Province of the
EASTERN CAPE
EDUCATION

NATIONAL SENIOR CERTIFICATE

GRADE 11

NOVEMBER 2012

PHYSICAL SCIENCES P2

MARKS: 150

TIME: 3 hours

PHSCE2

This question paper consists of 17 pages, including four data sheets, graph paper and one answer sheet.

INSTRUCTIONS AND INFORMATION

1. Write your FULL NAME and SURNAME (and/or examination number if applicable) in the appropriate spaces on the ANSWER SHEET and ANSWER BOOK.

2. Answer ALL the questions.

3. This question paper consists of TWO sections:

   SECTION A: 25 marks
   SECTION B: 125 marks

4. Answer SECTION A on the attached ANSWER SHEET and SECTION B in the ANSWER BOOK.

5. Non-programmable calculators may be used.

6. Appropriate mathematical instruments may be used.

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

8. Data Sheets and a Periodic Table are attached for your use.

9. Wherever motivations, discussions, etc. are required, be brief.

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) on the ANSWER SHEET.

1.1 The type of chemical reaction during which there is a net release of energy. (1)

1.2 The half-reaction that involves a loss of electrons. (1)

1.3 Acids which have only one proton per molecule for donation. (1)

1.4 A formula with the simplest whole number ratio of the elements making up a compound. (1)

1.5 A measure of the ability of an atom in a molecule to attract the bonding pair of electrons. (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 make a cross (X) in the appropriate block next to the question number (2.1 − 2.10) on the ANSWER SHEET.

2.1 A certain mass of gas occupies a volume (V) in a closed container. If the pressure is halved and the temperature is doubled, the volume will be:

A ¼ V
B ½ V
C V
D 4 V (2)

2.2 Consider the following chemical reaction:

$$NH_3\,(g) + H_2O\,(\ell) \rightarrow NH_4^+\,(aq) + OH^-\,(aq)$$

In this equation, H_2O is the Brønsted ...

A acid because it donates a proton.
B base because it donates a proton.
C acid because it accepts a proton.
D base because it accepts a proton. (2)

2.3 According to the VSEPR theory, the shape of a boron trifluoride (BF_3) molecule is:

A Trigonal bipyramidal
B Trigonal planar
C Trigonal pyramidal
D Tetrahedral (2)

2.4 The type of bond which occurs when two atoms share one or more electron pairs will always be …

A ionic.
B polar.
C metallic.
D covalent. (2)

2.5 Consider the following equation: $3H_2 + N_2 \rightarrow 2NH_3$

From the equation we can deduce that:

A 2 moles of N_2 can produce 6 moles of NH_3.
B 6 moles of H_2 can produce 5 moles of NH_3.
C 9 moles of H_2 can produce 6 moles of NH_3.
D 3 moles of N_2 can react with 6 moles of H_2. (2)

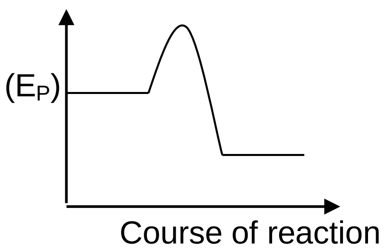
2.6 The mass of carbon present in 10 g of carbon monoxide is …

A 1,20 g.
B 4,29 g.
C 0,83 g.
D 2,36 g. (2)

2.7 Which ONE of the following reactions is an example of an addition reaction?

A $CH_4\ (g) + C\ell_2\ (g) \rightarrow CH_3C\ell\ (g) + HC\ell\ (g)$
B $CH_2CH_2\ (g) + H_2\ (g) \rightarrow CH_3CH_3\ (g)$
C $C_2H_6\ (g) \rightarrow C_2H_4\ (g) + H_2(g)$
D $CH_3C\ell\ (\ell) + KOH\ (aq) \rightarrow CH_3OH\ (\ell) + KC\ell\ (aq)$ (2)

2.8 Consider the following graph:



This graph represents a reaction in which …

A more energy is absorbed than released.
B the reactants have less energy than the products.
C more energy is released than absorbed.
D the products have more energy than the reactants. (2)

