education

Department:
Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 10

PHYSICAL SCIENCE: CHEMISTRY (P2)

EXEMPLAR PAPER

MARKS: 150

TIME: 3 hours

This question paper consists of 11 pages, an answer sheet and 1 information sheet.

156 2 E

INSTRUCTIONS AND INFORMATION

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

2. Answer ALL the questions.

3. Answer SECTION A on the ANSWER SHEET provided. Answer SECTION B in the ANSWER BOOK.

4. Non-programmable calculators may be used.

5. Appropriate mathematical instruments may be used.

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

7. An information sheet is attached for your use.

8. Wherever motivation, discussion, et cetera is required, be brief.

SECTION A

Answer this section on the attached ANSWER SHEET.

QUESTION 1: ONE-WORD ANSWERS

Write only the word/term for each of the following descriptions next to the question number.

1.1 An element in Period 3 that has greatly influenced the electronic industry (1)

1.2 The number of nucleons in the atom (1)

1.3 The property that determines how easily a liquid flows (1)

1.4 A composition of two or more atoms that act as a unit (1)

1.5 A chemical reaction that is accompanied by a rapid increase in heat and volume (1)

[5]

QUESTION 2: MATCHING ITEMS

Match the information in COLUMN A with the information in COLUMN B by writing only the letter (A -I) next to the question number (2.1 - 2.5).

COLUMN A		COLUMN B	
2.1	A carbonate	A	HCl
2.2	Souring of milk	B	K^+
2.3	An example of an ionic compound	C	CO_3^{2-}
2.4	A positive ion with the electronic configuration of argon	D	physical change
2.5	A solution in which all components are in the same phase	E	$CaCl_2$
		F	heterogeneous mixture
		G	Al^{3+}
		H	chemical change
		I	homogeneous mixture

[5]

QUESTION 3: TRUE OR FALSE

Indicate whether the following statements are TRUE or FALSE. Write only 'true' or 'false' next to the question number (3.1 - 3.5). If the statement is FALSE, write down the correct statement.

3.1 Non-metallic solids are ductile. (2)

3.2 $^{20}_{10}Ne$ and $^{22}_{10}Ne$ each have 10 protons, 12 electrons and 12 neutrons. (2)

3.3 Atoms and molecules are conserved during a chemical reaction. (2)

3.4 The following chemical equation is an example of a decomposition reaction:

$$2\ H_2O_2 \rightarrow 2\ H_2O + O_2$$ (2)

3.5 You can push your hand into water because liquids are compressible. (2)
[10]

QUESTION 4: MULTIPLE-CHOICE QUESTIONS

Four possible options are provided as answers to the following questions. Each question has only ONE correct answer. Choose the answer, which in your opinion, is the correct or best one and mark the appropriate block on the answer sheet with a cross (X).

4.1 Which ONE of the following is a correct example of the law of multiple proportions?

A CuO and $CuCO_3$

B H_2O and H_2O_2

C MgO and $MgCO_3$

D H_2 and H_2O (3)

4.2 Ionic bonds form because of very strong forces of attraction between oppositely charged ions. From this we conclude that ionic compounds ...

A are electrically neutral.

B have high melting points.

C conduct electricity.

D are gaseous compounds. (3)

4.3 If Rutherford used neutrons, instead of alpha particles in his scattering experiment, the neutrons would ...

A not deflect because it has no charge.

B have deflected more often.

C have been attracted to the nucleus easily.

D have given the same results. (3)

4.4 Which ONE of the following uses the most underground water?

A Industrial processes

B Domestic purposes

C Agricultural purposes

D Mining processes (3)

4.5 Ammonia, an ingredient in household cleaners, can be broken down to form one part nitrogen (N) and three parts hydrogen (H). This means that ammonia ...

A is a colourless gas.

B is not a compound.

C cannot be an element.

D has the formula N_3H. (3)

[15]

TOTAL SECTION A: 35

SECTION B

INSTRUCTIONS

1. Answer this section in the ANSWER BOOK.

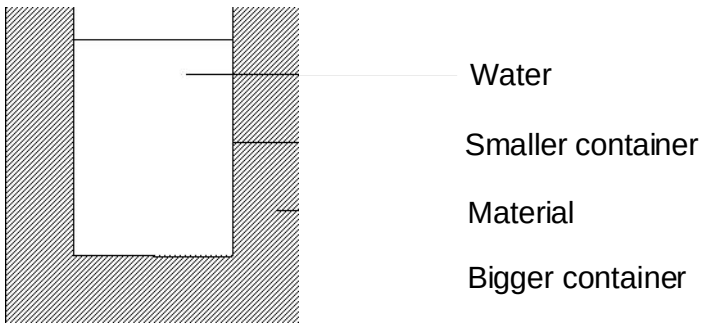
2. In ALL calculations, formulae and substitutions must be shown.

