



Access fun Grade 8–12 quizzes, matric past papers, K53 learner mock tests, and NBT prep!

*All in one easy-to-use app.*

---

**DOWNLOAD GO STUDY NOW**



Tap on the buttons above to download the app

 [www.gostudy.club](http://www.gostudy.club)



# basic education

Department:  
Basic Education  
**REPUBLIC OF SOUTH AFRICA**

**NATIONAL  
SENIOR CERTIFICATE/  
NASIONALE  
SENIOR SERTIFIKAAT**

**GRADE/GRAAD 10**

**PHYSICAL SCIENCES: CHEMISTRY (P2)  
FISIESE WETENSKAPPE: CHEMIE (V2)**

**NOVEMBER 2017**

**MARKING GUIDELINES/NASIENRIGLYNE**

**MARKS/PUNTE: 150**

**These marking guidelines consist of 10 pages.  
*Hierdie nasienriglyne bestaan uit 10 bladsye.***

## QUESTION/VRAAG 1

- |      |      |     |
|------|------|-----|
| 1.1  | C ✓✓ | (2) |
| 1.2  | A ✓✓ | (2) |
| 1.3  | A ✓✓ | (2) |
| 1.4  | A ✓✓ | (2) |
| 1.5  | C ✓✓ | (2) |
| 1.6  | A ✓✓ | (2) |
| 1.7  | D ✓✓ | (2) |
| 1.8  | A ✓✓ | (2) |
| 1.9  | B ✓✓ | (2) |
| 1.10 | C ✓✓ | (2) |

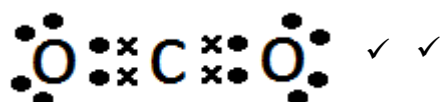
**[20]**



## QUESTION/VRAAG 2

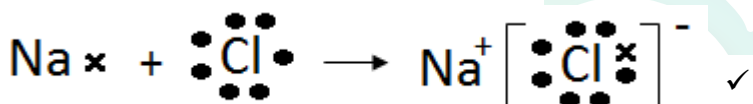
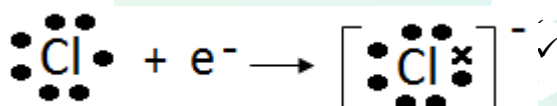
- 2.1.1  $\text{CO}_2$  ✓ **OR/OF**  $\text{H}_2\text{O}$  ✓ (1)  
 2.1.2 Fe ✓ (1)  
 2.1.3  $\text{C}_{90}$  ✓ (1)  
 2.1.4 NaCl ✓ (1)

2.2



(2)

- 2.3 Covalent bond ✓ / Kovalente binding ✓ (1)



(3)

- 2.5.1 Potassium iodide ✓ / Kaliumjodied ✓ (1)

- 2.5.2  $\text{CH}_4$  ✓ (1)

- 2.5.3 Ammonia ✓ / Ammoniak ✓ (1)

- 2.6.1 Physical ✓ / Fisies ✓ (1)

- 2.6.2 Boiling point ✓ / Kookpunt ✓ (1)

- 2.6.3 Nitrogen ✓; it has the lowest boiling point. ✓ / Stikstof ✓ Laagste kookpunt ✓ (2)

- 2.6.3 Nitrogen ✓; it has the lowest boiling point. ✓ / Stikstof ✓ Laagste kookpunt ✓ (2)

- 2.7.1 INCREASE. ✓  
TOENEEM ✓ (1)

- 2.7.2 DECREASE. ✓  
AFNEEM ✓ (1)

- 2.7.3 INCREASE. ✓  
TOENEEM ✓ (1)

