

GAUTENG DEPARTMENT OF EDUCATION EKHURULENI NORTH DISTRICT NATURAL SCIENCES MID-YEAR EXAMINATION MARKING GUIDELINES JUNE 2023

GRADE 9

MARKS: 90

This marking guideline consists of 5 pages

SECTION A: SHORT QUESTIONS **QUESTION 1: MULTIPLE CHOICE**

1.1	A✓	(1)
1.2	C√	(1)
1.3	C✓	(1)
1.4	A✓	(1)
1.5	D✓	(1)
1.6	B√	(1)
1.7	D✓	(1)
1.8	B√	(1)
		[8]

QUESTION 2: TERMINOLOGY

2.1	electrons \checkmark	(1)
2.2	period √	(1)
2.3	semi-metals √	(1)
2.4	compound √	(1)
2.5	combustion ✓ (NOT oxidation)	(1)
2.6	non-metal oxide 🗸	(1)
2.7	nitrates 🗸	(1)
2.8	galvanising √	(1)
		[8]

QUESTION 3: MATCH THE COLUMNS

COLL	JMN C	
3.1	G√	(1)
3.2	C√	(1)
3.3	D✓	(1)
3.4	A✓	(1)
3.5	E√	(1)
3.6	√	(1)
3.7	H✓	(1)
3.8	F√	(1)
		[8]

