Onderrigtoets 1. / *Class Test 1.*	Modulekode. / *Module Code.* NCHE 111		Duur. / *Duration.* 45 minute. / *45 minutes.*	
Maksimum punte. / *Maximum marks.* **33 punte. / *33 marks.***	Datum. / *Date.* **5 Maart 2019**		Roostergroep 7 *Roster Group 7*	
	Punt /33		**Persentasie.** *Percentage.*	**%**
	Mark /33			

MEMORANDUM (Leereenheid 2 en 3.1)

√ = ½ punt. / *mark.*

√ = 1 punt. / *mark.*

Vraag 1. / *Question 1.*

Skryf name van al die volgende ionieseverbindings neer. / *Write down the names of all the following ionic compounds.* **[2]**

1.1 $Mg(NO_3)_2$ **Magnesiumnitraat. / *Magnesium nitrate.*** √

1.2 V_2O_3 **Vanadium(III)oksied. / *Vanadium(III) oxide.* The Roman number (III) must be part of the answer.** √

Vraag 2. / *Question 2.*

Skryf chemiese formules van al die volgende ionieseverbindings neer. / *Write down the chemical formulas of all the following ionic compounds.* **[2]**

2.1 Natriumperchloraat. / *Sodium perchlorate.* **$NaClO_4$** √

2.2 Ammoniumwaterstoffosfaat. / *Ammonium hydrogen phosphate.* **$(NH_4)_2HPO_4$** √

Vraag 3. / *Question 3.*

Bereken die molêre massa van die volgende verbinding. / *Calculate the molar mass of the following compound.* **[1]**

Vanadium(II)dichromaat. / *Vanadium(II) dichromate.*

VCr_2O_7 = (50.9 g.mol^{-1}) + 2(52.0 g.mol^{-1}) + 7(16.00 g.mol^{-1}) = <u>266.9 g.mol^{-1}</u>

Trek 'n ½ punt af indien die student nie die eenheid in die antwoord aandui nie. / *Deduct a ½ mark if the student does not indicate the unit in the answer.*

Vraag 4. / _Question 4._

Gebruik jou periodieketabel om jou te lei en voorspel dan die chemiese formule **en** naam van die verbinding wat gevorm kan word deur die volgende elemente. / _Using your periodic table to guide you, predict the chemical formula **and** name of the compound formed by the following elements._ **[4]**

4.1 Ba en/_and_ Cl **$BaCl_2$ (Bariumchloried. / barium chloride)** ✓

4.2 Mg en/_and_ O **MgO (magnesiumoksied. / magnesium oxide)** ✓

Vraag 5. / _Question 5._

Die mees algemene lading geassosieer met sink in ioniese verbindings is 2+. Skryf die chemiese formule van verbinding wat jy vermoed sal vorm tussen sink en **(a)** chloor en **(b)** nitraatione neer. / _The most common charge associated with zink in ionic compounds is 2+. Write down the chemical formula of the compound you would expect to form between zink and **(a)** chlorine and **(b)** nitrate ions._ **[2]**

$ZnCl_2$ en/_and_ $Zn(NO_3)_2$ ✓ ✓

Skryf die naam van verbinding **(b)** neer. / _Write down the name of compound **(b)**._ **[1]**

Sink(II)nitraat. / _zink(II) nitrate._ ✓

Vraag 6. / _Question 6._

Beantwoord die volgende vrae ten opsigte van $Fe_2(CO_3)_3$. / _Answer the following questions about $Fe_2(CO_3)_3$._

6.1 Bereken die molhoeveelheid $Fe_2(CO_3)_3$ in 0.250 kg $Fe_2(CO_3)_3$. / _Calculate the mol amount of $Fe_2(CO_3)_3$ in 0.250 kg of $Fe_2(CO_3)_3$._ **[2]**

