



**NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY**

**FACULTY OF HEALTH, NATURAL RESOURCES AND APPLIED SCIENCES
SCHOOL OF AGRICULTURE AND NATURAL RESOURCES SCIENCES
DEPARTMENT OF AGRICULTURAL SCIENCE AND AGRIBUSINESS**

QUALIFICATIONS: BACHELOR OF SCIENCE IN AGRICULTURE BACHELOR OF SCIENCE IN HORTICULTURE	
QUALIFICATIONS CODE: 07BAGA 07BHOR	LEVEL: NQF LEVEL 7
COURSE CODE: ICA511S	COURSE NAME: INTRODUCTION TO CHEMISTRY
DATE: JULY 2025	SESSION: JULY
DURATION: 3 HOURS	MARKS: 100

SECOND OPPORTUNITY EXAMINATION QUESTION PAPER	
EXAMINER:	MS. PAULINA NDINELAGO NAUPU
MODERATOR:	MRS. LUCIA TUYENI-KELAO KAFIDI

INSTRUCTIONS
<ol style="list-style-type: none">1. Answer all the questions.2. Write neatly and clearly.3. Mark all answers clearly with their respective question numbers.4. All written work MUST be done in blue or black ink.5. No books, notes and other additional aids are allowed.

PERMISSIBLE MATERIALS

1. Calculator
2. Examination paper
3. Examination script

**THIS MARKING SCHEME CONSISTS OF 3 PAGES
(Excluding This Front Page)**

QUESTION 1

Define the following terms

- | | | |
|-----|-----------------------|-----|
| 1.1 | Substance | {2} |
| 1.2 | Heterogeneous mixture | {2} |
| 1.3 | Paper chromatography | {2} |
| 1.4 | Centrifugation | {2} |
| 1.5 | Precision | {2} |
| 1.6 | Significant figure | {2} |

[12]**QUESTION 2**

For each of the following, identify it as either an ionic or a molecular compound. For ionic, indicate the charges of each element.

- | | | |
|-----|---|-----|
| 2.1 | H ₂ O | {2} |
| 2.2 | MgCl ₂ | {2} |
| 2.3 | CO ₂ | {2} |
| 2.4 | Fe ₂ O ₃ | {2} |
| 2.5 | Sr(OH) ₂ | {2} |
| 2.6 | C ₆ H ₁₂ O ₆ | {2} |

[12]**QUESTION 3**

Give the correct name for the following ions:

- | | | |
|-----|-------------------------------|-----|
| 3.1 | Fe ³⁺ | {2} |
| 3.2 | SO ₄ ²⁻ | {2} |
| 3.3 | Cu ₂ ⁺ | {2} |
| 3.4 | NO ₃ ⁻ | {2} |
| 3.5 | NH ₄ ⁺ | {2} |

[10]**QUESTION 4**

Write the chemical formula for the following compounds

- | | | |
|-----|------------------------|-----|
| 4.1 | Magnesium chloride | {2} |
| 4.2 | Aluminum sulfate | {2} |
| 4.3 | Ammonium phosphate | {2} |
| 4.4 | Copper (II) nitrate | {2} |
| 4.5 | Potassium permanganate | {2} |

[10]**QUESTION 5**

5.1 Arrange the following elements in order of increasing atomic radius: K, Li, Cs, Na.

Explain your reasoning. {3}

]5.2 Which element has a higher first ionization energy, oxygen (O) or sulfur (S)?

Justify your answer. {3}

5.3 Why is fluorine (F) more reactive than iodine (I) in terms of periodic trends?

{3}

[9]

QUESTION 6

- 6.1 Consider copper (II) bromide CuBr_2 , calculate the percentage of copper and bromide {6}
- 6.2 What mass of oxygen gas is required to completely react with 25.0 grams of iron to produce iron (III) oxide, Fe_2O_3 according to the following balanced equation:
 $4\text{Fe} + 3\text{O}_2 \rightarrow 2\text{Fe}_2\text{O}_3$? {7}
- [13]**

QUESTION 7

2 moles of propane react with 8 moles of oxygen gas in a combustion reaction in the following equation: $1\text{C}_3\text{H}_8 + 5\text{O}_2 \rightarrow 3\text{CO}_2 + 4\text{H}_2\text{O}$.

- 7.1 What is the limiting reactant {7}
- 7.2 How many moles of carbon dioxide are formed {4}
- 7.3 How much of the excess reactant is left over? {6}
- [17]**

QUESTION 8

- 8.1 What is the molarity of a solution that contains 0.25 moles of glucose dissolved in 500 mL of water? {4}
- 8.2 How many milliliters of a 1.5 M solution of hydrochloric acid are needed to prepare 500mL of a 0.25 M solution? {4}
- 8.3 How many mL of 2.0M H_2SO_4 are needed to make 400mL of 0.11M H_2SO_4 . {4}
- 8.4 What is the mass of 0.30 moles $\text{Mg}(\text{NO}_3)_2$ {5}
- [17]**

Total Marks: 100

PERIODIC TABLE OF THE ELEMENTS

1																	18
1 H 1.00794																	2 He 4.00260
3 Li 6.941	4 Be 9.01218											5 B 10.81	6 C 12.011	7 N 14.0067	8 O 15.9994	9 F 18.9984	10 Ne 20.179
11 Na 22.9898	12 Mg 24.305											13 Al 26.9815	14 Si 28.0855	15 P 30.9738	16 S 32.06	17 Cl 35.453	18 Ar 39.948
19 K 39.0983	20 Ca 40.08	21 Sc 44.9559	22 Ti 47.88	23 V 50.9415	24 Cr 51.996	25 Mn 54.9380	26 Fe 55.847	27 Co 58.9332	28 Ni 58.69	29 Cu 63.546	30 Zn 65.38	31 Ga 69.72	32 Ge 72.59	33 As 74.9216	34 Se 78.96	35 Br 79.904	36 Kr 83.8
37 Rb 85.4678	38 Sr 87.62	39 Y 88.9059	40 Zr 91.22	41 Nb 92.9064	42 Mo 95.94	43 Tc (98)	44 Ru 101.07	45 Rh 102.906	46 Pd 106.42	47 Ag 107.868	48 Cd 112.41	49 In 114.82	50 Sn 118.69	51 Sb 121.75	52 Te 127.6	53 I 126.9	54 Xe 131.29
55 Cs 132.905	56 Ba 137.33	71 Lu 174.967	72 Hf 178.49	73 Ta 180.948	74 W 183.85	75 Re 186.207	76 Os 190.2	77 Ir 192.22	78 Pt 195.08	79 Au 196.967	80 Hg 200.59	81 Tl 204.383	82 Pb 207.2	83 Bi 208.908	84 Po (209)	85 At (210)	86 Rn (222)
87 Fr (223)	88 Ra 226.025	103 Lr (260)	104 Rf (261)	105 Db (262)	106 Sg (263)	107 Bh (264)	108 Hs (265)	109 Mt (268)	110 Uun (269)	111 Uuu (272)	112 Uub (269)		114 Uuq		116 Uuh		118 Uuo

3

Lanthanides:

57 La 138.906	58 Ce 140.12	59 Pr 140.908	60 Nd 144.24	61 Pm (145)	62 Sm 150.36	63 Eu 151.96	64 Gd 157.25	65 Tb 158.925	66 Dy 162.50	67 Ho 161.930	68 Er 167.26	69 Tm 166.934	70 Yb 173.04
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Actinides:

89 Ac 227.028	90 Th 232.038	91 Pa 231.036	92 U 238.029	93 Np 237.048	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 (259)
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