

Onderrigtoets 1. / <i>Class Test 1.</i>	Modulekode. / <i>Module Code.</i> CHEM 111		Duur. / <i>Duration.</i> 45 minute. / <i>45 minutes.</i>	
Maksimum punte. / <i>Maximum marks.</i> 29 punte. / <i>29 marks.</i>	Datum. / <i>Date.</i> 8 Maart 2017		Roostergroep 3 <i>Roster Group 3</i>	
	Punt /29 <i>Mark /29</i>		Persentasie. <i>Percentage.</i>	%

MEMORANDUM (Leereenheid 2)

✓ = ½ punt. / *mark.*

✓ = 1 punt. / *mark.*

Vraag 1. / Question 1.

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

[1]



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

Vraag 2. / Question 2.

Hoeveel mol word verteenwoordig deur 0.750 g van die volgende verbinding? / *How many mol is represented by 0.750 g of the following compound?*

[1½]



= 0.750 g / 46.06 g.mol⁻¹ = 0.0163 mol OF 0.0160 mol OF 1.63 x 10⁻² mol ✓

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

Vraag 3. / Question 3.

Skryf die name of formules van die volgende ioniese verbindinge neer. / *Write down the names or formulas of the following ionic compounds.*

[4]

3.1 Kaliumfosfaat. / *Potassium phosphate.*



3.2 Koper(I)bromied. / *Copper(I) bromide.*



3.3 MnSO_4 Mangaan(II)sulfaat. / Manganese(II) sulfate. ✓

Die Romeinse syfer (II) moet deel van die antwoord wees. / *The Roman number (II) must be part of the answer.*

3.4 MgS Magnesiumsulfied. / Magnesium sulfide. ✓

Vraag 4. / Question 4.

Jy reageer 33.93 g vanadium met 'n oormaat swael. Die massa van die produk is 87.43 g. Wat is die molekulêre formule van die produk? / You react 33.93 g of vanadium with an excess of sulphur. The mass of product is 87.43 g. What is the molecular formula of the product? [4]

Wet van behoud van massa: $87.43 \text{ g} - 33.93 \text{ g} = 53.5 \text{ g S}$ wat reageer.

$$n_V = 33.93 / 50.9 = 0.666 \text{ mol V}$$

$$n_S = 53.5 / 32.1 = 1.60 \text{ mol S}$$

Verhouding: / Ratio:

$$1.60 \text{ mol S} / 0.666 \text{ mol V} : 0.666 \text{ mol V} / 0.666 \text{ mol V} = 2.50 \text{ S} : 1 \text{ V} \quad \times 2$$

Dus: V_2S_5

Vraag 5. / Question 5.

Voltooi die volgende tabel deur aan te dui of die gegewe verbindings molekulêreverbinding of ionieseverbinding is. Dui ook aan of die formules van die verbindings reg of verkeerd is en indien jy dink dat 'n formule verkeerd is, skryf dan die korrekte formule neer. Indien jy dink dat die formule reg is moet jy slegs 'n streep in die laaste kolom trek. / Complete the following table by indicating whether the given compounds are molecular compounds or ionic compounds. Also indicate whether the formulas of the compounds are correct or incorrect and if you think that a formula is incorrect, then write down the correct formula. If you think that the formula is correct, then you only draw a line in the last column. [9 x ½ = 4½]

Verbinding. Compound.	Molekulêre- of ionieseverbinding? Molecular or ionic compound?	Formule reg of verkeerd? Formula correct or incorrect?	Korrekte formule indien gegeve formule verkeerd is. Correct formula if given formula is incorrect.
ZnO	Ionies. / ionic. ✓	Reg. / correct. ✓	----- ✓
CuO	Ionies. / ionic. ✓	Reg. / correct. ✓	----- ✓
Ga ₂ S ₂	Ionies. / ionic. ✓	Verkeerd. / wrong. ✓	Ga ₂ S ₃ ✓

Trek asb 'n streep deur al die leë kolomme om latere onduidelikheid te voorkom.

Please draw a line through all empty columns, to stop uncertainties later on.

Vraag 6. / Question 6.

Skryf vier verbindings in die verskafte spasies neer wat kan vorm vanuit die gegewe ione. / Write down four compounds in the supplied spaces that can form from the given ions. [4 x ½ = 2]

	$\text{Cr}_2\text{O}_7^{2-}$	PO_4^{3-}
NH_4^+	$(\text{NH}_4)_2\text{Cr}_2\text{O}_7$ ✓	$(\text{NH}_4)_3\text{PO}_4$ ✓
Ni^{2+}	NiCr_2O_7 ✓	$\text{Ni}_3(\text{PO}_4)_2$ ✓

Vraag 7. / Question 7.