TOTAL FOR SECTION A: 24

GUESTION 4 4.1 36 ✓ (1) 4.2 17 ✓ (1) 4.3 Non-metal ✓ (1) 4.4 Halogens ✓ (1) 4.5 p ⁺ = 17 e ⁻ = 17 n ⁰ = 36 - 17 = 19 ✓ correct number of protons and neutrons ✓ protons and neutrons in the nucleus ✓ correct number of electrons ✓ electrons in the correct positions around the nucleus 4.6.1 4Na ✓ + O ₂ → 2Na ₂ O ✓ (2) 4.6.2 4Fe ✓ + 3O ₂ ✓ → 2Fe ₂ O ₃ ✓ (3) 4.6.3 Pb(OH) ₂ + 2HCt ✓ → PbCt ₂ + 2H ₂ O ✓ (4) 4.6.4 2CaHta ✓ + 2SO ₂ ✓ → 16CO ₂ ✓ + 18H ₂ O ✓ (4) QUESTION 5 5.1. oxygen ✓ (3) 5.2.2 2Mg ✓ + O ₂ ✓ → 2MgO ✓ (3) 5.2.2 2Mg ✓ + O ₂ ✓ → H ₂ O ₃ ✓ (3) 6.1 sulfur dioxide ✓ + water ✓ → sulfurous acid ✓ (3) 6.2 SO ₂ ✓ + H ₂ O, ✓ → H ₂ SO ₃ ✓ (3) 6.4 Lowers the pH of the soil. ✓ Damages buildings ✓ (any 3 logical answers) (3)	SECT	ION B: LONG QUESTIONS		
4.1 30° (1) 4.2 17° (1) 4.3 Non-metal \checkmark (1) 4.4 Halogens \checkmark (1) 4.5 $p^{z} = 17$ $e^{z} = 17$ $n^{0} = 36 - 17$ = 19 \checkmark correct number of protons and neutrons \checkmark protons and neutrons in the nucleus \checkmark correct number of electrons \checkmark protons and neutrons around the nucleus \checkmark correct number of electrons \checkmark electrons in the correct positions around the nucleus \checkmark correct number of electrons \checkmark electrons in the correct positions around the nucleus \checkmark correct number of electrons \checkmark electrons in the correct positions around the nucleus \checkmark correct number of electrons \checkmark electrons in the correct positions around the nucleus \checkmark correct number of electrons \checkmark electrons in the correct positions around the nucleus \checkmark correct number of electrons \checkmark electrons in the correct positions around the nucleus \checkmark correct number of electrons \checkmark correct number of electrons (2) (3) (3) (4) (4) (4) (4) (5) (4) (5) (4) (5) (5) (5) (6) (6) (6) (6) (6) (6) (6) (6		$26 \checkmark$		(1)
4.3 Non-metal ✓ 4.4 Halogens ✓ 4.5 p ⁺ = 17 e ⁻ = 17 n ⁰ = 36 - 17 = 19 ✓ correct number of protons and neutrons ✓ protons and neutrons in the nucleus ✓ correct number of electrons ✓ electrons in the correct positions around the nucleus 4.6.1 4Na ✓ + O ₂ → 2Na ₂ O ✓ 4.6.2 4Fe ✓ + 3O ₂ ✓ → 2Fe ₂ O ₃ ✓ 4.6.3 Pb(OH) ₂ + 2H(2 ✓ → PbCl ₂ + 2H ₂ O ✓ 4.6.4 2CaH _{1a} ✓ + 25O ₂ ✓ → 16CO ₂ ✓ + 18H ₂ O ✓ 4.6.4 2CaH _{1a} ✓ + 25O ₂ ✓ → 16CO ₂ ✓ + 18H ₂ O ✓ 6.1 sulfur dioxide ✓ + water ✓ → sulfurous acid ✓ 5.2.2 2Mg ✓ + O ₂ ✓ → 2MgO ✓ 6.3 $\bigcirc \bigcirc \bigcirc \checkmark + (\bigcirc \bigcirc \bigcirc \bigcirc (\bigcirc \bigcirc \bigcirc + (\bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc (]) (])$ 6.4 Lowers the pH of the soil. ✓ Damages buildings ✓ (any 3 logical answers) (3)	4.1	50 V 17 √		(1)
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Ho p = 17 n ⁰ = 36 - 17 = 19	4.4 4 5	$n^+ - 17$		(1)
$n^{0} = 36 - 17$ = 19	т . 5	$\rho = 17$ $\rho_{-} = 17$		
= 19 $ = 19 $ $ = 19 $ $ < correct number of protons and neutrons$		$n^0 - 36 - 17$		
$\begin{array}{c} \begin{array}{c} \begin{array}{c} \begin{array}{c} \begin{array}{c} \begin{array}{c} \begin{array}{c} \begin{array}{c} $		= 19		
4.6.14Na ✓ + O ₂ → 2Na ₂ O ✓(2)4.6.24Fe ✓ + 3O ₂ ✓ → 2Fe ₂ O ₃ ✓(2)4.6.3Pb(OH) ₂ + 2HCl ✓ → PbCl ₂ + 2H ₂ O ✓(2)4.6.42C ₈ H ₁₈ ✓ + 25O ₂ ✓ → 16CO ₂ ✓ + 18H ₂ O ✓(4) QUESTION 5 5.1.oxygen ✓5.2.22Mg ✓ + O ₂ ✓ → 2MgO ✓(3) QUESTION 6 6.1sulfur dioxide ✓ + water ✓ → sulfurous acid ✓6.2SO ₂ ✓ + H ₂ O. ✓ → H ₂ SO ₃ ✓(3) O (can be any shape)6.4Lowers the pH of the soil. ✓ Damages plants ✓ Damages buildings ✓(any 3 logical answers)(3)		✓ correct number of protons and ✓ correct number of electrons ✓ correct number of electrons ✓ correct number of electrons ✓ electrons in the correct posit	nd neutrons nucleus ions around the	(4)