2.9 The region of the atmosphere closest to earth is the …

A troposphere.
B thermosphere.
C mesosphere.
D stratosphere. (2)

2.10 Global warming is most probably the result of:

A Farmers using too much fertiliser so as to increase crop production
B People using large amounts of petrol, oil and coal as an energy source
C Overgrazing of land in developing nations
D None of the above factors (2)

[20]

TOTAL SECTION A: 25

SECTION B

INSTRUCTIONS AND INFORMATION

1. Answer this section in the ANSWER BOOK.
2. Start each question on a NEW page.
3. Leave one line between two subsections, for example between QUESTIONS 3.1 and 3.2.
4. The formulae and substitutions must be shown in ALL calculations.
5. Round off your answers to TWO decimal places.

QUESTION 3

3.1 Most of the substances we encounter in our daily lives occur as electrically neutral combinations of atoms called molecules. Carbon dioxide, ammonia and methane are some examples of such substances.

3.1.1 Give the formula and Lewis structure for each of the substances mentioned above. (6)

3.1.2 According to the VSEPR theory, what shape will EACH of the above structures have? (3)

3.1.3 Is the ammonia molecule polar or non-polar? Give an explanation for your answer. (5)

3.1.4 Which ONE of the three substances (carbon dioxide, ammonia or methane) will have the strongest intermolecular force? (1)

3.1.5 Name the force referred to in QUESTION 3.1.4 above. (2)

3.2 Ammonium nitrate is added to a beaker containing water. The salt dissociates in the water and the temperature of the solution decreases.

3.2.1 Is this an example of an endothermic or exothermic reaction? (1)

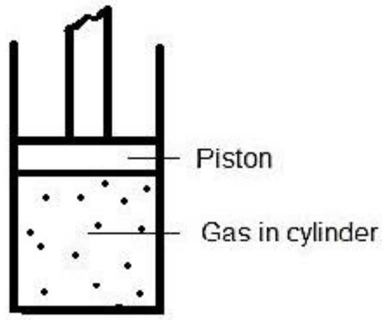
3.2.2 Draw a sketch graph to show the energy changes which take place during the reaction. Label your axes and give your graph a heading. (4)

[22]

QUESTION 4

One of the remarkable facts about gases is that despite wide differences in chemical properties, they all more or less obey the same set of physical laws – the gas laws.

4.1 The diagram which follows represents a piston in a cylinder. The piston is able to move up and down.



4.1.1 Assume a gas is trapped in the cylinder at a pressure of 101,3 kPa when the volume is 100 cm^3 and the temperature is 35 °C. What will the pressure be (in Pa) if its temperature increases to 311 °C and its volume is 200 cm^3? (5)

4.1.2 Explain in terms of the kinetic model of gases why the gas in the cylinder exerts a pressure on all the sides of the container. (2)

4.1.3 Will the piston move UP or DOWN if the temperature of the gas in the cylinder is increased? Explain your answer. (3)

4.2 A learner investigates the relationship between the pressure and volume of a given mass of gas at constant temperature. The following set of readings are obtained:

p (kPa)	V (cm^3)
128,5	35
180	25
220	20,5
300	15,0

4.2.1 Give a hypothesis for the investigation. (2)

4.2.2 Name the law that is being investigated in this experiment. (1)

4.2.3 State the law in words which you mentioned in QUESTION 4.2.2. (2)

4.2.4 Give the mathematical relationship for the law mentioned in QUESTIONS 4.2.2 and 4.2.3. (2)

4.2.5 Use the attached graph paper to draw a graph of p (on the x-axis) vs. V (on the y-axis). (4)

[21]

QUESTION 5

A learner wants to determine the molecular formula of a compound found in cigarettes. The learner asks for your help with the calculation. The following is known about the compound: It is responsible for cigarettes being such an addictive substance, it has a molecular mass of 162,2 $g \cdot mol^{-1}$ and its percentage composition is 74,07% **C**; 8,65% **H** and 17,28% **N**.

