

Onderrigtoets 1. / Class Test 1.	Modulekode. / Module Code. NCHE111	Duur. / Duration. 40 minute. / 40 minutes.
Maksimum punte. / Maximum marks. 33 punte. / 33 marks.	Datum. / Date. 6 March 2020	Groep 4 Group 4
	Punt /33 Mark /33	Persentasie. Percentage. %

MEMORANDUM

✓ = 1 punt. / 1 mark.

✓ = 1/2 punt. / 1/2 mark.

Titel:	
<i>Title:</i>	

Van:	
<i>Surname:</i>	

Voorletters:	
<i>Initials:</i>	

Studentenommer:	
<i>Student number:</i>	

Vraag 1. / Question 1.

Skryf die naam of simbool van die volgende elemente neer. / Write down the name or symbol for the following elements. [4 x 1/2 = 2]

Litium. / Lithium. _____ **Li** ✓

Barium. / Barium. _____ **Ba** ✓

C _____ **Koolstof (Carbon)** ✓

K _____ **Kalium (Potassium)** ✓

Vraag 2. / Question 2.

Skryf by elk van die volgende neer of dit 'n ioon of 'n molekule is. / Write down at each of the following whether it is an ion or a molecule. [2]

Koolstofmonoksied. / Carbon monoxide. **molekule (molecule)** ✓

CH₄ **molekule (molecule)** ✓

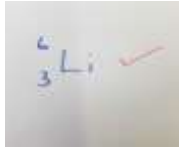
Vraag 3. / Question 3.

Skryf die volledige simbool, (A_ZX) insluitende die atoomgetal en massagetal vir die volgende isotoop neer.

Write down the complete symbol, (A_ZX) including the atomic number and mass number for the following isotope.

Litium met 3 neutrone. / Lithium with 3 neutrons.

[1]



Vraag 4. / Question 4.

Kies antwoorde vir die vrae hieronder vanuit die volgende lys van elemente: He, Li, S, Mn, Ni en Br. Verwag om van die simbole meer as een keer te gebruik.

Select answers to the questions below from the following list of elements: He, Li, S, Mn, Ni and Br. Expect to use some symbols more than once. [5]

4.1 Watter elemente is nie-metale? / Which elements are non-metals?

He, S, Br

4.2 Watter elemente is hoofgroep elemente? / Which elements are main group elements?

He, Li, S, Br

4.3 Watter elemente is oorgangselemente? / Which elements are transition elements?

Mn en Ni

4.4 Watter elemente is gasse? / Which elements are gases?

He

Vraag 5. / Question 5.

Bereken die volgende: / Calculate the following:

- 5.1 Die massa kalsium, in gram, vanaf 0.015 mol kalsium. / The mass of calcium, in grams, from 0.015 mol calcium. [1]

$$n = m/M, \text{ dus } m = n \times M = 0.015 \text{ mol} \times 40.1 \text{ g.mol}^{-1} = \underline{0.6015 \text{ g Ca}} \checkmark$$

- 5.2 Die mol Al vanaf 6.75 g Al. / The mol Al from 6.75 g Al. [1]

$$n = m/M = 6.75 \text{ g} / 27.0 \text{ g.mol}^{-1} = \underline{0.25 \text{ mol Al}} \checkmark$$

- 5.3 Die molêre massa van BCl₃. / The molar mass of BCl₃. [1]

$$10.8 + (3)(35.45) = \underline{117.15 \text{ g.mol}^{-1}} \checkmark$$

- 5.4 Watter massa aspirien, in gram, word verteenwoordig deur 0.0255 mol aspirien (C₉H₈O₄)? / What mass of aspirin, in grams, is represented by 0.0255 mol of aspirin (C₉H₈O₄)? [2]

$$M = (9)(12) + (8)(1.01) + (4)(16) = \underline{180.08 \text{ g.mol}^{-1}} \checkmark$$

$$m = n \times M = 0.0255 \times 180.08 = \underline{4.59 \text{ g}} \checkmark$$

Vraag 6. / Question 6. The answers for questions 6.1 – 6.3 are either correct or wrong, nothing in-between.

- 6.1 Skryf die ladings van die ione in die ioniese verbinding wat kobalt(II)- en 'n sulfaatioon bevat neer. Skryf ook die formule van die verbinding neer. / Write down the charges of the ions in an ionic compound containing cobalt(II) and a sulphate ion. Also write down the formula for the compound. [3]



- 6.2 Skryf die formule neer vir magnesiumperchloraat. / Write down the formula for magnesium perchlorate. [1]




- 6.3 Skryf die naam neer van die volgende ionieseverbinding: Ca(CH₃CO₂)₂. / Write down the name of the following ionic compound: Ca(CH₃CO₂)₂. [1]



Vraag 7. / Question 7.