**[20]**

## QUESTION/VRAAG 3

- 3.1 Energy needed per mole to remove an electron from an atom in a gaseous phase. ✓✓  
*Energie benodig per mol om 'n elektron uit 'n atoom in die gasfase te verwyder. ✓✓* (2)
- 3.2 Ionisation energy increases from left to right, across a period. ✓✓  
*Ionisasie energie neem toe van links na regs oor 'n periode. ✓✓* (2)
- 3.3.1 Be:  $1s^2 2s^2$  ✓✓  
 B:  $1s^2 2s^2 2p^1$  ✓✓ (4)
- 3.3.2 B has a 2p energy level; 2p has a higher energy than 2s. ✓  
 Therefore less energy is needed to remove the valence electrons from B as from Be ✓✓.  
*B het 'n 2p energievlak; 2p het meer energie as 2s ✓*  
*Dus minder energie word benodig om 'n valenselektron van B te verwyder in vergelyking met Be. ✓✓*
- OR/OF**
- 2s electrons are paired and 2p electron is unpaired. ✓ Therefore less energy needed to remove 2p electron. ✓✓  
*Die 2s elektrone is gepaard teenoor die ongepaarde 2p elektrone. ✓ Daaom word minder energie benodig om 'n 2p elektron te verwyder. ✓✓* (3)
- 3.4 False ✓,  
 The energy is high because of filled s and p-orbitals. ✓/  
*Vals ✓*  
*Die energie is hoog agv die vol s- en p-orbitale. ✓* (2)
- 3.5.1 Alkali-metals ✓  
*Alkali-metale ✓* (1)
- 3.5.2 Reactivity increases from top to bottom ✓✓  
*Reaktiwiteit verhoog van bo na onder in die groep. ✓✓* (2)
- 3.5.3 Ionisation energy decreases, thus less energy to remove an electron. Therefore reactivity increases. ✓✓  
*Ionisasie-energie neem af, daarom word minder energie benodig om 'n elektron te verwyder. Reaktiwiteit neem dus toe. ✓✓* (2)

[18]

## QUESTION/VRAAG 4

- 4.1.1 Isotope: atoms of the same element having the same number of protons, but different number of neutrons. **OR** Same atomic number, but different mass numbers. ✓✓

*Isotoop: Atome van dieselfde element wat dieselfde getal protone het, maar verskillende getalle neutrone. ✓✓ OF Dieselfde atoomgetalle, maar verskillende massagetalle.*

(2)

- 4.1.2 50% = 106,9 amu  
50% = 109,1 amu ✓

$$A_r = \frac{(50 \times 106,9) + (50 \times 108,9)}{100} = 108$$

(5)

- 4.1.3 Ag/Silver ✓✓  
Ag/Silwer ✓✓

(2)

- 4.2.1 13 ✓  
4.2.2 14 ✓  
4.2.3 13 ✓  
4.2.4 39 ✓  
4.2.5 19 ✓  
4.2.6 20 ✓  
4.2.7 18 ✓

(7)  
[16]

## QUESTION/VRAAG 5

- 5.1 An aqueous solution. ✓/In Waterige oplossing. ✓

(1)

- 5.2 Redox. ✓  
Electron transfer took place. ✓/  
Redoks. ✓  
Elektron oordrag het plaasgevind. ✓

(2)

- 5.3 Chemical change. ✓/Chemiese verandering. ✓

(1)

- 5.4 The amount of substance having the same number of particles as there are atoms in 12g C-12. ✓✓  
*Die stofhoeveelheid wat dieselfde getal deeltjies het as wat daar atome in 12g koolstof-12 is. ✓✓*

(2)

5.5  $\text{H}_2\text{O}_2 : \text{O}_2$   
 $2 : 1$   
 Therefore  $n(\text{O}_2) = 2 \text{ mol}$  ✓

$$n = \frac{V}{V_m} \quad \checkmark$$

$$2 = \frac{V}{22,4} \quad \checkmark$$

$$V = 44,8 \text{ dm}^3 \quad \checkmark$$

(4)

5.6  $n(\text{H}_2\text{O}_2) = \frac{m}{M}$   
 $= \frac{17}{34} \quad \checkmark$   
 $= 0,5 \text{ mol}$

$$n = \frac{N}{N_A} \quad \checkmark$$

$$(0,5)(2) = \frac{N}{6,02 \times 10^{23}} \quad \checkmark$$

$$N = 6,02 \times 10^{23} \text{ atoms} \quad \checkmark$$

(4)