5.1 Name the compound being referred to here. (2)

5.2 As much as the substance referred to in QUESTION 5.1 is responsible for the addiction of smokers to cigarettes, it is used in some products to help them overcome their addiction. Name ONE example of such a product. (2)

5.3 Cigarette packs contain various warnings on them concerning the harmful effects of smoking. Name ONE harmful effect of smoking on humans. (1)

5.4 Show, by means of calculation, how you would go about helping the learner determine the molecular formula of this compound. (7)

[12]

QUESTION 6

Many household substances are either acids or bases. Some examples are: vinegar, baking soda (bicarbonate of soda), caustic soda, lemon juice.

6.1 Use the examples provided to name ONE substance which is an acid and give a characteristic of it to support your answer. (3)

6.2 Give the formula for baking soda (bicarbonate of soda). (2)

6.3 A group of learners decide to do a titration to find the concentration of a sample of vinegar. To do the titration, they prepare a 250 cm^3 standard solution of NaOH of concentration 0,2 $mol \cdot dm^{-3}$. It is found that during the titration 8,5 cm^3 of NaOH reacted with 4 cm^3 of the vinegar sample. The balanced chemical equation for the reaction is:

$$\mathbf{CH_3COOH + NaOH \rightarrow CH_3COONa + H_2O}$$

6.3.1 Give an investigative question for this investigation. (2)

6.3.2 What is the scientific name for vinegar? (2)

6.3.3 Calculate the concentration of the vinegar sample. (6)

6.4 A certain antacid tablet contains $MgCO_3$. When taken, the antacid tablet neutralises the excess hydrochloric acid in the stomach.

6.4.1 Write a balanced chemical equation for the reaction between $MgCO_3$ and the hydrochloric acid. (3)

6.4.2 Why is there a tendency to burp when antacids are taken? (2)

[20]

QUESTION 7

7.1 The combustion of fuels is probably the best known example of a practical application of redox reactions. Another example is the use of chlorine. Chlorine is a powerful oxidising agent which is used to kill bacteria.

7.1.1 What is a redox reaction? (2)

7.1.2 What do you understand by the term *oxidising agent*? (2)

7.1.3 The chlorine is oxidised when it reacts with the bacteria. Is this statement correct? Motivate your answer. (3)

7.1.4 Municipalities use chlorine to kill bacteria in a substance that they supply to most households. Name this substance. (1)

7.2 Consider the following two chemical reactions:

(i) $AgNO_3 (aq) + HC\ell (aq) \rightarrow AgC\ell (s) + HNO_3 (aq)$

(ii) $Zn (s) + 2HC\ell (aq) \rightarrow ZnC\ell_2 (aq) + H_2 (g)$

7.2.1 Which one of the two reactions is a redox reaction? Write ONLY the number (i) or (ii) as your answer. (2)

7.2.2 Identify the reducing agent. (1)

7.2.3 Give the oxidation half-reaction. (2)

7.2.4 Name the substance that is reduced. (2)
[15]

QUESTION 8

Organic chemistry is the chemistry of carbon compounds (with the exception of CO, CO_2, CO_3^{2-} and CN^-). Carbon is usually bonded with hydrogen, but may also be bonded with other atoms such as oxygen, halogens, nitrogen, sulphur and phosphorus.

8.1 What general term is used for organic compounds consisting of ONLY carbon and hydrogen atoms? (2)

8.2 Name the group of compounds (homologous series) which contains one or more triple bonds (C≡C). (1)

8.3 The addition of steam to ethene produces an alcohol.

8.3.1 Name the alcohol produced by the above reaction. (2)

8.3.2 Write a balanced chemical equation using structural formulae for the above reaction. (3)

8.3.3 The alcohol named in QUESTION 8.3.1 is found in wine and beer. Name ONE negative impact of alcohol abuse on society. (2)

