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GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

PROVINCIAL EXAMINATION/ *PROVINSIALE EKSAMEN*

JUNE/*JUNIE* 2023

GRADE/*GRAAD* 11

MARKING GUIDELINES/*NASIENRIGLYNE*

PHYSICAL SCIENCES: CHEMISTRY/
FISIESE WETENSKAPPE: CHEMIE

PAPER/*VRAESTEL* 2

5 pages/*bladsye*

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QUESTION/*VRAAG 1*

1.1 B ✓✓ (2)

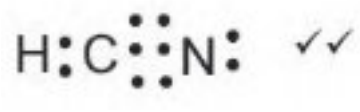
1.2 C ✓✓ (2)

1.3 D ✓✓ (2)

1.4 B ✓✓ (2)
[8]

QUESTION/*VRAAG 2*

2.1 2.1.1 The chemical bond is a mutual attraction between two atoms resulting from the simultaneous attraction between their nuclei and the outer electrons.✓✓/*Chemiese binding is die gemeenskaplike aantrekkingskrag tussen twee atome as gevolg van die gelyktydige aantrekkingskrag tussen hul kerne en buite elektrone*. ✓✓ (2)

2.1.2  ✓✓ (2)

2.1.3 Linear/*Linieêr* ✓✓ (2)

2.1.4 Polar/*Polêr* ✓ (1)

2.2 2.2.1 Bond energy is the energy needed to break one mole of its molecules into separate atoms. ✓✓/*Bindingsenergie is die energie wat nodig is om een mol van die molekules in aparte atome op te breek.* ✓✓ (2)

2.2.2 CN has a higher order bond/triple bond with more orbitals overlapping ✓ than CH, which is a single bond. ✓ Thus the CN bond needs more energy to break./*CN het 'n hoër orde binding/trippelbinding met meer orbitale wat oorvleuel*✓ *as in CH, wat 'n enkelbinding is.* ✓ *Dus neem die CN meer energie om die binding te breek.* (2)

2.2.3 CN has a longer bond length than CH ✓ because the H atom is smaller than the N atom. ✓/*CN het 'n langer bindingslengte as CH*✓ *omdat die H atom kleiner is as die N atoom*. ✓ (2)

2.2.4 Yes/*Ja* ✓ (1)

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2.2.5
- Both molecules are polar. ✓/*Beide molekules is polêr*. ✓
- HCN has dipole-dipole forces and H_2O has (dipole-dipole forces) hydrogen bonds. ✓/*HCN het dipool-dipool kragte en H_2O het (dipool-dipool) waterstofbindings*. ✓
- Like dissolves like. ✓/*Soort los soort op*. ✓

OR/*OF*

- HCN has polar molecules with dipole-dipole forces✓./HCN het polêre molekules met dipool-dipool kragte. ✓
- H_2O has polar molecules with hydrogen bonds (dipole-dipole forces). ✓/ *H_2O het polêre molekules met waterstof bindings (dipool-dipool kragte)* ✓
- If the forces are of the same order/comparable, the substances will dissolve. ✓/*Indien kragte van dieselfde orde/vergelykbaar is, dan sal die stowwe oplos.* ✓ (3)

[17]

QUESTION/*VRAAG 3*

3.1 3.1.1 D ✓ (1)

3.1.2 A ✓ (1)

3.1.3 C ✓ (1)

3.2 EF: bond length ✓/*bindingslengte* ✓
FC: bond energy ✓/*bindingsenergie* ✓ (2)

3.3 C ✓ (1)

3.4 C ✓ – lowest potential energy./*laagste potensiële energie* ✓ (2)

3.5 Attractive forces between the subatomic particles of the atoms./*Aantrekkingskrag tussen die subatomiese deeltjies van die atome*. ✓✓ (2)

[10]

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QUESTION/*VRAAG 4*

4.1

Criteria for investigative question:/ *Kriteria vir ondersoekende vraag*:	
The dependent and independent variables are stated correctly./ *Die afhanklike en onafhanklike veranderlikes is korrek gestel*.	✓
Asks a question about the relationship between dependent and independent variables./ *Vra 'n vraag oor die verband tussen die afhanklike en onafhanklike veranderlikes.*	✓