$Fe_2(CO_3)_3$ = 291.8 g.mol^{-1}

n = m/M = 250 g / 291.8 g.mol^{-1} = **0.857 mol** ✓

6.2 Hoeveel molekules $Fe_2(CO_3)_3$ is daar in 0.250 kg $Fe_2(CO_3)_3$? / _How many molecules of $Fe_2(CO_3)_3$ are there in 0.250 kg of $Fe_2(CO_3)_3$?_ **[1]**

Aantal molekules = 0.857(6.02 x 10^{23}) = **5.159 x 10^{23} molekules.** ✓

6.3 Hoeveel ysteratome is in 0.250 kg $Fe_2(CO_3)_3$? / _How many iron atoms are in 0.250 kg $Fe_2(CO_3)_3$?_ ✓ **[1]**

Each molecule contains 2 Fe atoms, therefore there will be 2(5.159 x 10^{24}) Fe atoms = **1.032 x 10^{24} Fe atoms.**

6.4 Hoeveel suurstofatome is in 0.250 kg $Fe_2(CO_3)_3$? / _How many oxygen atoms are in 0.250 kg $Fe_2(CO_3)_3$?_ **[1]**

Each molecule contains 9 O atoms, therefore there will be 9(5.159 x 10^{24}) O atoms = **4.643 x 10^{24} O atoms.** ✓

Vraag 7. / *Question 7.*

Watter van die volgende verbindings is molekulêr en watter verbindings is ionies van aard? / *Which of the following compounds are molecular and which compounds are ionic by nature?* **[2]**

7.1 $CoCO_3$ **ionic** ✓

7.2 CH_3COOH **molecular** ✓

Vraag 8. / *Question 8.*

Wanneer $Ba(OH)_2.xH_2O$ verhit word totdat al die water verwyder is, verloor dit 45.69 % van die totale massa. Bereken die hoeveelheid watermolekules (x) in die hidraat. / *When $Ba(OH)_2.xH_2O$ is heated until all the water is removed, it loses 45.69 % of its total mass. Calculate the number of water molecules (x) in the hydrate.* **[5]**

(**Gegee: /** *Given***:** M_{H_2O} = 18.02 g.mol^{-1}; $M_{Ba(OH)_2}$ = 171.32 g.mol^{-1})

If 45.69% H_2O then 45.69 g H_2O per 100 g of compound.

$M_{Ba(OH)_2}$ = 100 g – 45.69 g = <u>54.31 g $Ba(OH)_2$</u> ✓

45.69% H_2O = 45.69 g H_2O = 45.69 g/18.02 g.mol^{-1} = <u>2.535 mol H_2O</u> ✓

54.31 g $Ba(OH)_2$ = 54.31 g/171.32 g.mol^{-1} = <u>0.317 mol $Ba(OH)_2$</u> ✓

Molverhouding: / Mol Ratio: (Deel klein in groot molhoeveelheid. / Devide small into large mol amount)

2.535 H_2O/0.317 $Ba(OH)_2$: 0.317 $Ba(OH)_2$/0.317 $Ba(OH)_2$ = 7.99 H_2O : 1 $Ba(OH)_2$

DUS: 8 H_2O molekules $Ba(OH)_2.8H_2O$ ✓✓

Indien die student slegs die hoeveelheid watermolekules gee is dit ook reg. Hy/sy hoef nie die formule te gee nie. / *If a student only gives the number of water molecules it is also correct. He/she does not have to give the formula.*

Vraag 9. / *Question 9.*

Bepaal die molekulêre formule van 'n verbinding wat 31.91% K, 28.93% Cl en 39.16% O bevat en 'n molêre massa van 122.55 g.mol⁻¹ het. / *Determine the molecular formula of a compound that contains 31.91% K, 28.93% Cl and 39.16% O and has a molar mass of 122.55 g.mol⁻¹.*   **[5]**

$31.91\% K = 31.91 \, g \, K = \dfrac{31.91 \, g}{39.1 \, g.mol^{-1}} = 0.816 \, mol \, K$

$28.93\% \, Cl = 28.93 \, g \, Cl = \dfrac{28.93 \, g}{35.45 \, g.mol^{-1}} = 0.816 \, mol \, Cl$

$39.16\% \, O = 39.16 \, g \, O = \dfrac{39.16 \, g}{16 \, g.mol^{-1}} = 2.448 \, mol \, O$

Ratio:

$\dfrac{0.816}{0.816} \, K : \dfrac{0.816}{0.816} \, Cl : \dfrac{2.448}{0.816} \, O$

$1 \, K : 1 \, Cl : 3 \, O$

Empirical formula = $KClO_3$

↕ same!!