3. Round off your answers to TWO decimal places.

QUESTION 5

A camper wants to find a suitable insulator to put under his mattress in his tent. He has a choice of three materials: newspaper, plastic and towels.

To know which one of the three materials to take along, he performs an investigation to test their insulating properties, using a sample of each of the materials. He uses the apparatus illustrated below and measures the decrease in temperature of the water over a fixed time interval.



Answer the following questions concerning the investigation:

5.1 Explain the difference between a thermal conductor and an insulator. (2)

5.2 Write down a possible investigative question. (2)

5.3 Write down a possible hypothesis. (2)

5.4 Name any TWO other apparatus required to perform the investigation. (4)

5.5 Name the independent variable in this investigation? (2)

5.6 Name the dependent variable in this investigation? (2)

5.7 Name at least ONE variable that must be controlled during this investigation. (2)
[16]

QUESTION 6

The following table shows the first ionisation energies for the elements of periods 1 and 2.

Period	Element	First ionisation energy ($kJ.mol^{-1}$)
1	H	1 312
	He	2 372
2	Li	520
	Be	899
	B	801
	C	1 086
	N	1 402
	O	1 314
	F	1 681
	Ne	2 081

6.1 What is the meaning of the term *first ionisation energy*? (2)

6.2 Identify the pattern of first ionisation energies in a period. (2)

6.3 Which TWO elements exert the strongest attractive forces on their electrons? Use the data in the table to supply a reason for your answer. (4)

6.4 Draw Aufbau diagrams for the TWO elements in QUESTION 6.3 and explain why these elements are so stable. (5)

6.5 It is safer to use helium gas than hydrogen gas in balloons. Which property of helium makes it a safer substitute? (2)

6.6 'Group 1 elements readily form positive ions'.
Is this statement correct? Explain your answer by referring to the table. (3)
[18]

QUESTION 7

Indigenous people worked with metals long ago. The remains of several furnaces (ovens) used for extraction of iron can be seen in our country. The iron ore (Fe_2O_3) was smelted in clay furnaces, in which the ore was refined using charcoal (C) and employing bellows to blow air over the charcoal to make the temperature high enough to melt the ore.

Modern extraction methods make use of almost the same processes as used by indigenous people. Iron ore, coke (almost pure carbon) and limestone ($CaCO_3$) are mixed together in a blast furnace. The limestone removes impurities, resulting in a better quality of iron. Hot air is blasted into the furnace through pipes.

Use a table to compare the indigenous methods for extracting iron with the modern method.

In your table use the following criteria for your comparison:

(i) Reactants used or in use
(ii) Method used to increase temperature
(iii) Type of furnace
(iv) Purity of product **[10]**

QUESTION 8

Chemical weapons were banned by the Geneva Protocol in 1925. According to this protocol, all chemicals that release suffocating and poisonous gases are not to be used as weapons. White phosphorus, a very reactive allotrope of phosphorus, was recently used during a military attack. Phosphorus burns vigorously in oxygen. Many people got severe burns and some even died as a result.

The equation for this spontaneous reaction is as follows: $P_4(s) + O_2(g) \rightarrow P_2O_5(s)$