[14]

## QUESTION/VRAAG 6

6.1.1 Gas forming ✓ / *Gasvormende reaksie* ✓

(1)

6.2.1  $M(\text{Na}_2\text{CO}_3) = 2(23) + 12 + 3(16)$   
 $= 106 \text{ g} \cdot \text{mol}^{-1} \quad \checkmark$

(2)

6.2.2  $n(\text{Na}_2\text{CO}_3) = \frac{m}{M}$   
 $= \frac{10,6}{106} \quad \checkmark$   
 $= 0,1 \text{ mol} \quad \checkmark$

(2)

6.2.3  $n(\text{Na}_2\text{CO}_3) : n(\text{CO}_2)$   
 $1 : 1 \quad \checkmark$   
 Thus:  $n(\text{CO}_2) = 0,1 \text{ mol}$

$$n(\text{CO}_2) = \frac{m}{M} \quad \checkmark$$

$$0,1 = \frac{m}{44} \quad \checkmark$$

$$m = 4,4 \text{ g} \quad \checkmark$$

(4)

6.2.4

$$\begin{aligned} n(\text{CO}_2) &= \frac{V_{\text{CO}_2}}{V_m} \checkmark \\ &= \frac{4,87}{22,4} \\ &= 0,217 \text{ mol } \checkmark \end{aligned}$$

$$\begin{aligned} n(\text{CO}_2) : n(\text{NaCl}) \\ 1 : 2 \checkmark \\ n(\text{NaCl}) &= 0,434 \text{ mol} \end{aligned}$$

$$\begin{aligned} n(\text{NaCl}) &= \frac{m}{M} \checkmark \\ 0,434 &= \frac{m}{58,5} \checkmark \\ m &= 25,16 \text{ g } \checkmark \end{aligned}$$

(6)

6.3

**OPTION1/OPSIE 1:**

$$\begin{aligned} \text{Mass of H}_2\text{O} &= 14,2 - 5,3 \\ &= 8,9 \text{ g } \checkmark \end{aligned}$$

$$\begin{aligned} n(\text{Na}_2\text{CO}_3) &= \frac{m}{M} & n(\text{H}_2\text{O}) &= \frac{m}{M} \\ &= \frac{5,3}{106} \checkmark & &= \frac{8,9}{18} \checkmark \\ &= 0,05 \text{ mol} & &= 0,5 \text{ mol} \end{aligned}$$

$$\begin{aligned} \text{Na}_2\text{CO}_3 : \text{H}_2\text{O} & \checkmark \\ \frac{0,05}{0,05} : \frac{0,5}{0,05} & \\ 1 : 10 & \end{aligned}$$

$$\text{Thus } x = 10 \quad \checkmark$$



## **OPTION 2/OPSIE 2:**

Mass of H<sub>2</sub>O = 14,2 – 5,3

= 8,9g ✓

M(Na<sub>2</sub>CO<sub>3</sub>) = 160 g·mol<sup>-1</sup>      M(H<sub>2</sub>O) = 18 g·mol<sup>-1</sup>

$n(\text{Na}_2\text{CO}_3) : n(\text{H}_2\text{O})$   
 $\frac{m(\text{Na}_2\text{CO}_3)}{M(\text{Na}_2\text{CO}_3)} : \frac{m(\text{H}_2\text{O})}{M(\text{H}_2\text{O})}$  ✓

$\frac{5,3}{160} : \frac{8,9}{18}$  ✓

0,05 : 0,5

$\frac{0,05}{0,05} : \frac{0,5}{0,05}$  ✓

1 : 10

Thus x = 10 ✓

(5)  
[20]