What is the relationship between the boiling point and the strength of the intermolecular forces?/*Wat is die verband tussen die kookpunt en die sterkte van die intermolelulêre kragte?* (2)

4.2 4.2.1 Liquid✓/*Vloeistof* ✓ (1)

4.2.2 The volume of liquid, atmospheric pressure. (Any one) ✓/*Die volume van die vloeistof, atmosferiese druk (Enige een)*✓ (1)

4.3 (Some) liquids are flammable. ✓/*(Sommige) vloeistowwe is vlambaar*.✓ (1)

4.4 Water or/*of* H_2O. ✓ Water has a higher boiling point. ✓/*Water het 'n hoër kookpunt.* ✓ (2)

4.5 The stronger the intermolecular force, the higher the boiling point. ✓✓/*Hoe sterker die intermolekulêre kragte, hoe hoër die kookpunt.* ✓✓ (2)

4.6 The **temperature** at which the **vapour pressure** of a substance **equals atmospheric pressure.** ✓✓/Die **temperatuur** waarby die **dampdruk** van 'n **verbinding gelyk is aan die atmosferiese druk.** ✓✓ (2)

4.7
- Acetone has dipole-dipole forces ✓, and water has hydrogen bonds. ✓/ *Asetoon het dipool-dipool kragte* ✓, *en water het waterstofbindings.* ✓
- The intermolecular forces in water are stronger than in acetone (The hydrogen bond is stronger than dipole-dipole). ✓/*Die intermolekulêre kragte in water is sterker as in asetoon (Die waterstof binding is sterker as dipool-dipool.)* ✓
- More energy is needed to overcome intermolecular forces in water/hydrogen bonding than in acetone/dipole-dipole. ✓/*Meer energie is nodig om die intermolekulêre kragte in water/waterstofbinding te oorkom as in asetoon/dipool-dipool* .✓

OR/*OF*

- The intermolecular forces in acetone are weaker than in water (dipole-dipole are weaker than hydrogen bonding). ✓/*Die intermolekulêre krag in asetoon is swakker as in water (dipool-dipool is swakker as waterstofbinding*). ✓
- Less energy is needed to overcome intermolecular forces in acetone/dipole-dipole than in water/hydrogen bonding. ✓/*Minder energie is nodig om die intermolekulêre in asetoon/dipool-dipool te oorkom as in water/watersofbinding.* ✓ (4)

[15]

TOTAL/*TOTAAL*:

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Taxonomy/*taksonomie*: Weighting of Topics/*gewig van onderwerpe*

QUESTION *VRAAG*	Atomic combinations *Atoomkombinasies*	Intermolecular forces *Intermolekulêre kragte*	Question Total *Vraagtotaal*
1	4	4	**8**
2	17		**17**
3	10		**10**
4		15	**15**
Total Mark/*Totale punt*	31	19	**50**
Actual/*Werklik*			**50**
Target/*Teiken*			**50**

	Cognitive Levels/*Kognitiewe vlakke*			
Question no: *Vraagnommer*	**Knowing Science *Wetenskap kennis***	**Understanding Science *Om Wetenskap te verstaan***	**Applying scientific knowledge *Die toepassing van wetenskaplike kennis***	**Evaluating, analysing, synthesising *Evaluering/ analisering sintetisering***
1.1	2 ✓			
1.2		2 ✓		
1.3		2 ✓		
1.4		2 ✓		
2.1.1	2 ✓			
2.1.2		2 ✓		
2.1.3		2 ✓		
2.1.4		1 ✓		
2.2.1	2 ✓			
2.2.2			2 ✓	
2.2.3			2 ✓	
2.2.4		1 ✓		
2.2.5			3 ✓	
3.1.1		1 ✓		
3.1.2		1 ✓		
3.1.3		1 ✓		
3.2		2 ✓		
3.3		1 ✓		
3.4		2 ✓		
3.5		2 ✓		
4.1		2 ✓		
4.2.1		1 ✓		
4.2.2		1 ✓		
4.3		1 ✓		
4.4			2 ✓	
4.5	2 ✓			
4.6	2 ✓			
4.7			4 ✓	
Total Mark// *Totale punt*	10	27	13	

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