8.1 Balance the chemical equation. (2)

8.2 Prove that the law of conservation of mass is obeyed during this chemical reaction. (5)

8.3 Name the product formed during this reaction. (2)

8.4 Classify the reaction as exothermic or endothermic. Give a reason for your answer. (3)

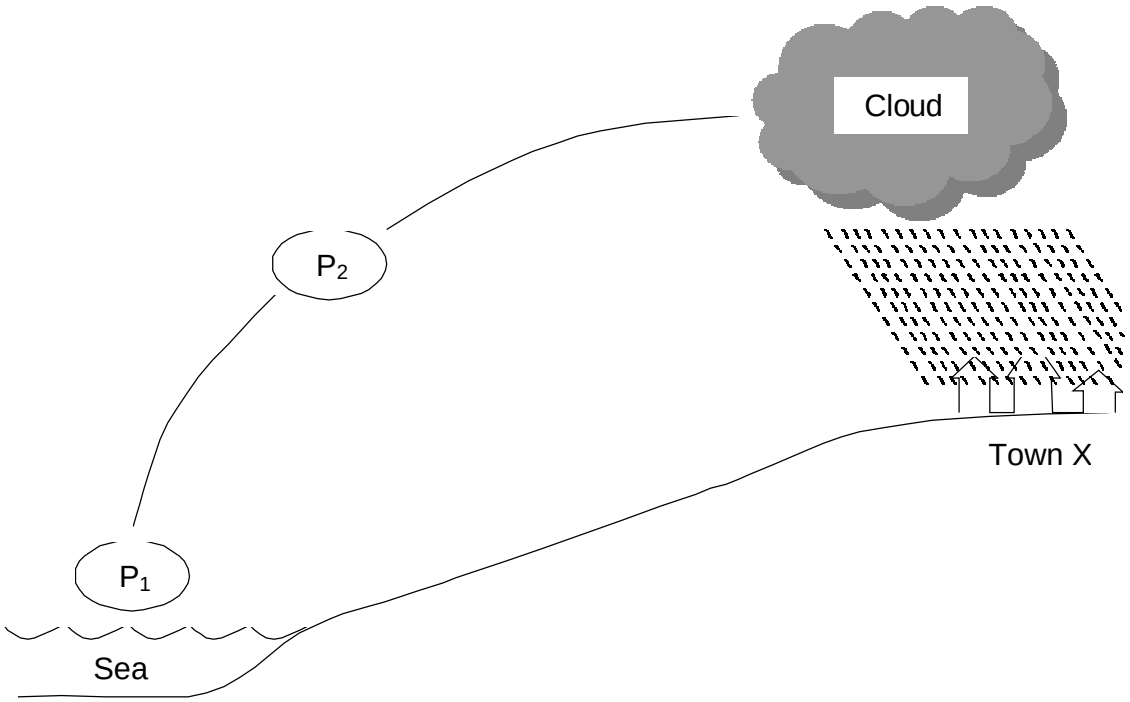
8.5 Classify the reaction as a synthesis or a decomposition reaction. Give a reason for your answer. (3)

8.6 Was white phosphorous used as a chemical weapon? Substantiate your answer. (3)

8.7 What effect can the irresponsible use of phosphorous have on humans and the environment? (4)
[22]

QUESTION 9

The sketch shows a process that leads to rainfall in town **X**. The town has been relying only on rainfall for its water supply, because it has no access to rivers or tap water. A group of people told the community that they will never run out of rainwater because *it will never stop raining*.



9.1 List the processes labelled P_1 and P_2 that lead to rainfall in town X. (2)

9.2 Is this group of people correct in saying that town X will never run out of rainwater? Justify your answer from the sketch. (3)

Recently, the amount of rainfall has decreased considerably. Various reasons have been given to explain the drought. Some of the community members are blaming this group who told them that *it will never stop raining*.

9.3 What scientific arguments can you use to convince the community members that this group of people should not be blamed for the drought? (6)

9.4 What possible strategies can the community leaders adopt to ensure that they have a regular supply of water? (3)
[14]

QUESTION 10

A learner returns home from school on a hot afternoon. In order to get cold water to drink, she puts ice cubes into a glass of water. She makes the following observations:

Observation I	The ice cubes float in the water.
Observation II	After a while the water becomes cold and the ice cubes melt.

10.1 What property of ice cubes allows them to float in the water? (1)

10.2 Briefly explain why the water gets cold as the ice cubes melt. (2)

10.3 Briefly describe how the property mentioned in QUESTION 10.1 affects the survival of aquatic life during winter. (4)
[7]

QUESTION 11

A certain brand of fertiliser contains urea [$CO(NH_2)_2$], ammonium chloride (NH_4Cl) and potassium chloride (KCl). Some of the properties of these substances are shown in the table below:

Substance	State of substance	Degree of solubility in water	Changes on heating
Urea $CO(NH_2)_2$	Solid	Does not dissolve	It melts
Ammonium chloride (NH_4Cl)	Solid	Dissolves very well	It sublimes
Potassium chloride (KCl)	Solid	Dissolves very well	It melts

11.1 For each of the substances, name a process that may be used to obtain a pure sample from the fertiliser. (6)

11.2 *The human population is growing at a high rate*.
Explain the importance of fertilisers in light of this statement. (4)

11.3 *Excessive use of fertilisers has a negative effect on the environment*.
Explain this statement. (4)
[14]

QUESTION 12

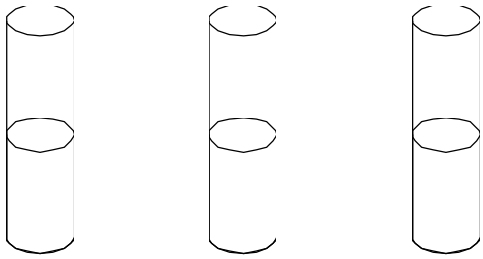
Plants need carbon dioxide gas (CO_2) to manufacture food. However, the engines of motor vehicles cause too much CO_2 gas to be released into the atmosphere.

12.1 State the possible consequence of having too much carbon dioxide gas in the atmosphere. (2)

12.2 Explain TWO possible effects on humans if the amount carbon dioxide in the atmosphere becomes too low. (4)
[6]

QUESTION 13

The test tubes labelled **X, Y** and **Z** below each contains a solution of an unknown potassium salt.



