nAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY

FACULTY OF HEALTH, APPLIED SCIENCES AND NATURAL RESOURCES

Department of Agriculture and Natural Resources Sciences

QUALIFICATIONS: BACHELOR OF AGRICULTURE	
BACHELOR OF HORTICULTURE	
QUALIFICATIONS CODE: 07BAGA & 07BHOR	LEVEL: NQF LEVEL 5
COURSE CODE: ICA511S	COURSE NAME: INTRODUCTION TO CHEMISTRY
DATE: JULY 2022	SESSION: JULY
DURATION: 3 HOURS	MARKS: 120

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

INSTRUCTIONS
1. Answer all questions
2. Type clearly and neatly
3. Number the answers clearly
4. Report all your answers to the correct significant figures

PERMISSIBLE MATERIALS
1. Scientific calculator

ATTACHMENT:
1. Periodic Table

THIS QUESTION PAPER CONSISTS OF 4 PAGES *(Excluding this front page)*

QUESTION 1

State three classification of matter and define them: **[6]**

QUESTION 2

a) How many mL of 2.0M H_2SO_4 are needed to make 400mL of 0.11M H_2SO_4.

[4]

b) 24.6 mL of a 0.50M monoprotic acid solution was titrated with a 0.18M NaOH solution. What is the volume of NaOH that should be added to the solution in order to reach the equivalence point?   **[4]**

c) Suppose you want to prepare 250.0 mL (that is, 0.2500 L) of 0.100 M $CuSO_4$ solution by diluting a 1.00 M $CuSO_4$ stock solution. What volume of $CuSO_4$ do you need?

{4}

QUESTION 3

a) What is the mass in grams of 4.30 moles of Aluminum?   **[3]**

b) How many moles in 127.5 grams of sodium chloride?   **[3]**

c) How many moles are in 32.7 grams of ethanol (C_2H_6O)   **[4]**

QUESTION 4

a) Calculate the molarity of a solution prepared by dissolving 9.8 moles of solid NaOH in enough water to make 3.62 L of solution. What does your answer tells you?

[5]

b) You dissolve 152.5 g of CuCl2 in water to make a solution with a final volume of 2.25 L. What is its molarity?   **[6]**

QUESTION 5
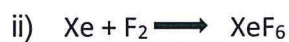
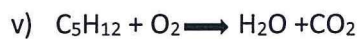a) Name the formula of each of the following acids   [6]

    i) Hydrosulfuric acid

    ii) Iron (III) hydroxide

    iii) Hydrophosphoric acid

b) Balance the following chemical equations   [8]

    i) $C + SO_2 \longrightarrow CS_2 + CO$

    ii) $Xe + F_2 \longrightarrow XeF_6$

    iii) $Ag + H_2S \longrightarrow Ag_2S + H_2$

    iv) $FeCl_3 + NaOH \longrightarrow Fe(OH)_3 + NaCl$

c) Indicate the type of each of the following chemical reactions   [5]

    i) $2Na + Cl_2 \longrightarrow 2NaCl$

    ii) $H_2CO_3 \longrightarrow H_2O + CO_2$

    iii) $2KCl \longrightarrow 2K + Cl_2$

    iv) $S + O_2 \longrightarrow SO_2$

    v) $C_5H_{12} + O_2 \longrightarrow H_2O + CO_2$

QUESTION 6

30g of C_3H_8 burns in air to produce 70g of CO_2. $C3H8 + 5O_2 \longrightarrow 3\ CO_2 + 4H_2O$ **[10]**

   a) Calculate the theoretical yield   {7}

   b) Calculate the percent yield   {3}

QUESTION 7

Bicarbonate of soda (sodium hydrogen carbonate) is used in many commercial preparations. Its formula is $NaHCO_3$. Find the mass percentages (mass %) of Na, H, C, and O in sodium hydrogen carbonate.   **[10]**

QUESTION 8

   a) Determine the molecular formula of a compound with the empirical formula CF_2 and a molar mass of 200 g/mol   [6]

   b) A compound has empirical formula C_2H_5N and molar mass 86 g/mol. What is its molecular formula?   [6]