4.0.1 $4 \text{Na} \vee + O_2 \rightarrow 2 \text{Na}_2 O \vee$ 4.6.2 $4 \text{Fe} \checkmark + 3O_2 \checkmark \rightarrow 2 \text{Fe}_2O_3 \checkmark$ 4.6.3 $Pb(OH)_2 + 2 \text{HC} \ell \checkmark \rightarrow PbC \ell_2 + 2 \text{H}_2O \checkmark$ 4.6.4 $2C_8 \text{H}_{18} \checkmark + 25O_2 \checkmark \rightarrow 16 \text{CO}_2 \checkmark + 18 \text{H}_2O \checkmark$ QUESTION 5 5.1. $\text{oxygen }\checkmark$ 5.2.1 magnesium $\checkmark + \text{oxygen }\checkmark \rightarrow \text{magnesium oxide }\checkmark$ 5.2.2 $2\text{Mg} \checkmark + O_2 \checkmark \rightarrow 2\text{MgO} \checkmark$ QUESTION 6 6.1 $\text{sulfur dioxide }\checkmark + \text{water }\checkmark \rightarrow \text{sulfurous acid }\checkmark$ 6.2 $SO_2 \checkmark + \text{H}_2O. \checkmark \rightarrow \text{H}_2SO_3 \checkmark$ 6.3 $\bigcirc \bigcirc \bigcirc \checkmark + \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc (\text{can be any shape})$ 6.4 Lowers the pH of the soil. \checkmark $Damages plants \checkmark$ $Damages buildings \checkmark$ (anv 3 logical answers) (3)	161			(4)
4.6.2 $4 \text{Fe} (+ 362 \vee - 362 \vee - 2 \text{Fe} 203 \vee (3)$ 4.6.3 $Pb(OH)_2 + 2HCl \checkmark \rightarrow PbCl_2 + 2H_2O \checkmark (2)$ 4.6.4 $2C_8H_{18} \checkmark + 25O_2 \checkmark \rightarrow 16CO_2 \checkmark + 18H_2O \checkmark (4)$ QUESTION 5 5.1. $oxygen \checkmark (5)$ 5.2.1 magnesium \checkmark + $oxygen \checkmark \rightarrow magnesium oxide \checkmark (3)$ 5.2.2 $2Mg \checkmark + O_2 \checkmark \rightarrow 2MgO \checkmark (3)$ QUESTION 6 6.1 $sulfur dioxide \checkmark + water \checkmark \rightarrow sulfurous acid \checkmark (3)$ 6.2 $SO_2 \checkmark + H_2O. \checkmark \rightarrow H_2SO_3 \checkmark (3)$ 6.3 $\bigcirc \bigcirc \bigcirc \checkmark + \bigoplus \bigoplus$	4.0.1	4Na \checkmark + $\bigcirc_2 \rightarrow 2$ Na ₂ $\bigcirc \checkmark$		(Z)
4.0.3 FO(01)2 + 21120 * (2) 4.6.4 $2C_8H_{18} \checkmark + 25O_2 \checkmark \rightarrow 16CO_2 \checkmark + 18H_2O \checkmark$ (4) [19] QUESTION 5 5.1. oxygen \checkmark (1) 5.2.1 magnesium $\checkmark + oxygen \checkmark \rightarrow$ magnesium oxide \checkmark (3) 5.2.2 $2Mg \checkmark + O_2 \checkmark \rightarrow 2MgO \checkmark$ (3) 5.2.2 $2Mg \checkmark + O_2 \checkmark \rightarrow 2MgO \checkmark$ (3) 6.1 sulfur dioxide $\checkmark +$ water $\checkmark \rightarrow$ sulfurous acid \checkmark (3) 6.2 $SO_2 \checkmark + H_2O. \checkmark \rightarrow H_2SO_3 \checkmark$ (3) 6.3 $\bigcirc \bigcirc \bigcirc \checkmark + \bigcirc $	4.0.2	$4Fe^{-1} + 3O2^{-1} \rightarrow 2Fe^{-1}O3^{-1}$ $Pb(OH)_{0} + 2HO1_{1} - \sum PbOl_{0} + 2H_{0}O_{1} - \sum PbOl_{0$		(3)
$\begin{array}{cccc} (f) \\ (f) \\ $	4.0.5	$2 C_{0}H_{40} \checkmark \pm 25 C_{0} \checkmark \pm 16 C C_{0} \checkmark \pm 18 H_{2} C \checkmark$		(エ) (イ)
QUESTION 5(1)5.1. $\operatorname{oxygen} \checkmark$ (1)5.2.1 $\operatorname{magnesium} \checkmark + \operatorname{oxygen} \checkmark \rightarrow \operatorname{magnesium} \operatorname{oxide} \checkmark$ (3)5.2.2 $2\operatorname{Mg} \checkmark + \operatorname{O_2} \checkmark \rightarrow 2\operatorname{MgO} \checkmark$ (3) QUESTION 6 (3)6.1 $\operatorname{sulfur} \operatorname{dioxide} \checkmark + \operatorname{water} \checkmark \rightarrow \operatorname{sulfurous} \operatorname{acid} \checkmark$ (3)6.2 $\operatorname{SO_2} \checkmark + \operatorname{H_2O} \checkmark \rightarrow \operatorname{H_2SO_3} \checkmark$ (3)6.3 $\bigcirc \bigcirc \bigcirc \checkmark + \bigoplus \bigoplus \bigoplus \checkmark$ (an be any shape)6.4 Lowers the pH of the soil. ✓ Damages plants ✓ Damages buildings ✓(any 3 logical answers)(3)	4.0.4			(+) [10]