8.4 Chloromethane reacts with water and forms methanol and hydrogen chloride gas.

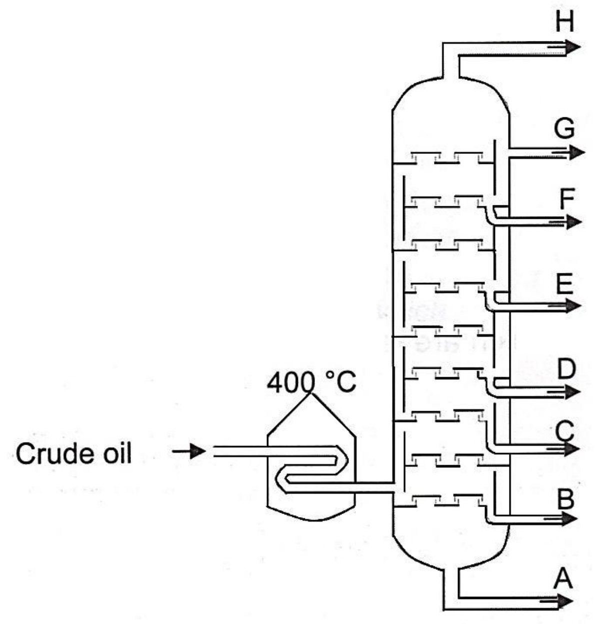
8.4.1 Is this reaction an example of an addition, substitution or elimination reaction? (1)

8.4.2 Write a balanced chemical equation using molecular formulae for the above reaction. (3)

[14]

QUESTION 9

Crude oil is a viscous, dark-brown liquid containing a mixture of alkanes, alkenes, cycloalkanes and aromatic compounds. The various compounds are separated from each other by making use of the following tower.



9.1 Name the separation technique illustrated in the diagram. (1)

9.2 Name the physical property of the compounds in the mixture that is used for the separation. (1)

9.3 Refer to the diagram and write down ONLY the letter (A – H) as your answer to the following questions.

9.3.1 The fraction that will contain natural gases. (1)

9.3.2 The fraction that will contain bitumen. (1)

9.3.3 The fraction that will contain gasoline (petrol). (1)

9.4 Name ONE use of the natural gases obtained from crude oil. (1)

[6]

QUESTION 10

Phosphate occurs in nature as phosphate rock and the mineral family of the phosphates is called the apatites. Fluorapatite, $Ca_5(PO_4)_3F$, is the principal phosphate mineral. Most of the apatite mined in South Africa is used to produce phosphoric acid. A general equation for this reaction is:

$$\text{apatite (aq)} + H_2SO_4\text{ (aq)} \rightarrow CaSO_4{\cdot}xH_2O\text{ (s)} + H_3PO_4\text{ (aq)}$$

10.1 How is phosphate rock mined? (1)

10.2 What is the main use of phosphoric acid? (2)

10.3 Name ONE other way in which the phosphoric acid is used for our benefit. (2)

10.4 Explain why rock phosphate is unsuitable for fertiliser. (2)
[7]

QUESTION 11

The atmosphere is a relatively thin layer of gases which supports life and provides protection to living organisms. The ozone layer is found in the atmosphere and protects the earth against harsh ultraviolet radiation. The use of CFCs by man has caused depletion of the ozone layer.

11.1 In which layer of the atmosphere is ozone found? (2)

11.2 In what way does ultraviolet light harm us directly? (2)

11.3 What does CFCs stand for? (2)

11.4 Name TWO ways in which CFCs were used. (2)
[8]

TOTAL SECTION B: 125

GRAND TOTAL: 150

NASIONALE SENIOR SERTIFIKAAT
NATIONAL SENIOR CERTIFICATE

GEGEWENS VIR FISIESE WETENSKAPPE GRAAD 11
VRAESTEL 2 (CHEMIE)

DATA FOR PHYSICAL SCIENCES GRADE 11
PAPER 2 (CHEMISTRY)

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

NAAM/*NAME*	**SIMBOOL/*SYMBOL***	**WAARDE/*VALUE***
Avogadro's constant *Avogadro-konstante*	N_A	$6{,}02 \times 10^{23}$ mol^{-1}
Molar gas constant *Molêre gaskonstante*	R	$8{,}31\ J \cdot K^{-1} \cdot mol^{-1}$
Standard pressure *Standaarddruk*	p^{θ}	$1{,}013 \times 10^{5}$ Pa
Molar gas volume at STP *Molêre gasvolume teen STD*	V_m	$22{,}4\ dm^{3} \cdot mol^{-1}$
Standard temperature *Standaardtemperatuur*	T^{θ}	273 K