Beantwoord die volgende vrae ten opsigte van CaCO_3 . / Answer the following questions about CaCO_3 . [4]

7.1 Bereken die molhoeveelheid CaCO_3 in 'n ½ kg CaCO_3 . / Calculate the mol amount of CaCO_3 in a ½ kg of CaCO_3 .

$$\text{CaCO}_3 = 100.1 \text{ g}\cdot\text{mol}^{-1}$$

$$n = m/M = 500 \text{ g} / 100.1 = \underline{4.995 \text{ mol}}$$
 ✓

7.2 Hoeveel molekules CaCO_3 is daar in 'n ½ kg CaCO_3 ? / How many molecules of CaCO_3 are there in a ½ kg of CaCO_3 ?

$$\text{Aantal molekules} = 4.995(6.02 \times 10^{23}) = \underline{3.008 \times 10^{24} \text{ molekules.}}$$
 ✓

7.3 Hoeveel kalsiumatome is in 'n ½ kg CaCO_3 ? / How many calcium atoms are in a ½ kg CaCO_3 ?

Elke molekule bevat 1 Ca-atoom, daarom sal daar 3.008×10^{24} Ca-atome wees.

 ✓

7.4 Hoeveel suurstofatome is in 'n ½ kg CaCO_3 ? / How many oxygen atoms are in a ½ kg CaCO_3 ?

Elke molekule bevat 3 O-atome, daarom sal daar $3(3.008 \times 10^{24}) = \underline{9.024 \times 10^{24} \text{ O-atome wees.}}$

 ✓

Vraag 8. / Question 8.

Wanneer $\text{FeCl}_2 \cdot x\text{H}_2\text{O}$ verhit word totdat al die water verwyder is, verloor dit 36.24 % van die totale massa. Bereken die hoeveelheid watermolekules (x) in die hidraat. / *When $\text{FeCl}_2 \cdot x\text{H}_2\text{O}$ is heated until all the water is removed, it loses 36.24 % of its total mass. Calculate the number of water molecules (x) in the hydrate.* [5]

(Gegee: / Given: $M_{\text{H}_2\text{O}} = 18.02 \text{ g}\cdot\text{mol}^{-1}$; $M_{\text{FeCl}_2} = 126.80 \text{ g}\cdot\text{mol}^{-1}$)

If 36.24% H_2O then 36.24 g H_2O per 100 g of compound.

$$M_{\text{FeCl}_2} = 100 \text{ g} - 36.24 \text{ g} = 63.76 \text{ g FeCl}_2$$

$$36.24\% \text{ H}_2\text{O} = 36.24 \text{ g H}_2\text{O} = 36.24 \text{ g} / 18.02 \text{ g}\cdot\text{mol}^{-1} = 2.011 \text{ mol H}_2\text{O}$$

$$63.76 \text{ g FeCl}_2 = 63.76 \text{ g} / 126.80 \text{ g}\cdot\text{mol}^{-1} = 0.503 \text{ mol FeCl}_2$$

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

$$2.011 \text{ H}_2\text{O} / 0.503 \text{ FeCl}_2 : 0.503 \text{ FeCl}_2 / 0.503 \text{ FeCl}_2 = 3.998 \text{ H}_2\text{O} : 1 \text{ FeCl}_2$$

DUS: 4 H_2O molekules ($\text{FeCl}_2 \cdot 4\text{H}_2\text{O}$)

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.

Watter van die volgende is NIE 'n isotoop van element X waarvan die atoomgetal 17 is NIE. / *Which of the following is NOT an isotope of element X, the atomic number for which is 17?* [1]

1. ${}^{34}_{17}\text{X}$

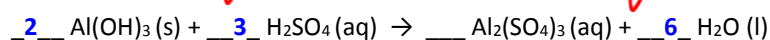
2. ${}^{35}_{17}\text{X}$?

3. ${}^{35}_{18}\text{X}$

4. ${}^{36}_{17}\text{X}$

Vraag 10. / Question 10.

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



1 mark for reagent side and one mark for product side. No half marks.

PERIODIC TABLE OF THE ELEMENTS
PERIODIEKE INDELING VAN DIE ELEMENTE

IA (1)																	0 (18)	
1 H 1,01		IIA (2)											IIIA (13)	IVA (14)	VA (15)	VIA (16)	VIIA (17)	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	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 83,8	
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 (243)	96 Cm (247)	97 Bk (247)	98 Cf (251)	99 Es (252)	100 Fm (257)	101 Md (258)	102 No (258)	103 Lr (260)		