5.1. $\operatorname{oxygen} \checkmark$ (1) 5.2.1 magnesium $\checkmark + \operatorname{oxygen} \checkmark \to \operatorname{magnesium} \operatorname{oxide} \checkmark$ (3) 5.2.2 $2\operatorname{Mg} \checkmark + \operatorname{O}_2 \checkmark \to 2\operatorname{MgO} \checkmark$ (3) QUESTION 6 6.1 sulfur dioxide $\checkmark + \operatorname{water} \checkmark \to \operatorname{sulfurous} \operatorname{acid} \checkmark$ (3) 6.2 $\operatorname{SO}_2 \checkmark + \operatorname{H}_2 \operatorname{O} \checkmark \to \operatorname{H}_2 \operatorname{SO}_3 \checkmark$ (3) 6.3 $\bigcirc_{\mathbb{C}} \bigcirc^{\checkmark} + \overset{\overset{\overset{\overset{\overset{\overset{\overset{\overset{\overset{\overset{\overset{\overset{\overset{\overset{\overset{\overset{\overset{\overset$	QUES	STION 5		[10]
5.2.1 magnesium $\checkmark + \text{oxygen }\checkmark \rightarrow \text{magnesium oxide }\checkmark$ 5.2.2 $2\text{Mg} \checkmark + \text{O}_2 \checkmark \rightarrow 2\text{MgO} \checkmark$ (3) QUESTION 6 6.1 sulfur dioxide $\checkmark + \text{water }\checkmark \rightarrow \text{sulfurous acid }\checkmark$ 6.2 $SO_2 \checkmark + \text{H}_2O. \checkmark \rightarrow \text{H}_2SO_3 \checkmark$ (3) 6.3 $\bigcirc \bigcirc \bigcirc \checkmark + \bigcirc \bigcirc + \bigcirc \bigcirc \bigcirc \bigcirc (\text{can be any shape})$ (3) 6.4 Lowers the pH of the soil. \checkmark Damages plants \checkmark Damages buildings \checkmark (any 3 logical answers) (3)	5.1.	oxygen √		(1)
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QUESTION 6 [7] 6.1 sulfur dioxide \checkmark + water $\checkmark \rightarrow$ sulfurous acid \checkmark (3) 6.2 SO ₂ \checkmark + H ₂ O. $\checkmark \rightarrow$ H ₂ SO ₃ \checkmark (3) 6.3 $\bigcirc \bigcirc \bigcirc \checkmark + \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc ($ can be any shape) (3) 6.4 Lowers the pH of the soil. \checkmark Damages plants \checkmark (any 3 logical answers) (3)	522	$2Mq \checkmark + \Omega_2 \checkmark \rightarrow 2Mq\Omega \checkmark$		(3)
QUESTION 6 6.1 sulfur dioxide $\checkmark +$ water $\checkmark \rightarrow$ sulfurous acid \checkmark (3) 6.2 SO ₂ $\checkmark +$ H ₂ O. $\checkmark \rightarrow$ H ₂ SO ₃ \checkmark (3) 6.3 $\bigcirc \bigcirc \bigcirc \checkmark + \bigcirc $	0.2.2	Zing a 1 Oz a 2 Zingo a		[7]
QUESTION 66.1sulfur dioxide $\checkmark +$ water $\checkmark \rightarrow$ sulfurous acid \checkmark (3)6.2SO ₂ $\checkmark +$ H ₂ O. $\checkmark \rightarrow$ H ₂ SO ₃ \checkmark (3)6.3 $\bigcirc \bigcirc \checkmark \checkmark + \bigcirc \bigcirc \checkmark + \bigcirc $				r. 1
6.1 sulfur dioxide $\checkmark + \text{ water } \checkmark \rightarrow \text{ sulfurous acid } \checkmark$ (3) 6.2 $SO_2 \checkmark + H_2O. \checkmark \rightarrow H_2SO_3 \checkmark$ (3) 6.3 $\bigcirc \bigcirc \checkmark \curlyvee + \bigcirc \bigcirc \circlearrowright \dashv \checkmark \circlearrowright \bigcirc \bigcirc \circlearrowright \lor \checkmark$ (can be any shape) (3) 6.4 Lowers the pH of the soil. \checkmark Damages plants \checkmark Damages buildings \checkmark (any 3 logical answers) (3)	QUES	STION 6		
6.2 $SO_2 \checkmark + H_2O. \checkmark \rightarrow H_2SO_3 \checkmark$ (3) 6.3 $O \bigcirc \checkmark + H \bigcirc H \checkmark \odot O H \checkmark$ (can be any shape) (3) 6.4 Lowers the pH of the soil. \checkmark Damages plants \checkmark (any 3 logical answers) (3)	6.1	sulfur dioxide \checkmark + water \checkmark \rightarrow sulfurous acid \checkmark		(3)
6.3 $\bigcirc \bigcirc \bigcirc \checkmark + \bigcirc $	6.2	$SO_2 \checkmark + H_2O. \checkmark \rightarrow H_2SO_3 \checkmark$		(3)
 6.4 Lowers the pH of the soil. ✓ Damages plants ✓ Damages buildings ✓ (any 3 logical answers) (3) 	6.3	$\bigcirc \bigcirc \bigcirc & \checkmark & + & \bigcirc & + & \bigcirc & + & \bigcirc & \bigcirc & \bigcirc & & & &$	be any shape)	(3)
Damages buildings ✓ (any 3 logical answers) (3)	6.4	Lowers the pH of the soil. \checkmark		
		Damages buildings ✓	(any 3 logical answers)	(3)