The following observations were made during a practical investigation to identify the solutions in the test tubes:

A A white precipitate formed when silver nitrate ($AgNO_3$) was added to test tube Z.
B A white precipitate formed in test tubes X and Y on addition of barium chloride ($BaCl_2$).
C The precipitate in test tube X dissolved in hydrochloric acid (HCl) and a gas was released.
D The precipitate in test tube Y was insoluble in hydrochloric acid.

13.1 Use the above information to identify the solutions in each of the test tubes X, Y and Z. (6)

13.2 Write a balanced chemical equation for the reaction that took place in test tube X before addition of the hydrochloric acid. (2)
[8]

TOTAL SECTION B: 115

GRAND TOTAL: 150

PHYSICAL SCIENCES GRADE 10 ANSWER SHEET
FISIESE WETENSKAPPE GRAAD 10 ANTWOORDBLAD

QUESTION 1 / *VRAAG 1*

1.1 _____ (1)
1.2 _____ (1)
1.3 _____ (1)
1.4 _____ (1)
1.5 _____ (1)
[5]

QUESTION 2 / *VRAAG 2*

2.1 _____ (1)
2.2 _____ (1)
2.3 _____ (1)
2.4 _____ (1)
2.5 _____ (1)
[5]

QUESTION 3 / *VRAAG 3*

3.1 _____ (2)
3.2 _____ (2)
3.3 _____ (2)
3.4 _____ (2)
3.5 _____ (2)
[10]

QUESTION 4 / *VRAAG 4*

4.1	A	B	C	D
4.2	A	B	C	D
4.3	A	B	C	D
4.4	A	B	C	D
4.5	A	B	C	D

(5 x 3) [15]

TOTAL SECTION A / TOTAAL AFDELING A: 35

NSC

THE PERIODIC TABLE OF ELEMENTS
DIE PERIODIEKETABEL VAN ELEMENTE

SLEUTEL / KEY

Atoomgetal
Atomic number

Elektronegatiwiteit
Electronegativity

Simbool
Symbol

Benaderde relatiewe atoommassa
Approximate relative atomic mass

1 (I)												13 (III)	14 (IV)	15 (V)	16 (VI)	17 (VII)	18 (VIII)
2,1 **1** **H** 1	2 (II)																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	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	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**
0,7 **87** **Fr**	0,9 **88** **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**

education

Department:
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REPUBLIC OF SOUTH AFRICA

NASIONALE SENIOR SERTIFIKAAT

GRAAD 10

FISIESE WETENSKAPPE: CHEMIE (V2)

MODELVRAESTEL

PUNTE: 150

TYD: 3 uur

Hierdie vraestel bestaan uit 11 bladsye, 'n antwoordblad en 1 inligtingsblad.

156 2 A

INSTRUKSIES EN INLIGTING

1. Skryf jou eksamennommer (en sentrumnommer indien van toepassing) in die toepaslike spasies op die ANTWOORDEBOEK neer.

2. Beantwoord AL die vrae.

3. Beantwoord AFDELING A op die ANTWOORDBLAD voorsien. Beantwoord AFDELING B in die ANTWOORDEBOEK.

4. Nie-programmeerbare sakrekenaars mag gebruik word.

5. Toepaslike wiskundige instrumente mag gebruik word.

6. Nommer die antwoorde korrek volgens die nommeringstelsel wat in hierdie vraestel gebruik is.

7. 'n Inligtingsblad is vir jou gebruik aangeheg.

8. Wees kortliks in vrae waar 'n motivering, bespreking, ensovoorts ver-lang word.

AFDELING A

Beantwoord hierdie afdeling op die aangehegte ANTWOORDBLAD.

VRAAG 1: EENWOORD-ANTWOORDE

Skryf slegs die woord/ term lvir elk van die volgende beskrywings langs die vraagnommer neer.

1.1 'n Element in Periode 3 wat 'n groot invloed op die elektronika-industrie het (1)

1.2 Die aantal nukleone in die atoom (1)

1.3 Die eienskap wat bepaal hoe maklik 'n vloeistof kan vloei (1)

1.4 'n Samestelling van twee of meer atome wat as 'n eenheid optree (1)

1.5 'n Chemiese reaksie wat met 'n vinnige toename in hitte en volume gepaard gaan (1)

[5]

VRAAG 2: PASITEMS

Pas die inligting in KOLOM A by die inligting in KOLOM B deur slegs die letter (A - I) langs die vraagnommer (2.1 - 2.5) neer te skryf.