TABEL 2: FORMULES/*TABLE 2: FORMULAE*

$\frac{p_1V_1}{T_1} = \frac{p_2V_2}{T_2}$	$pV = nRT$
$\frac{c_a v_a}{c_b v_b} = \frac{n_a}{n_b}$	$c = \frac{n}{V} = \frac{m}{MV}$
$n = \frac{m}{M} = \frac{V}{V_m} = \frac{N}{N_A}$	

TABEL 3: DIE PERIODIEKE TABEL VAN ELEMENTE / *TABLE 3: THE PERIODIC TABLE OF ELEMENTS*

SLEUTEL/*KEY*

Atoomgetal / *Atomic number*: 29
Elektronegatiwiteit / *Electronegativity*: 1,9
Simbool / *Symbol*: Cu
Benaderde relatiewe atoommassa / *Approximate relative atomic mass*: 63,5

1 (I)	2 (II)	3	4	5	6	7	8	9	10	11	12	13 (III)	14 (IV)	15 (V)	16 (VI)	17 (VII)	18 (VIII)
1 2,1 H 1																	2 He 4
3 1,0 Li 7	4 1,5 Be 9											5 2.0 B 11	6 2.5 C 12	7 3.0 N 14	8 3.5 O 16	9 4.0 F 19	10 Ne 20
11 0,9 Na 23	12 1,2 Mg 24											13 1.5 Aℓ 27	14 1.8 Si 28	15 2.1 P 31	16 2.5 S 32	17 3.0 Cℓ 35,5	18 Ar 40
19 0,8 K 39	20 1,0 Ca 40	21 1,3 Sc 45	22 1,5 Ti 48	23 1,6 V 51	24 1,6 Cr 52	25 1,5 Mn 55	26 1,8 Fe 56	27 1,8 Co 59	28 1,8 Ni 59	29 1,9 Cu 63,5	30 1,6 Zn 65	31 1,6 Ga 70	32 1,8 Ge 73	33 2,0 As 75	34 2,4 Se 79	35 2,8 Br 80	36 Kr 84
37 0,8 Rb 86	38 1,0 Sr 88	39 1,2 Y 89	40 1,4 Zr 91	41 Nb 92	42 1,8 Mo 96	43 1,9 Tc	44 2,2 Ru 101	45 2,2 Rh 103	46 2,2 Pd 106	47 1,9 Ag 108	48 1,7 Cd 112	49 1,7 In 115	50 1,8 Sn 119	51 1,9 Sb 122	52 2,1 Te 128	53 2,5 I 127	54 Xe 131
55 0,7 Cs 133	56 0,9 Ba 137	57 La 139	72 1,6 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	81 1,8 Tℓ 204	82 1,8 Pb 207	83 1,9 Bi 209	84 2,0 Po	85 2,5 At	86 Rn
87 0,7 Fr	88 0,9 Ra 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

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

Toenemende oksiderende vermoë/*Increasing oxidising ability* ↑

Toenemende reduserende vermoë/*Increasing reducing ability* ↓

Halfreaksies / *Half-reactions*			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
$SO_2 + 4H^+ + 4e^-$	$\rightleftharpoons$	$S + 2H_2O$	+ 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
$\mathbf{2H^+ + 2e^-}$	$\rightleftharpoons$	$\mathbf{H_2(g)}$	**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