Molecular formula = $KClO_3$

→ 122.55 g/mol
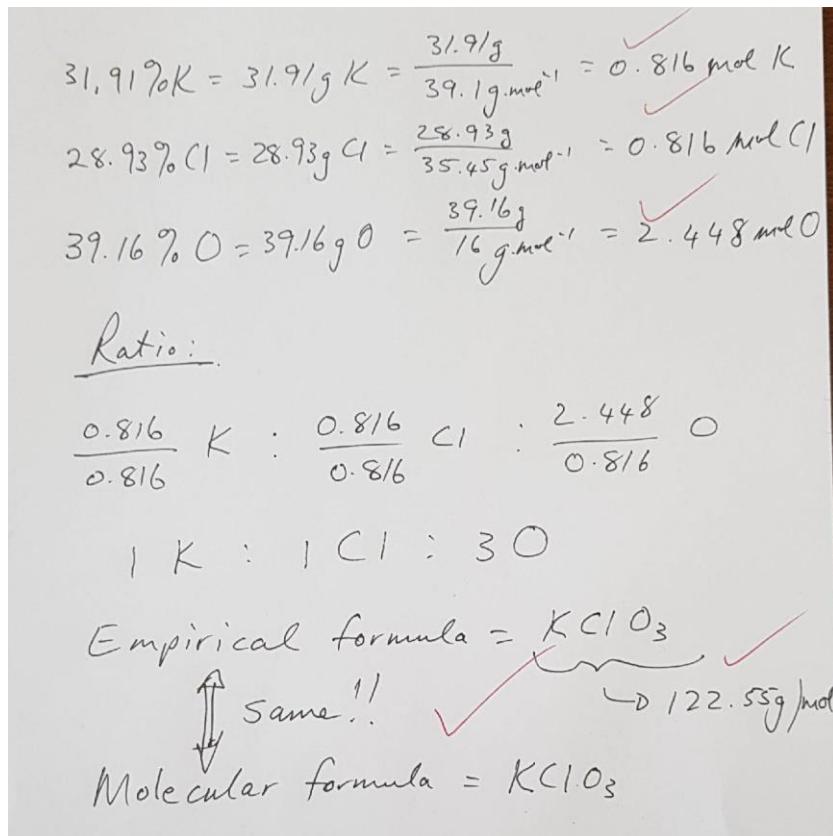
Vraag 10. / *Question 10.*

Balanseer die volgende chemiese vergelyking deur inspeksie. / *Balance the following chemical equation by inspection.* **[2]**

__**2**_ C_6H_6 (l) + __**15**_ O_2 (g) → _**12**__ CO_2 (g) + _**6**__ H_2O (g)
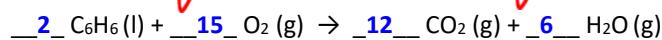
1 mark for reagent side and one mark for product side. No half marks.

Vraag 11. / *Question 11.*

Skryf 'n gebalanseerde reaksievergelyking vir die volgende reaksie neer. Dui ook die fisiesetoestande van al die reagense en produkte aan. / *Write down a balanced reaction equation for the following reaction. Also indicate the physical states of all the reagents and products.* **[2]**

Vloeibare fosforpentachloried reageer met water om 'n waterige oplossing van waterstoffosfaat en waterstofchloriedgas as produkte te lewer. / *Liquid phosphorous pentachloride reacts with liquid water to form an aqueous hydrogen phosphate and gaseous hydrogen chloride as products.*

$$PCl_5 (\ell) + 4H_2O (\ell) \rightarrow H_3PO_4 (aq) + 5HCl (g)$$

Die hele vergelyking moet reg wees om 2 punte te verdien, d.w.s die balansering, formules en fisiese toestande. Geen halwe punte of 1 punt nie. Dit is 2 of 0.
The whole equation must be correct to receive 2 marks, in other words the balancing, formulas and physical states. No half marks or 1 mark. It is 2 or 0.