Vergelyk die volgende twee ioniese verbindings in terme van hul smeltpunte relatief tot mekaar en omkring dan die letter van die stelling wat die vergelyking korrek beskryf. / Compare the following two ionic compounds in terms of their melting points relative to each other and then circle the letter of the statement that describes the comparison correctly. [2]

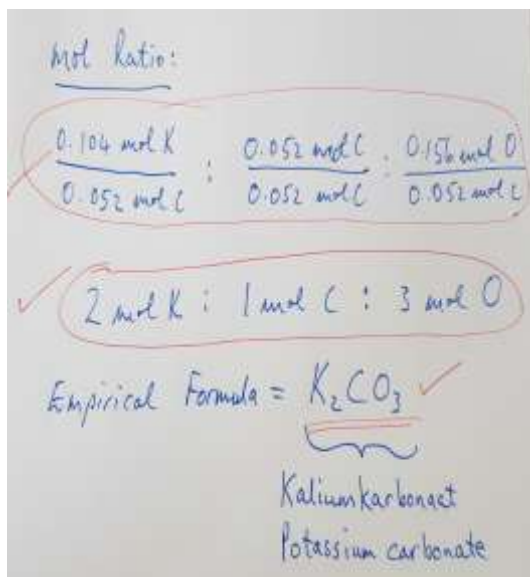
MgO en/and CaO (2852 °C vs 2613 °C)

- a. MgO se smeltpunt is hoër as die van CaO omrede Coulomb se wet bepaal dat hoe groter die ione waaruit die verbinding bestaan is, hoe sterker is die elektrostatische aantrekkingskrag wat die ione bymekaar hou en daarom is MgO se smeltpunt hoër. / *The melting point of MgO is higher than that of CaO because Coulomb's law states that the larger the ions from which the compound is compiled from, the stronger the electrostatic attraction forces that holds the ions together and therefor the melting point of MgO is higher.*
-  b. MgO se smeltpunt is hoër as die van CaO omrede Coulomb se wet bepaal dat hoe kleiner die ione waaruit die verbinding bestaan is, hoe sterker is die elektrostatische aantrekkingskrag wat die ione bymekaar hou en daarom is MgO se smeltpunt hoër. / *The melting point of MgO is higher than that of CaO because Coulomb's law states that the smaller the ions from which the compound is compiled from, the stronger the electrostatic attraction forces that holds the ions together and therefor the melting point of MgO is higher.*
- c. MgO se smeltpunt is laer as die van CaO omrede Coulomb se wet bepaal dat hoe kleiner die ione waaruit die verbinding bestaan hoe swakker is die elektrostatische aantrekkingskrag wat die ione bymekaar hou en daarom is MgO se smeltpunt laer. / *The melting point of MgO is lower than that of CaO because Coulomb's law states that the smaller the ions from which the compound is compiled from, the weaker the electrostatic attraction forces that holds the ions together and therefor the melting point of MgO is lower.*
- d. MgO se smeltpunt is laer as die van CaO omrede Coulomb se wet bepaal dat die produk van die ladings op die kation en die anioon die grootte van die elektrostatische aantrekkingskrag tussen die ione bepaal. Die produk van die ladings vir MgO behoort dus laer te wees as die produk van die ladings vir CaO en daarom is MgO se smeltpunt laer. / *The melting point of MgO is lower than that of CaO because Coulomb's law states that the product of the charges on the cation and the anion determines the strength of the electrostatic attraction forces between the ions. The product of the charges for MgO should therefore be lower than the product of the charges for CaO en therefore the melting point of MgO is lower.*

Vraag 8. / Question 8. *If the answer is correct and the student did a calculation you can give full marks. The calculation steps does not have to be exactly the same as in the memo.*

Bepaal die empiriese formule vir 'n verbinding wat soos volg saamgestel is: / Determine the empirical formula for a compound that is compiled as follow: [3]