QUESTION 9

Consider the following equation: $2H_2S + 3O_2 \longrightarrow 2SO_2 + 2H_2O$ **[15]**

    a) How many moles of O_2 are needed to combine with 8.4 moles of H_2S

                                                                                              {5}

    b) Starting with 9.2 moles of O_2,

        i) How many moles of H_2S will you need?   {5}

        ii) How many moles of SO_2 will you get?   {5}

QUESTION 10

3.2 moles of N_2 reacts with 5.4 moles H_2 in the following chemical reaction:

$N_2 + 3H_2 \longrightarrow 2NH_3$.   **[15]**

    a) What is the limiting reactant   {5}

    b) How many moles of ammonia are formed   {5}

    c) How much of the excess reactant is left over?   {5}

Total Marks: **120**

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Periodic Table of the Elements

1																	18
1 H 1.01	**2**											**13**	**14**	**15**	**16**	**17**	**2** He 4.00
3 Li 6.94	**4** Be 9.01											**5** B 10.81	**6** C 12.01	**7** N 14.01	**8** O 16.00	**9** F 19.00	**10** Ne 20.18
11 Na 22.99	**12** Mg 24.31	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13** Al 26.98	**14** Si 28.09	**15** P 30.97	**16** S 32.07	**17** Cl 35.45	**18** Ar 39.95
19 K 39.10	**20** Ca 40.08	**21** Sc 44.96	**22** Ti 47.87	**23** V 50.94	**24** Cr 51.99	**25** Mn 54.94	**26** Fe 55.85	**27** Co 58.93	**28** Ni 58.69	**29** Cu 63.55	**30** Zn 65.38	**31** Ga 69.72	**32** Ge 72.63	**33** As 74.92	**34** Se 78.97	**35** Br 79.90	**36** Kr 84.80
37 Rb 84.47	**38** Sr 87.62	**39** Y 88.91	**40** Zr 91.22	**41** Nb 92.91	**42** Mo 95.95	**43** Tc 98.91	**44** Ru 101.07	**45** Rh 102.91	**46** Pd 106.42	**47** Ag 107.87	**48** Cd 112.41	**49** In 114.82	**50** Sn 118.71	**51** Sb 121.76	**52** Te 127.6	**53** I 126.90	**54** Xe 131.25
55 Cs 132.91	**56** Ba 137.33	**57-71**	**72** Hf 178.49	**73** Ta 180.95	**74** W 183.84	**75** Re 186.21	**76** Os 190.23	**77** Ir 192.22	**78** Pt 195.09	**79** Au 196.97	**80** Hg 200.59	**81** Tl 204.38	**82** Pb 207.2	**83** Bi 208.98	**84** Po [208.98]	**85** At 209.99	**86** Rn 222.02
87 Fr 223.02	**88** Ra 226.03	**89-103**	**104** Rf [261]	**105** Db [262]	**106** Sg [266]	**107** Bh [264]	**108** Hs [269]	**109** Mt [268]	**110** Ds [269]	**111** Rg [272]	**112** Cn [277]	**113** Uut unknown	**114** Fl [289]	**115** Uup unknown	**116** Lv [298]	**117** Uus unknown	**118** Uuo unknown

57 La 138.91	**58** Ce 140.12	**59** Pr 140.91	**60** Nd 144.24	**61** Pm 144.91	**62** Sm 150.36	**63** Eu 151.96	**64** Gd 157.25	**65** Tb 158.93	**66** Dy 162.50	**67** Ho 164.93	**68** Er 167.26	**69** Tm 168.93	**70** Yb 173.06	**71** Lu 174.97
89 Ac 227.03	**90** Th 232.04	**91** Pa 231.04	**92** U 238.03	**93** Np 237.05	**94** Pu 244.06	**95** Am 243.06	**96** Cm 247.07	**97** Bk 247.07	**98** Cf 251.08	**99** Es [254]	**100** Fm 257.10	**101** Md 258.1	**102** No 259.10	**103** Lr [262]

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