KOLOM A		KOLOM B	
2.1	'n Karbonaat	A	HCl
2.2	Melk wat suur word	B	K^+
2.3	'n Voorbeeld van 'n ioniese verbinding	C	CO_3^{2-}
2.4	'n Positiewe ioon met die elektronkonfigu-rasie van argon	D	fisiese verandering
2.5	'n Oplossing waarvan al die komponente in dieselfde fase is	E	$CaCl_2$
		F	heterogene mengsel
		G	Al^{3+}
		H	chemiese verandering
		I	homogene mengsel

[5]

VRAAG 3: WAAR OF ONWAAR

Dui aan of die volgende stellings WAAR of ONWAAR is. Skryf slegs 'waar' of 'onwaar' langs die vraagnommer (3.1 - 3.5) neer. Indien die stelling ONWAAR is, skryf die korrekte stelling neer.

3.1 Nie-metaalagtige vaste stowwe is smeebaar. (2)

3.2 $^{20}_{10}Ne$ en $^{22}_{10}Ne$ het elk 10 protone, 12 elektrone en 12 neutrone. (2)

3.3 Atome en molekule bly tydens 'n chemiese reaksie behoue. (2)

3.4 Die volgende chemiese vergelyking is 'n voorbeeld van 'n ontbindingsreaksie:

$$2\ H_2O_2 \rightarrow 2\ H_2O + O$$ (2)

3.5 Jy kan jou hand in water druk omdat vloeistowwe saampersbaar is. (2)

[10]

VRAAG 4: MEERVOUDIGEKEUSE-VRAE

Vier moontlike opsies word as antwoorde vir die volgende vrae verskaf. Elke vraag het slegs een korrekte antwoord. Kies die antwoord, wat na jou mening die korrekte of beste antwoord is en merk die toepaslike blokkie op die antwoordblad met 'n kruisie.

4.1 Watter EEN van die volgende is 'n korrekte voorbeeld van die wet op veelvuldige verhoudings?

A CuO en $CuCO_3$

B H_2O en H_2O_2

C MgO en $MgCO_3$

D H_2 en H_2O (3)

4.2 Ioniese bindings vorm as gevolg van baie sterk aantrekkingskragte tussen teenoorgesteld gelaaide ione. Hieruit lei ons af dat ioniese verbindings …

A elektries neutraal is.

B hoë smeltpunte het.

C elektrisiteit gelei.

D gasagtige verbindings is. (3)

4.3 Indien Rutherford neutrone in plaas van alfadeeltjies in sy verstrooiings-eksperiment gebruik het, sou die neutrone …

A nie gedeflekteer het nie, omdat dit geen lading het nie.

B baie meer gereeld gedeflekteer word.

C maklik na die kern aangetrek word.

D dieselfde resultate gegee het. (3)

4.4 Watter EEN van die volgende gebruik die meeste ondergrondse water?

A Industriële prosesse

B Huishoudelike gebruike

C Landbougebruike

D Mynbouprosesse (3)

4.5 Ammoniak, 'n bestanddeel in huishoudelike skoonmaakmiddels, kan ontbind om een deel stikstof (N) en drie dele waterstof (H) te vorm. Dit beteken dat ammoniak …

A 'n kleurlose gas is.

B nie 'n verbinding is nie.

C nie 'n element kan wees nie.

D 'n formule N_3H moet hê. (3)

[15]

TOTAAL AFDELING A: 35

AFDELING B

INSTRUKSIES

1. Beantwoord hierdie afdeling in die ANTWOORDEBOEK.

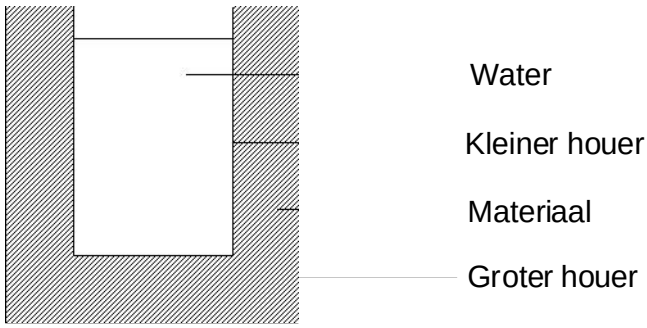
2. In ALLE berekeninge moet die formules en vervangings getoon word.

3. Rond jou antwoorde tot TWEE desimale plekke af.

VRAAG 5

'n Kampeerder wil 'n geskikte isolator vind om onder sy matras in sy tent te plaas. Hy het 'n keuse van drie materiale: koerante, plastiek en handdoeke.

Om vas te stel watter materiaal om saam te neem, voer hy 'n ondersoek uit om die isolerende eienskappe van monsters van hierdie materiale te toets. Hy gebruik die apparaat soos hieronder geïllustreer en meet die afname in temperatuur van die water oor 'n vaste tydsinterval.