## **QUESTION/VRAAG 7**

- 7.1 Distilled water does not contain free ions. ✓  
 Gedistilleerde water bevat geen vrye ione nie. ✓ (1)
- 7.2 Electrolyte ✓✓ / Elektroliet ✓✓ (2)
- 7.3 AgNO<sub>3</sub>(s) → Ag<sup>+</sup>(aq) ✓ + NO<sub>3</sub><sup>-</sup>(aq) ✓ (2)
- 7.4.1 The conductivity of AgNO<sub>3</sub> solution will increase with an increase in the concentration of the AgNO<sub>3</sub> solution at a constant temperature. ✓✓  
 Die geleidingsvermoë van die AgNO<sub>3</sub> oplossing sal toeneem met 'n toename in die konsentrasie van die oplossing, mits die temperatuur konstant bly. ✓✓ (2)
- 7.4.2 Conductivity ✓ / Geleidingsvermoë ✓ (1)
- 7.4.3 Concentration (of the AgNO<sub>3</sub> solution) ✓  
 Konsentrasie (van die AgNO<sub>3</sub> oplossing) ✓ (1)
- 7.4.4 Temperature ✓ / Temperatuur ✓ (1)
- 7.5 Without water ✓ / Sonder water / Watervry. ✓ (1)

7.6 Mass of  $\text{AgNO}_3 = (5,3)(2)$   
 $= 10,6\text{g}$  ✓

$$c = \frac{m}{MV} \quad \checkmark$$

$$= \frac{10,6}{106(0,2)} \quad \checkmark$$

$$= 0,5 \text{ mol} \cdot \text{dm}^{-3} \quad \checkmark \quad (4)$$

7.7 No. ✓  
 Tap water contains ions and it will affect the conductivity of the  $\text{AgNO}_3$  solution. ✓/Nee, ✓  
*Die kraanwater sal die geleidingsvermoë van die  $\text{AgNO}_3$  oplossing beïnvloed.* ✓ (2)

7.8 An increase in concentration of ions in a solution increases conductivity of a solution. ✓✓  
*Met 'n toename in konsentrasie van ione, neem die geleidingsvermoë toe.* ✓✓ (2)

7.9.1 DECREASE ✓/AFNEEM ✓ (1)

7.9.2 Silver chloride precipitate forms/ a reaction takes place ✓, thus decreasing the concentration of the ions. ✓  
*Daar vorm 'n silwerchloried neerslag/n chemiese reaksie vind plaas ✓ wat die konsentrasie van die ione laat afneem.* ✓ (2)  
**[22]**

## QUESTION/VRAAG 8

8.1  $\text{BaCl}_2$  (1)

8.2  $\text{CO}_3^{2-}(\text{aq}) + \text{BaCl}_2(\text{aq}) \checkmark \rightarrow \text{BaCO}_3(\text{s}) \checkmark + 2\text{Cl}^-(\text{aq}) \checkmark$  Bal ✓ (4)

8.3  $\text{BaCO}_3(\text{s}) + \text{HNO}_3(\text{aq}) \checkmark \rightarrow \text{Ba}(\text{NO}_3)_2(\text{aq}) + \text{CO}_2(\text{g}) \checkmark + \text{H}_2\text{O}(\text{l}) \checkmark$  Bal ✓ (4)

8.4 Barium carbonate ✓✓/Bariumkarbonaat. ✓✓ (2)  
**[11]**

## QUESTION/VRAAG 9

9.1.1 Condensation ✓/Kondensasie ✓ (1)

9.1.2 Precipitation ✓/Presipitasie ✓ (1)

9.1.3 Transpiration ✓/Transpirasie ✓ (1)

9.2 Released ✓, energy is released to the surrounding/cooling takes place/particles moves closer together. ✓  
*Vrygestel ✓, energie is vrygestel na die omgewing toe/afkoeling vind plaas/deeltjies beweeg nader aan mekaar.* ✓ (2)

- 9.3 Water absorbs the infrared energy from the sun and re-emits it therefore regulating the climate. ✓✓  
*Water absorber die infrarooi energie van die son en stel dit weer vry om klimaat te reguleer. ✓✓* (2)
- 9.4 Drilling of boreholes/Building of dams ✓✓  
*Boorgate te sink/Damme te bou ✓✓* (2)
- [9]
- TOTAL/TOTAAL: 150**