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

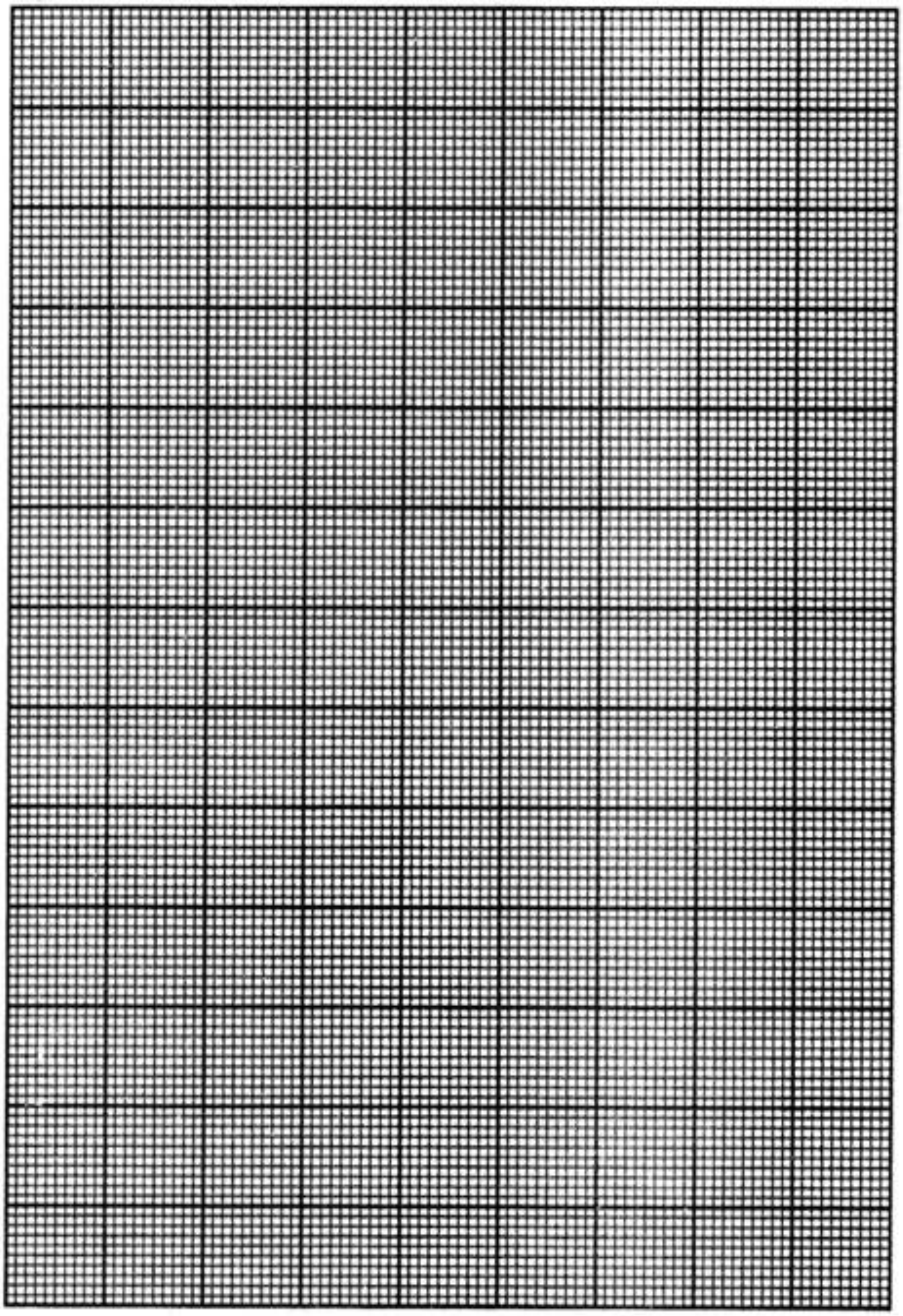
Toenemende oksiderende vermoë/*Increasing oxidising ability* ↓

Toenemende reduserende vermoë/*Increasing reducing ability* ↑

Halfreaksies/*Half-reactions*			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: ______________________________ GRADE: _____

QUESTION 4.2.5



PHYSICAL SCIENCES P2

ANSWER SHEET

NAME : ……………………………………………………………….

SECTION A

QUESTION 1: ONE WORD ITEMS

1.1 ………………………………………………………… (1)

1.2 ………………………………………………………… (1)

1.3 ………………………………………………………… (1)

1.4 ………………………………………………………… (1)

1.5 ………………………………………………………… (1)
[5]

QUESTION 2: MULTIPLE-CHOICE QUESTIONS

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