Beantwoord die volgende vrae in verband met die ondersoek:

5.1 Verduidelik die verskil tussen 'n termiese geleier en 'n isolator. (2)

5.2 Skryf 'n moontlike ondersoekende vraag neer. (2)

5.3 Skryf 'n moontlike hipotese neer. (2)

5.4 Noem enige TWEE ander apparate benodig om hierdie ondersoek uit te voer. (4)

5.5 Noem die onafhanklike veranderlike in hierdie ondersoek? (2)

5.6 Noem die afhanklike veranderlike in hierdie ondersoek? (2)

5.7 Noem ten minste EEN veranderlike wat tydens hierdie ondersoek gekontroleer moet word. (2)
[16]

VRAAG 6

Die volgende table toon die eerste ionisasie-energieë vir die elemente in periode 1 en 2.

Periode	Element	Eerste ionisasie-energie ($kJ.mol^{-1}$)
1	H	1 312
	He	2 372
	Li	520
2	Be	899
	B	801
	C	1 086
	N	1 402
	O	1 314
	F	1 681
	Ne	2 081

6.1 Wat beteken die term *eerste ionisasie-energie*? (2)

6.2 Identifiseer die patroon van eerste ionisasie-energieë in 'n periode. (2)

6.3 Watter TWEE elemente oefen die sterkste aantrekkingskragte op hulle elektrone uit? Gebruik die gegewens in die tabel om 'n rede vir jou antwoord te gee. (4)

6.4 Teken Aufbaudiagramme vir die TWEE elemente in VRAAG 6.3 genoem en verduidelik hoekom hierdie elemente so stabiel is. (5)

6.5 Dit is veiliger om heliumgas as waterstofgas in ballonne te gebruik. Watter eienskap van helium maak dit 'n veiliger plaasvervanger? (2)

6.6 'Groep 1 elemente vorm geredelik positiewe ione'.
Is hierdie stelling korrek? Verduidelik jou antwoord deur na in die tabel te verwys. (3)
[18]

VRAAG 7

Inheemse mense het lank gelede met metale gewerk. Oorblyfsels van verskeie oonde wat vir die ekstraksie van yster gebruik is, kan in ons land gesien word. Die ystererts (Fe_2O_3) is in kleioonde gesmelt waarin dit geraffineer is deur die gebruik van houtskool (C) en blaasbalke om lug oor die houtskool te blaas vir die verkryging van hoë genoeg temperature vir die smelt van die erts.

Moderne ekstraksiemetodes maak van feitlik dieselfde prosesse gebruik as wat inheemse mense gebruik het. Ystererts, kooks (feitlik suiwer koolstof) en kalksteen ($CaCO_3$) word saam in 'n hoogoond verhit. Die kalksteen verwyder onsuiwerhede en so word 'n beter tipe yster verkry. Warm lug word deur pype in die oonde ingeblaas.

Gebruik 'n tabel om die inheemse metodes vir die ekstraksie van yster te vergelyk met die moderne metode.

In jou tabel, gebruik die volgende kriteria vir jou vergelyking:

(i) Reaktante gebruik of steeds in gebruik
(ii) Metode gebruik om die temperatuur te verhoog
(iii) Tipe oond
(iv) Suiwerheid van die produk **[10]**

VRAAG 8

Chemiese wapens is in 1925 deur die Geneefse Protokol verbied. Volgens hierdie protokol mag geen chemikalieë wat verstikkende en giftige gasse vrystel as wapens gebruik word nie. Wit fosfor, 'n baie reaktiewe allotroop van fosfor, is onlangs tydens 'n militêre aanval gebruik. Fosfor brand heftig in suurstof. Baie mense het ernstige brandwonde opgedoen en sommiges het selfs daaraan gesterf.

Die vergelyking vir die spontane reaksie is soos volg: $P_4(s) + O_2(g) \rightarrow P_2O_5(s)$