(any 3 logical answers) (3) **[12]**

QUESTION 7

7.1	5,5 to 6 ✓ (MUST be a range)		(5)
7.2	beetroot \checkmark ; onion \checkmark ; carrot \checkmark ; mint: lettuce	(any 3)	(3)
7.3	Beetroot ✓		(1)
7.4	Neutralise 🗸 with lime 🗸 / limestone		(2)
7.5	Base + acid $\checkmark \rightarrow$ salt + water \checkmark		(2)
7.6	Ca(OH)₂ ✓		(1)
7.7.1	blue 🗸		(1)
7.7.2	yellow √		(1)
7.7.3	green 🗸		(1)
			[13]

QUESTION 8

8.1	To identify which power station in South Africa ✓ produces the largest a	mount of	
	carbon dioxide and sulfur dioxide \checkmark . (an	y similar)	(2)
8.2.1	Power stations (name) √		(1)

- Amount of carbon dioxide and sulfur dioxide \checkmark / amount of coal burnt (1) (1) (1) 8.2.2
- 8.3 Arnot √
- Calculations 8.4

$$Kelvin = \frac{4}{100} \times 360^{\circ}$$

$$= 14^{\circ}$$
Bloemfontein
$$= \frac{4}{100} \times 360^{\circ}$$

$$= 14^{\circ}$$
Kusile
$$= \frac{16}{100} \times 360^{\circ}$$

$$= 58^{\circ}$$
Komati
$$= \frac{19}{100} \times 360^{\circ}$$

$$= 68^{\circ}$$
Kendal
$$= \frac{27}{100} \times 360^{\circ}$$

$$= 97^{\circ}$$
Kelvin
$$= \frac{30}{100} \times 360^{\circ}$$

$$= 108^{\circ}$$



Pie chart to show the amount of coal burnt (%) at various Power Stations (names) in South Africa

Criteria	Elaboration	Mark
Calculations (C)	1 – 2 correct (1 mark only) no units, no marks 3 – 5 Some correct (2 marks only)	3
	All 6 correct (3 marks total)	_
Heading (H)	(Pie Chart with amount of coal burnt (%) \checkmark)	2
rieduling (ri)	(Power Stations (names) \checkmark) no units, no marks	
Pie chart (P)	Drawn with a pencil, compass, ruler and protractor \checkmark	
	1 – 2 correct (1 mark only)	
Sectors (S)	3 – 5 Some correct (2 marks only)	3
	All correct (3 marks total)	
Key (K)	Key (K) Names under key and values (with unit) on chart \checkmark	
Total		10

[15]

TOTAL FOR SECTION B: 66

GRAND TOTAL: 90