PERIODIC TABLE OF THE ELEMENTS
PERIODIEKE INDELING VAN DIE ELEMENTE

IA (1)												IIIA (13)	IVA (14)	VA (15)	VIA (16)	VIIA (17)	0 (18)
1 **H** 1,01	IIA (2)																2 **He** 4,00
3 **Li** 6,94	4 **Be** 9,01			13 **Al** 27,0	atomic number / atoomgetal symbol / simbool atomic mass / atoommassa							5 **B** 10,8	6 **C** 12,0	7 **N** 14,0	8 **O** 16,0	9 **F** 19,0	10 **Ne** 20,2
11 **Na** 23,0	12 **Mg** 24,3	IIIB (3)	IVB (4)	VB (5)	VIB (6)	VIIB (7)	VIII (8)	(9)	(10)	IB (11)	IIB (12)	13 **Al** 27,0	14 **Si** 28,1	15 **P** 31,0	16 **S** 32,1	17 **Cl** 35,45	18 **Ar** 39,9
19 **K** 39,1	20 **Ca** 40,1	21 **Sc** 45,0	22 **Ti** 47,9	23 **V** 50,9	24 **Cr** 52,0	25 **Mn** 54,9	26 **Fe** 55,9	27 **Co** 58,9	28 **Ni** 58,7	29 **Cu** 63,4	30 **Zn** 65,4	31 **Ga** 69,7	32 **Ge** 72,6	33 **As** 74,9	34 **Se** 79,0	35 **Br** 79,9	36 **Kr** 83,6
37 **Rb** 85,5	38 **Sr** 87,6	39 **Y** 88,9	40 **Zr** 91,2	41 **Nb** 92,9	42 **Mo** 95,9	43 **Tc** (98)	44 **Ru** 101,1	45 **Rh** 102,9	46 **Pd** 106,4	47 **Ag** 107,9	48 **Cd** 112,4	49 **In** 114,8	50 **Sn** 118,7	51 **Sb** 121,6	52 **Te** 127,6	53 **I** 127,9	54 **Xe** 131,3
55 **Cs** 132,9	56 **Ba** 137,3	57 **La** 138,9	* 72 **Hf** 178,5	73 **Ta** 180,9	74 **W** 183,9	75 **Re** 186,2	76 **Os** 190,2	77 **Ir** 192,2	78 **Pt** 195,1	79 **Au** 197,0	80 **Hg** 200,6	81 **Tl** 204,4	82 **Pb** 207,2	83 **Bi** 209,0	84 **Po** (209)	85 **At** (210)	86 **Rn** (222)
87 **Fr** (223)	88 **Ra** 226,0	89 **Ac** 227,0	# 104 **Rf** (261)	105 **Db** (262)	106 **Sg** (263)	107 **Bh** (262)	108 **Hs** (265)	109 **Mt** (266)									

lanthanides / lantaniede *	58 **Ce** 140,1	59 **Pr** 140,9	60 **Nd** 144,2	61 **Pm** (145)	62 **Sm** 150,4	63 **Eu** 152,0	64 **Gd** 157,3	65 **Tb** 158,9	66 **Dy** 162,5	67 **Ho** 164,9	68 **Er** 167,3	69 **Tm** 168,9	70 **Yb** 173,0	71 **Lu** 175,0
actinides / aktiniede #	90 **Th** 232,0	91 **Pa** 231,0	92 **U** 238,0	93 **Np** 237,0	94 **Pu** (244)	95 **Am** (234)	96 **Cm** (247)	97 **Bk** (247)	98 **Cf** (251)	99 **Es** (252)	100 **Fm** (257)	101 **Md** (258)	102 **No** (258)	103 **Lr** (260)