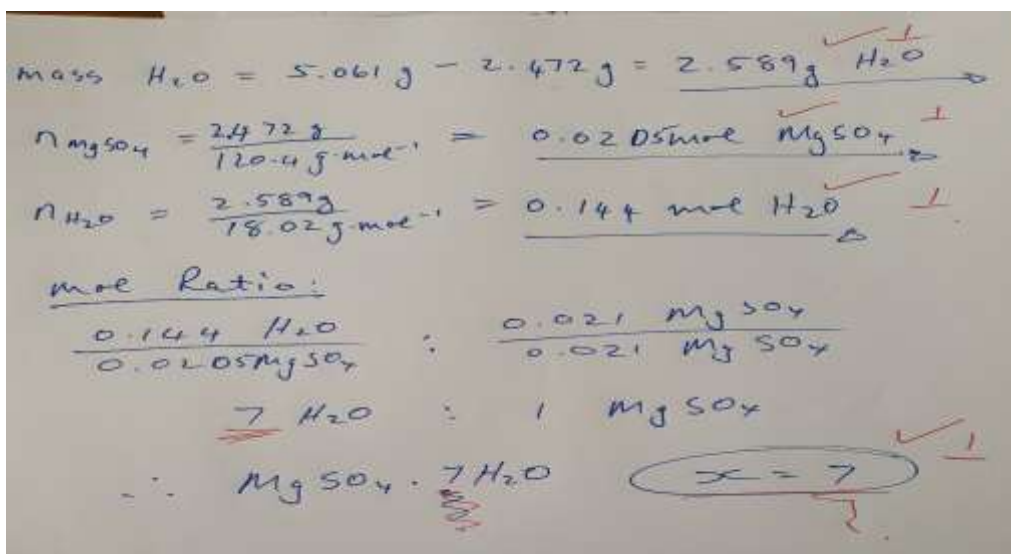
0.104 mol K; 0.052 mol C en/and 0.156 mol O



Vraag 9. / Question 9.

Wanneer 5.061 g $\text{MgSO}_4 \cdot x\text{H}_2\text{O}$ verhit word verloor die gehidrateerde verbinding al die water van hidrasie en slegs 2.472 g anhidriese MgSO_4 bly oor. Bereken die waarde van x. / When 5.061 g of $\text{MgSO}_4 \cdot x\text{H}_2\text{O}$ is heated the hydrated compound loses all the water of hydration and leaves only 2.472 g of anhydrous MgSO_4 . Calculate the value of x. [4]

(Gegee: / Given: $M_{\text{MgSO}_4} = 120.4 \text{ g} \cdot \text{mol}^{-1}$; $M_{\text{H}_2\text{O}} = 18.02 \text{ g} \cdot \text{mol}^{-1}$)



Vraag 10. / Question 10.

Voltooi die volgende tabel met betrekking tot wateroplosbaarheid. Die oplosbaarheidstabel is agter aan die vraestel vasgeheg. Jy mag die afskeur en hou. / *Complete the following table with regards to water solubility. The solubility table is attached at the back of the paper. You may tear it of and keep it.* [4 x ½ = 2]

Verbinding. Compound.	Wateroplosbaar. Water soluble.		Dui die ione wat in oplossing mag wees (indien enige) aan. Indicate the ions that may be present in solution (if any).
	Ja. / Yes.	Nee. / No.	
NaF	x ✓		Na ⁺ and F ⁻ ✓
Ca(NO ₃) ₂	x ✓		Na ⁺ and NO ₃ ⁻ ✓ OR Na ⁺ and 2NO ₃ ⁻

Vraag 11. / Question 11. The answer is either correct or wrong. There does not have to be a 1 before C₇H₁₆. SO, either 2 marks or 0. NO 1 mark!!

Balanseer die volgende reaksievergelyking. / *Balance the following reaction equation.* [2]



PERIODIC TABLE OF THE ELEMENTS
PERIODIEKE INDELING VAN DIE ELEMENTE

IA (1)																	0 (18)						
1 H 1,01																	2 He 4,00						
3 Li 6,94	4 Be 9,01											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	13 Al 27,0	<div style="display: flex; justify-content: space-between; font-size: small;"> atomic number / atoomgetal symbol / simbool atomic mass / atoommassa </div>																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 83,8						
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)							

GUIDELINES TO PREDICT THE SOLUBILITY OF IONIC COMPOUNDS

SOLUBLE COMPOUNDS	
Almost all salts of Na^+ , K^+ , NH_4^+ Salts of: nitrate, NO_3^- chlorate, ClO_3^- perchlorate, ClO_4^- acetate, CH_3CO_2^-	
	EXCEPTIONS
Almost all salts of Cl^- , Br^- , I^-	Halides of Ag^+ , Hg_2^{2+} , Pb^{2+}
Salts containing F^-	Fluorides of Mg^{2+} , Ca^{2+} , Sr^{2+} , Ba^{2+} , Pb^{2+}
Salts of sulfate, SO_4^{2-}	Sulfates of Ca^{2+} , Sr^{2+} , Ba^{2+} , Pb^{2+} , Ag^+

INSOLUBLE COMPOUNDS	
Most salts of: Carbonate, CO_3^{2-} Phosphate, PO_4^{3-} Oxalate, $\text{C}_2\text{O}_4^{2-}$ Chromate, CrO_4^{2-} Sulfide, S^{2-}	
	EXCEPTIONS
	Salts of NH_4^+ and the alkali metal cations
Most metal hydroxides and oxides	Alkali metal hydroxides and $\text{Ba}(\text{OH})_2$ and $\text{Sr}(\text{OH})_2$