8.1 Balanseer die chemiese vergelyking. (2)

8.2 Bewys dat die wet van behoud van massa tydens hierdie chemiese reaksie gehoorsaam word. (5)

8.3 Noem die naam van die produk wat tydens hierdie reaksie gevorm word. (2)

8.4 Klassifiseer hierdie reaksie as eksotermies of endotermies. Verstrek 'n rede vir jou antwoord. (3)

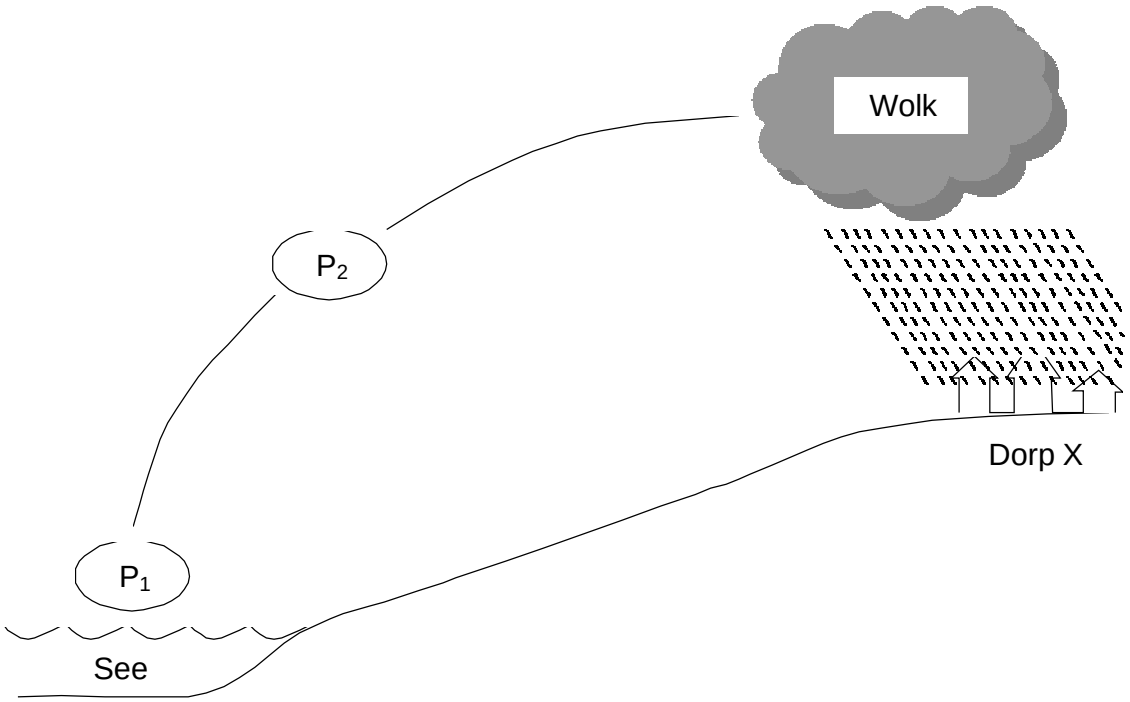
8.5 Klassifiseer die reaksie as 'n sintese- of 'n ontbindingsreaksie. Verstrek 'n rede vir jou antwoord. (3)

8.6 Is wit fosfor as 'n chemiese wapen gebruik? Motiveer jou antwoord. (3)

8.7 Watter invloed kan die onverantwoordelike gebruik van wit fosfor op mense en die omgewing hê? (4)
[22]

VRAAG 9

Die skets toon 'n proses wat tot reënval in dorp X lei. Die dorp is slegs van reënval vir sy watertoevoer afhanklik omdat dit geen toegang tot riviere of kraanwater het nie. 'n Groep mense het vir die gemeenskap gesê dat hulle reënwater nooit sal opraak nie, aangesien dit *nooit sal ophou reën nie*.



9.1 Noem die prosesse gemerk P_1 en P_2 wat tot reënval in dorp X lei. (2)

9.2 Is hierdie groep mense reg as hulle sê dat dorp X se reënwater nooit sal opraak nie? Regverdig jou antwoord van die skets. (3)

Onlangs het die reënval drasties afgeneem. Verskeie redes is aangevoer om die droogte te verduidelik. Van die gemeenskapslede blameer nou die groep wat gesê het *dat dit nooit sal ophou reën nie.*

9.3 Watter wetenskaplike argumente kan jy gebruik om die gemeenskapslede te oortuig dat die groep mense nie vir die droogte blameer kan word nie? (6)

9.4 Watter moontlike strategieë kan die gemeenskapsleiers kies om te verseker dat hulle 'n gereelde watertoevoer het? (3)

[14]

VRAAG 10

'n Leerder kom op 'n warm namiddag by die huis na skool. Ten einde koue water te hê om te drink, plaas sy ysblokkies in 'n glas met water. Sy maak die volgende waarnemings:

Waarneming I	Die ysblokkies dryf in die water.
Waarneming II	Na 'n ruk word die water koud en die ysblokkies smelt.

