$Cu^{2+} + 2e^- \rightleftharpoons Cu$	+0,34
$SO_4^{2-} + 4H^+ + 2e^- \rightleftharpoons SO_2 + 2H_2O$	+0,17
$Cu^{2+} + e^- \rightleftharpoons Cu^+$	+0,16
$Sn^{4+} + 2e^- \rightleftharpoons Sn^{2+}$	+0,15
$S + 2H^+ + 2e^- \rightleftharpoons H_2S$	+0,14
$\mathbf{2H^+ + 2e^- \rightleftharpoons H_2}$	**0,00**
$Fe^{3+} + 3e^- \rightleftharpoons Fe$	-0,04
$Pb^{2+} + 2e^- \rightleftharpoons Pb$	-0,13
$Sn^{2+} + 2e^- \rightleftharpoons Sn$	-0,14
$Ni^{2+} + 2e^- \rightleftharpoons Ni$	-0,25
$Co^{2+} + 2e^- \rightleftharpoons Co$	-0,28
$Cd^{2+} + 2e^- \rightleftharpoons Cd$	-0,40
$Fe^{2+} + 2e^- \rightleftharpoons Fe$	-0,44
$Cr^{3+} + 3e^- \rightleftharpoons Cr$	-0,74
$Zn^{2+} + 2e^- \rightleftharpoons Zn$	-0,76
$2H_2O + 2e^- \rightleftharpoons H_2 + 2OH^-$	-0,83
$Mn^{2+} + 2e^- \rightleftharpoons Mn$	-1,18
$A\ell^{3+} + 3e^- \rightleftharpoons A\ell$	-1,66
$Mg^{2+} + 2e^- \rightleftharpoons Mg$	-2,37
$Na^+ + e^- \rightleftharpoons Na$	-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

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

Halfreaksie / Half-reaction	E° /volt
$Li^+ + e^- \rightleftharpoons Li$	-3,05
$K^+ + e^- \rightleftharpoons K$	-2,93
$Cs^+ + e^- \rightleftharpoons Cs$	-2,92
$Ba^{2+} + 2e^- \rightleftharpoons Ba$	-2,90
$Sr^{2+} + 2e^- \rightleftharpoons Sr$	-2,89
$Ca^{2+} + 2e^- \rightleftharpoons Ca$	-2,87
$Na^+ + e^- \rightleftharpoons Na$	-2,71
$Mg^{2+} + 2e^- \rightleftharpoons Mg$	-2,37
$A\ell^{3+} + 3e^- \rightleftharpoons A\ell$	-1,66
$Mn^{2+} + 2e^- \rightleftharpoons Mn$	-1,18
$2H_2O + 2e^- \rightleftharpoons H_2 + 2OH^-$	-0,83
$Zn^{2+} + 2e^- \rightleftharpoons Zn$	-0,76
$Cr^{3+} + 3e^- \rightleftharpoons Cr$	-0,74
$Fe^{2+} + 2e^- \rightleftharpoons Fe$	-0,44
$Cd^{2+} + 2e^- \rightleftharpoons Cd$	-0,40
$Co^{2+} + 2e^- \rightleftharpoons Co$	-0,28
$Ni^{2+} + 2e^- \rightleftharpoons Ni$	-0,25
$Sn^{2+} + 2e^- \rightleftharpoons Sn$	-0,14
$Pb^{2+} + 2e^- \rightleftharpoons Pb$	-0,13
$Fe^{3+} + 3e^- \rightleftharpoons Fe$	-0,04
$2H^+ + 2e^- \rightleftharpoons H_2$	**0,00**
$S + 2H^+ + 2e^- \rightleftharpoons H_2S$	+0,14
$Sn^{4+} + 2e^- \rightleftharpoons Sn^{2+}$	+0,15
$Cu^{2+} + e^- \rightleftharpoons Cu^+$	+0,16
$SO_4^{2-} + 4H^+ + 2e^- \rightleftharpoons SO_2 + 2H_2O$	+0,17
$Cu^{2+} + 2e^- \rightleftharpoons Cu$	+0,34
$2H_2O + O_2 + 4e^- \rightleftharpoons 4OH^-$	+0,40
$SO_2 + 4H^+ + 4e^- \rightleftharpoons S + 2H_2O$	+0,45
$I_2 + 2e^- \rightleftharpoons 2I^-$	+0,54
$O_2 + 2H^+ + 2e^- \rightleftharpoons H_2O_2$	+0,68
$Fe^{3+} + e^- \rightleftharpoons Fe^{2+}$	+0,77
$Hg^{2+} + 2e^- \rightleftharpoons Hg$	+0,79
$NO_3^- + 2H^+ + e^- \rightleftharpoons NO_2 + H_2O$	+0,80
$Ag^+ + e^- \rightleftharpoons Ag$	+0,80
$NO_3^- + 4H^+ + 3e^- \rightleftharpoons NO + 2H_2O$	+0,96
$Br_2 + 2e^- \rightleftharpoons 2Br^-$	+1,09
$Pt^{2+} + 2e^- \rightleftharpoons Pt$	+1,20
$MnO_2 + 4H^+ + 2e^- \rightleftharpoons Mn^{2+} + 2H_2O$	+1,21
$O_2 + 4H^+ + 4e^- \rightleftharpoons 2\ H_2O$	+1,23
$Cr_2O_7^{2-} + 14H^+ + 6e^- \rightleftharpoons 2Cr^{3+} + 7H_2O$	+1,33
$C\ell_2 + 2e^- \rightleftharpoons 2C\ell^-$	+1,36
$Au^{3+} + 3e^- \rightleftharpoons Au$	+1,42
$MnO_4^- + 8H^+ + 5e^- \rightleftharpoons Mn^{2+} + 4H_2O$	+1,51
$H_2O_2 + 2H^+ + 2e^- \rightleftharpoons 2H_2O$	+1,77
$F_2 + 2e^- \rightleftharpoons 2F^-$	+2,87

Increasing oxidising ability / Toenemende oksideervermoë ↓

↑ Increasing reducing ability / Toenemende reduseervermoë

SENIOR CERTIFICATE EXAMINATION - MARCH 2005

ANTWOORDBLAD
ANSWER SHEET

NATUUR- EN SKEIKUNDE SG (TWEEDE VRAESTEL)/ PHYSICAL SCIENCE SG (SECOND PAPER)

Eksamennommer **Examination number**													

DEPARTEMENT VAN ONDERWYS
DEPARTMENT OF EDUCATION

SENIORSERTIFIKAAT-EKSAMEN/SENIOR CERTIFICATE EXAMINATION

NATUUR- EN SKEIKUNDE STANDAARDGRAAD TWEEDE VRAESTEL (CHEMIE)
PHYSICAL SCIENCE STANDARD GRADE SECOND PAPER (CHEMISTRY)

1.1	A	B	C	D
1.2	A	B	C	D
1.3	A	B	C	D
1.4	A	B	C	D
1.5	A	B	C	D
1.6	A	B	C	D
1.7	A	B	C	D
1.8	A	B	C	D
1.9	A	B	C	D
1.10	A	B	C	D
1.11	A	B	C	D
1.12	A	B	C	D
1.13	A	B	C	D
1.14	A	B	C	D
1.15	A	B	C	D

Vir die gebruik van die nasiener For the use of the marker	
Punte behaal Marks obtained	
Nasiener se paraaf Marker's initials	
Nasiener se nommer Marker's number	