10.1 Watter eienskap van ysblokkies veroorsaak dat dit op water kan dryf? (1)

10.2 Verduidelik kortliks hoekom die water koud word terwyl die ysblokkies smelt. (2)

10.3 Beskryf kortliks hoe die eienskap genoem in VRAAG 10.1 die oorlewing van waterlewe in die winter beïnvloed. (4)
[7]

VRAAG 11

'n Sekere tipe kunsmis bevat ureum [$CO(NH_2)_2$], ammoniumchloried (NH_4Cl) en kaliumchloried (KCl). Sommige van die eienskappe van hierdie stowwe word in die tabel hieronder aangetoon:

Verbinding	Toestand van die stof	Graad van oplosbaarheid in water	Verandering tydens verhitting
Ureum $CO(NH_2)_2$	Vaste stof	Los nie op nie	Dit smelt
Ammoniumchloried (NH_4Cl)	Vaste stof	Los baie goed op	Dit sublimeer
Kaliumchloried (KCl)	Vaste stof	Los baie goed op	Dit smelt

11.1 Vir ELK van die stowwe, noem 'n proses wat gebruik kan word om 'n suiwer monster van die stof uit die kunsmis te verkry. (6)

11.2 *Die menslike bevolking groei teen 'n hoë tempo.*
Verduidelik die belangrikheid van kunsmis in die lig van hierdie stelling. (4)

11.3 *Oormatige gebruik van kunsmis het 'n negatiewe impak op die omgewing.*
Verduidelik hierdie stelling. (4)
[14]

VRAAG 12

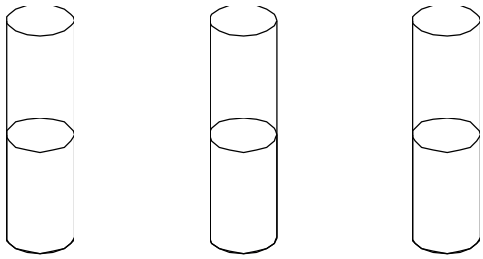
Plante benodig koolstofdioksiedgas (CO_2) om voedsel te vervaardig. Enjins van motors veroorsaak egter dat te veel CO_2-gas in die atmosfeer vrygestel word.

12.1 Noem die moontlike gevolg van te veel koolstofdioksiedgas in die atmosfeer. (2)

12.2 Verduidelik TWEE moontlike effeks op mense indien die hoeveelheid koolstofdioksied in die atmosfeer te laag word. (4)
[6]

VRAAG 13

Die proefbuise gemerk **X, Y** en **Z** hieronder bevat elk 'n oplossing van 'n onbekende kaliumsout.



Die volgende waarnemings is tydens 'n praktiese ondersoek om die oplossings in die proefbuise te identifiseer, gemaak.

A 'n Wit presipitaat vorm wanneer silwernitraat ($AgNO_3$) in proefbuis Z gevoeg is.
B 'n Wit presipitaat vorm in proefbuise X en Y na byvoeging van bariumchloried ($BaCl_2$).
C Die presipitaat in proefbuis X los in soutsuur (HCl) op en 'n gas word vrygestel.
D Die presipitaat in proefbuis Y is onoplosbaar in soutsuur.

13.1 Gebruik die bostaande inligting om die oplossings in elk van proefbuise X, Y en Z te identifiseer. (6)

13.2 Skryf 'n gebalanseerde chemiese vergelyking vir die reaksie wat in proefbuis X plaasvind voordat soutsuur bygevoeg is. (2)
[8]

TOTAAL AFDELING B: 115

GROOTTOTAAL: 150

NSS

FISIESE WETENSKAPPE GRAAD 10 ANTWOORDBLAD
PHYSICAL SCIENCES GRADE 10 ANSWER SHEET

VRAAG 1 / ***QUESTION 1***

1.1 _____ (1)

1.2 _____ (1)

1.3 _____ (1)

1.4 _____ (1)

1.5 _____ (1)

[5]

VRAAG 2 / ***QUESTION 2***

2.1 _____ (1)

2.2 _____ (1)

2.3 _____ (1)

2.4 _____ (1)

2.5 _____ (1)

[5]

VRAAG 3 / ***QUESTION 3***

3.1 _____ (2)

3.2 _____ (2)

3.3 _____ (2)

3.4 _____ (2)

3.5 _____ (2)

[10]

VRAAG 4 / ***QUESTION 4***

4.1	A	B	C	D
4.2	A	B	C	D
4.3	A	B	C	D
4.4	A	B	C	D
4.5	A	B	C	D

(5 x 3) [15]

TOTAAL AFDELING A / TOTAL SECTION A: 35

NSS

THE PERIODIC TABLE OF ELEMENTS
DIE PERIODIEKETABEL VAN ELEMENTE

SLEUTEL / KEY

Atoomgetal
Atomic number

Elektronegatiwiteit
Electronegativity

Simbool
Symbol

Benaderde relatiewe atoommassa
Approximate relative atomic mass

1 (I)												13 (III)	14 (IV)	15 (V)	16 (VI)	17 (VII)	18 (VIII)
2,1 1 H 1	2 (II)																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	3	4	5	6	7	8	9	10	11	12	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
0,7 87 Fr	0,9 88 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